

Eleventh International Conference on
**Climate Change:
Impacts & Responses**

Coastal Resilience

16–17 April 2019
Pryzbyla Center,
The Catholic University of America
Washington, D.C., USA

ON-CLIMATE.COM

FACEBOOK.COM/ONCLIMATE

[@ONCLIMATE](https://twitter.com/ONCLIMATE) - [#CCIR19](https://twitter.com/CCIR19)

Eleventh International Conference on
Climate Change: Impacts & Responses

“Coastal Resilience”

16–17 April 2019 | Pryzbyla Center, The Catholic University of America | Washington, D.C., USA



www.on-climate.com

www.facebook.com/OnClimate

@onclimate | #CCIR19

Eleventh International Conference on Climate Change: Impacts & Responses
www.on-climate.com

First published in 2019 in Champaign, Illinois, USA
by Common Ground Research Networks, NFP
www.cgnetworks.org

© 2019 Common Ground Research Networks

All rights reserved. Apart from fair dealing for the purpose of study, research, criticism, or review as permitted under the applicable copyright legislation, no part of this work may be reproduced by any process without written permission from the publisher. For permissions and other inquiries, please contact support@cgnetworks.org.

Common Ground Research Networks may at times take pictures of plenary sessions, presentation rooms, and conference activities which may be used on Common Ground's various social media sites or websites. By attending this conference, you consent and hereby grant permission to Common Ground to use pictures which may contain your appearance at this event.

Designed by Ebony Jackson and Brittani Musgrove



Welcome Letter - The Catholic University of America.....	1
Welcome Letter - Common Ground Research Networks.....	3
About Common Ground	5
Climate Change: Impacts & Responses Research Network	
About the Climate Change: Impacts & Responses Research Network.....	9
Themes	10
Scope and Concerns.....	12
The International Advisory Board	14
Scholar.....	15
Climate Change: Impacts & Responses Journal	
About the Journal	19
Article Submission Process and Timeline.....	20
Common Ground Open.....	23
International Award for Excellence	24
Subscriptions and Access	25
Climate Change: Impacts & Responses Book Imprint	
About the Book Imprint.....	29
Climate Change: Impacts & Responses Conference	
About the Climate Change: Impacts & Responses Conference	33
Ways of Speaking	36
Daily Schedule	38
Conference Highlights.....	40
Plenary Speakers.....	42
Emerging Scholars.....	44
Schedule of Sessions	46
List of Participants.....	70
Notes.....	73
Conference Calendar	80

Engineering Center for Care of Earth



Dear Climate Change: Impacts & Responses Conference Participants,

I am delighted to welcome you to our beautiful campus in Washington, DC. The Catholic University of America has long served our nation's capital as an institution in search of truth, dedicated to conscious innovation in an engaging learning environment. As the Director of the Engineering Center for Care of Earth (ECCE), I am excited to be hosting the Eleventh International Conference on Climate Change: Impacts & Responses on our campus, and sharing ECCE's Second International Workshop on Challenges of Climate Change, as showcased in the Special Focus Session in this year's conference.

ECCE was established in 2016 in response to Pope Francis' visit of our campus in September 2015. That same year Pope Francis wrote the encyclical, "Laudato Si," an indictment of the world's failure to protect the environment and a call to action. The first answer of ECCE to this call was to host the First International Workshop on the Challenges of Climate Change on our campus on November 16, 2017. This event brought together experts and scientists to share ideas and strategies to protect our "common home." We continue our commitment to this cause, with this year's conference, which has now expanded to two days of parallel sessions covering a diverse set of topics from engineering to policy, economics, and ethics.

We need everyone involved in this issue; not just prominent scientists, engineers, and leaders who you will meet at our Special Focus Session. It is a matter that affects us all. Especially at Catholic University, it is our responsibility as our tradition is ethical and responsible thinking to generate solutions for the well-being of humanity.

We hope that you will find the conference energizing, invigorating, and compelling to take action within your expertise and interests after our event. We have four plenary speakers, along with eight prominent expert speakers in our workshop who will address this issue from the multiple perspectives that it deserves. We will be concluding with a panel discussion for our future direction so we will all leave the event armed with optimism and determination to bring solutions to this global challenge whether it is with taking steps in our basic daily activities to reduce our carbon footprint, or engaging in innovative research, business, and legislative initiatives.

I welcome you to join us with your ideas, feedback, and knowledge to help us confront this global challenge with optimism. This event was certainly a fruit of help of many extremely busy, but genuinely caring, people who give this topic utmost priority. I especially thank the Technical Program Committee members from industry and academia, who were instrumental in recruiting all plenary and workshop speakers as well as the panelists in addition to planning the event logistics. Special thanks to Università Politecnica delle Marche, Ancona, Italy, which has been a strong partner with Catholic University of America for our annual workshop series on this topic since its inception.

On behalf of ECCE, I hope that you will find the conference rewarding and empowering. I wish you all the best, and I look forward to collaborating with you all to make our home a better place for future generations.

Best wishes,

A handwritten signature in cursive script that reads "O. Kilic".

Prof. Ozlem Kilic, Associate Dean of Engineering
The Catholic University of America
Washington, DC



Dear Climate Change: Impacts & Responses Conference Delegates,

Welcome to Washington D.C. and to the Eleventh International Conference on Climate Change: Impacts & Responses. My colleagues and I from Common Ground Research Networks are honored to have you join us for this year's conference.

Over the course of three and a half decades, Common Ground has given voice to many thousands of scholars—speakers and authors with things to say about the world and who are saying them in order to change the world.

Common Ground has a strong commitment to providing opportunities for people like you to meet, share, and learn from each other. Across its range of research networks, Common Ground is deeply concerned with the critical issues of our time including, among other things, the nature of social change, the relationships of the human species to nature, the process of knowledge creation, the changing shape of organizations, and the dynamics of learning. These raise big-picture questions which in turn demand an interdisciplinary perspective, something that is often neglected in discipline-based conference, journal, and institutional structures.

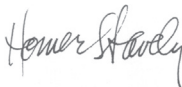
Throughout its history, Common Ground has worked to develop new approaches to knowledge community building, including interactive conference formats, criterion-referenced peer review, and online social knowledge media. As a media innovator, we are creating the spaces and technical conditions in which, collectively, we can explore the meaning and purpose of design.

While conference inspiration may fade with time, Common Ground offers a means for keeping inspiration alive through CG Scholar, an online environment for knowledge working and learning. We encourage all conference participants to explore CG Scholar—an internet venue for intellectual interaction and imagination.

I am grateful to all of you for sharing your work at this conference. I would like to thank our Conference Partner, Dr. Ozlem Kilic, her committee, and the Catholic University of America for their instrumental work on various aspects of the 2019 Conference, especially the Special Focus Session. Additionally, I thank my colleagues Michele Hill, Kimberly Kendall, and McCall Macomber, who have helped organize and produce this meeting with great dedication and expertise.

We wish you all the best for this conference, and we hope it will provide you every opportunity for dialogue with colleagues from around the corner and around the globe.

Best wishes,



Homer Stavelly
Common Ground Research Networks



COMMON GROUND

Founded in 1984, we are committed to building new kinds of knowledge communities, innovative in their media and forward thinking in their messages.



Heritage knowledge systems are characterized by vertical separations—of discipline, professional association, institution, and country. Common Ground Research Networks takes some of the pivotal challenges of our time and curates research networks which cut horizontally across legacy knowledge structures. Sustainability, diversity, learning, the future of humanities, the nature of interdisciplinarity, the place of the arts in society, technology's connections with knowledge, the changing role of the university—these are deeply important questions of our time which require interdisciplinary thinking, global conversations, and cross-institutional intellectual collaborations.

Common Ground Research Networks are meeting places for people, ideas, and dialogue. However, the strength of ideas does not come from finding common denominators. Rather, the power and resilience of these ideas is that they are presented and tested in a shared space where differences can meet and safely connect—differences of perspective, experience, knowledge base, methodology, geographical or cultural origins, and institutional affiliation. These are the kinds of vigorous and sympathetic academic milieu in which the most productive deliberations about the future can be held. We strive to create places of intellectual interaction and imagination that our future deserves.

Common Ground Research Networks offer integrated programs of action: international conferences, scholarly journals, book imprints, and online dialogue spaces using our path-breaking social knowledge software, CGScholar.com

 Aging & Social Change Research Network	 The Arts in Society Research Network	 Books, Publishing & Libraries Research Network	 Climate Change: Impacts & Responses Research Network
 Communication and Media Studies Research Network	 Constructed Environment Research Network	 Design Principles & Practices Research Network	 Diversity in Organizations, Communities & Nations Research Network
 e-Learning & Innovative Pedagogies Research Network	 Food Studies Research Network	 Global Studies Research Network	 Health, Wellness & Society Research Network
 The Image Research Network	 The Inclusive Museum Research Network	 Interdisciplinary Social Sciences Research Network	 The Learner Research Network
 New Directions in the Humanities Research Network	 On Sustainability Research Network	 Organization Studies Research Network	 Religion in Society Research Network
 Spaces & Flows Research Network	 Sports & Society Research Network	 Technology, Knowledge & Society Research Network	 Tourism and Leisure Research Network

University of Illinois Research Park
2001 South First Street, Suite 202
Champaign, IL 61820 USA

Ph: +1-217-328-0405
Fax: +1-217-328-0435
Web: cgnetworks.org

Common Ground Research Networks

Common Ground Research Networks

CGRResearchNetworks

CGRNetworks

cggscholar



Common Ground Research Networks is a not-for-profit corporation registered in the State of Illinois, USA, organized and operated pursuant to the General Not For Profit Corporation Act of 1986, 805 ILCS 105/101.01, et seq., (the "Act") or the corresponding section of any future Act.

Climate Change: Impacts & Responses Research Network

*Exploring scientific, policy, and strategic perspectives on
the impacts of, and responses to, climate change*



Founded in 2009, the Climate Change: Impacts & Responses Research Network fosters the discussion of climate change, its causes, its eco-systemic impacts, and its human impacts.

Conference

The annual conference is built upon three key features: Internationalism, Interdisciplinarity, and Inclusiveness. Conference delegates include leaders in the field, as well as emerging artists and scholars, who travel to the conference from all corners of the globe and represent a broad range of disciplines and perspectives. A variety of presentation options and session types offer delegates multiple opportunities to engage, to discuss key issues in the field, and to build relationships with scholars from other cultures and disciplines. You have already begun your engagement in the Climate Change: Impacts & Responses Research Network by attending the conference, presenting your work, and interacting face-to-face with other members. We hope this experience provides a valuable source of feedback for your current work and the possible seeds for future individual and collaborative projects, as well as the start of a conversation with research network colleagues that will continue well into the future.

Publishing

The Research Network enables members to publish through two media. First, network members can enter a world of journal publication, unlike the traditional academic publishing forums—a result of the responsive, non-hierarchical, and constructive nature of our member based peer review process. *The International Journal of Climate Change: Impacts and Responses* provides a framework for member based double-blind peer review, enabling authors to publish into an academic journal of the highest standard, but also to participate in the validation of knowledge that is produced by the network. The second publication medium is through the Climate Change Book Imprint, where we publishing cutting edge books in print and electronic formats.

We encourage you to submit an article for review and possible publication in the collection. In this way, you may share the finished outcome of your presentation with other participants and members of the network. As a member, you will also be invited to review others' work and contribute to the development of the research network knowledge base as a Reviewer. As part of your active membership in the network, you also have online access to the complete works (current and previous volumes) of journal and to the book imprint. We also invite you to consider submitting a proposal for the book imprint.

Membership

As a Research Network member you have access to a broad range of benefits, tools, and resources:

- Digital subscription to *The International Journal of Climate Change: Impacts and Responses* for one year.
- Digital subscription to the book imprint for one year.
- One article publication per year (pending peer review).
- Participation as a reviewer in the peer review process, with the opportunity to be listed as a Reviewer.
- Subscription to the e-newsletter, providing access to news and announcements for and from the Research Network.
- Option to add a video presentation to the research network YouTube channel.
- Free access to the Scholar social knowledge platform, including:
 - ◊ Personal profile and publication portfolio page;
 - ◊ Ability to interact and form communities with peers away from the clutter and commercialism of other social media;
 - ◊ Optional feeds to Facebook and Twitter;
 - ◊ Complimentary use of Scholar in your classes—for class interactions in its Community space, multimodal student writing in its Creator space, and managing student peer review, assessment, and sharing of published work.





What is evidence is there of climate change?

Theme 1: Scientific Evidence

- Paleoclimatology: the earth's climate in a long view
- Climate change today: examining the data
- Ice cap reduction and glacial melt
- Sea level change
- Floods, drought, forest fires, hurricanes, and other sporadic events
- Albedo or measuring the earth's reflectiveness
- Meteorology and climate informatics
- Equilibria and disequilibria: change processes and countervailing tendencies
- Climate measurement processes, methodologies, and technologies
- Reading complex, dynamic, and unstable systems
- Developing local and global climate models
- Change scenarios: slow, rapid, abrupt, or episodic

What are the impacts of climate change on natural environments?

Theme 2: Assessing Impacts in Divergent Ecosystems

- Ocean currents and el Niño
- Riverine ecosystem impacts
- Mountain ecosystem impacts
- Coastal ecosystem impacts
- Marine ecosystem impacts
- Forest and grassland ecosystem impacts
- Impacts on wilderness and protected areas
- Impacts on specific biomes
- Impacts on biodiversity, potential extinctions
- Hardiness zone migration
- Regional variations: temperature and rainfall



What evidence is there that human activity has contributed to climate change, and what are the impacts of climate change on human life?

How do scientists, technologies, policy makers, and community members respond to climate change?

Theme 3: Human Impacts and Impacts on Humans

- Anthropogenic factors in climate change: determining the relative contribution of natural and human causes
- Impacts of carbon dioxide and other greenhouse gases
- Land use patterns, agriculture, and livestock husbandry and deforestation as factors in climate change
- Impacts on humans: agriculture, fish stocks, food supply, health
- Human settlements and sea level rise
- Impacts on humans: water supply, desertification
- Impacts on humans of intense weather events, natural disasters, and ecological surprises
- Impacts of climate change in the developing world

Theme 4: Technical, Political, and Social Responses

- Environmental policies in response to climate change
- Controversy and denial: politics, the media, and scientists with dissenting views
- The international politics of climate change
- The past, present, and future of international agreements
- Education and awareness for management of global climate change
- Protected areas and preservation of biodiversity: “corridorizing” and other strategies
- Strategies for sustainability
- Human adaptive strategies
- Technologies of mitigation: carbon dioxide sequestration, solar shades, and other processes
- Alternative and renewable energy sources: technologies, policies, and strategies
- Carbon taxes, offsets, and trading
- Emission standards
- Climate ethics and the precautionary principle
- Eco-development, eco-efficiency





Climate Change: The Evidence

What is to be done?

Climate is one of the pivotal and dynamic forces in the natural history of the earth. Paleoclimatology provides us a long view of the ebb and flow of climate change, and a framework within which to interpret its ecosystemic consequences. In some times and places climate change explains processes of biodiversification, in other times and places a reduction in biodiversity. In this long view, the history of life on earth is integrally related to climatological history.

For the first time in natural history, the conscious actions of one creature—homo sapiens—have come to influence the course of earth's natural history, not just in local ecosystems, but on a planetary scale. This has been the case since humans began a process of populating the whole earth about one hundred thousand years ago. Ecosystems were revolutionized by the sustained yield harvesting technologies of hunters and gatherers, then the farming and animal husbandry technologies of self-sufficient peasantries, and most recently and most intensively by the global division of labor of the industrial revolution, market-directed agriculture, the widespread clearing and harvesting of forests, and the use of fossil fuels.

It is now widely accepted that the most recent phase of human society has had an impact on the earth's climate. Greenhouse gases are heating up the earth. Ice that was permanent until recently is rapidly melting. Sea levels are rising. Extreme weather events are occurring with greater frequency. Different regions are affected by these changes in different ways.

Some of the changes we are experiencing today may be part of the course of natural history. Other changes, many scientists agree, are the byproduct of human activity. Key questions include: How do we measure and explain these changes? What are their immediate and likely future impacts? And what is to be done? These are questions of practical concern and growing urgency.

Ecosystemic Impacts

What are the impacts on ecosystems, communities, species and genetic diversity?

There is today the potential for disastrous impacts on ecosystems, communities, species, and genetic diversity that could well lead to mass extinctions in a relatively brief period. For instance, the special effects of glacial melt on mountain and riverine biodiversity and that of sea level rise on coastal and mangrove systems raise concerns for the future of biodiversity. The effect of climate change on coral reefs is already a major concern. Increased rainfall variability (in especially monsoon regions) could dry up or expand wetlands temporarily which in both scenarios would be disastrous.

The most affected ecosystems will undoubtedly be situated in mountains, forests (especially evergreen types), grasslands, deserts, and wetlands. Glacial, riverine, and coastal ecosystems will also be altered. Knowledge currently available by simulating possible changes in Dynamic Global Vegetation models clearly demonstrates that there will be further species loss. Many species ill-adapted to environmental disturbances may vanish without a trace before scientists can detect decline.

The specific regional impacts on biomes and the vulnerabilities of different ecosystems across the globe need to be assessed. There are parallels between some areas, while there are subtle and complex dissimilarities between the changes that are occurring in different parts of the world. These include floods, drought, forest fires, hurricanes, and other sporadic events that could devastate endemic species and threaten microhabitats.



Some ecosystems could be highly vulnerable and will not be able to respond even to short term impacts such as natural disasters. In the presence of climate change, these short term events could be even more cataclysmic. The possible impacts of invasive alien species that will spread due to climatic change are very little understood and could be devastating.

The possibility of “ecological surprises” in sensitive areas also needs to be addressed. Extreme weather events could be especially damaging. Thus, there is a great need for scientists and practitioners to be brought on a common platform that will at least reduce the ill effects on species ecosystems and protected areas.

Human Impacts

How have we been agents of climate change? How will we be impacted by climate change?

Humans are agents in climate change due to their production of greenhouse gases and their patterns of land use. Humans will also be affected by climate change in many ways: including shifting shorelines, declining agricultural productivity, crisis of food supply, availability of water, the health of populations, and extreme weather events. For instance, environment related diseases could spread rapidly in epidemic proportions with changes in water availability and quality.

These impacts will be felt differentially in developed and developing worlds. Marginalized populations of people may not only have their lives and livelihoods affected, but also be affected by declines in species abundance and diversity of ecosystems upon which they are dependent at a landscape level. In heterogeneous landscapes with a mix of wilderness islands within a changing agricultural environment, urbanization, and industrial spread could well increase pressures on protected area networks as the effects of climatic changes increase. Agricultural communities, especially traditional farmers and pastoralists, may be forced to shift into what is now within the protected area networks in developing countries.

Framing Responses

How do we impact the future course of natural history?

This peculiar creature in natural history, homo sapiens, is increasingly being recognized by scientists to be an agent of climate change, though the precise mix of natural and human causes has yet to be determined. With conscious agency lacking in other species comes a unique species responsibility for the future course of natural history.

On the experience of the past one hundred thousand years, humans are clearly capable of adaptive responses. Our species has the capacity or can develop the capacity to nurture nature through a period of transition, for instance by creating corridors to assist species adaptation and inventing new agricultures which alleviate and mitigate the effects of climate change. Humans are also capable of precautionary action, reducing greenhouse gases for instance as part of a broader strategy of sustainable development. We may even be able to master technologies which balance and stabilize climate change.

The key, however, will be the extent to which our species can take a proactive role, be that technological or social and political acts will that produce changed patterns of land and energy use. Like no other creature in natural history, and like no other time in this creature's history, this is the moment when the future of the planet is in our hands. The consciousness which made us a unique species perhaps a hundred thousand years ago, for the first time today puts us in a position of unprecedented responsibility for the course of natural history. Climate change is a key intellectual and practical challenge for today's science, economics, politics, sociology, and ethics.





The principal role of the Advisory Board is to drive the overall intellectual direction of the Climate Change: Impacts & Responses Research Network and to consult on our foundational themes as they evolve along with the currents of the field. Board members are invited to attend the annual conference and provide important insights on conference development, including suggestions for speakers, venues, and special themes. We also encourage board members to submit articles for publication consideration to *The International Journal of Climate Change: Impacts and Responses* as well as proposals or completed manuscripts to the Climate Change Book Imprint.

We are grateful for the continued service and support of the following world-class scholars and practitioners.

- Alison Anderson, University of Plymouth, Plymouth, UK
- Tapan Chakrabarti, Chairman, Department of Biotechnology Task Force on Biodiversity Conservation and Environment, National Environmental Engineering Research Institute (NEERI), Nagpur, India
- Gowtam Raj Chintaram, Executive Chairman, ANPRAS /Earth-Mauritius, Port Louis, Mauritius
- Amar Galla, Executive Director, International Institute for the Inclusive Museum
- Candice Howarth, Global Sustainability Institute, Anglia Ruskin University, Cambridge, UK
- David Humphreys, The Open University, UK
- Thomas Krafft, Geomed Research Corporation, Bad Honnef, Germany
- Mordechai Shechter, University of Haifa, Haifa, Israel
- Gordon Wilson, The Open University, Milton Keynes, UK
- Zhihua Zhang, Deputy Director of Polar Climate and Environment Library, Beijing Normal University, Beijing, China

A Social Knowledge Platform

Create Your Academic Profile and Connect to Peers

Developed by our brilliant Common Ground software team, Scholar connects academic peers from around the world in a space that is modulated for serious discourse and the presentation of knowledge works.



Utilize Your Free Scholar Membership Today through

- Building your *academic profile* and list of published works.
- Joining a community with a *thematic or disciplinary focus*.
- Establishing a new Research Network *relevant to your field*.
- Creating *new academic work* in our innovative publishing space.
- Building a *peer review network* around your work or courses.

Scholar Quick Start Guide

1. Navigate to <http://cgscholar.com>. Select [Sign Up] below 'Create an Account'.
2. Enter a "blip" (a very brief one-sentence description of yourself).
3. Click on the "Find and join communities" link located under the YOUR COMMUNITIES heading (On the left hand navigation bar).
4. Search for a community to join or create your own.

Scholar Next Steps – Build Your Academic Profile

- **About:** Include information about yourself, including a linked CV in the top, dark blue bar.
- **Interests:** Create searchable information so others with similar interests can locate you.
- **Peers:** Invite others to connect as a peer and keep up with their work.
- **Shares:** Make your page a comprehensive portfolio of your work by adding publications in the Shares area - be these full text copies of works in cases where you have permission, or a link to a bookstore, library or publisher listing. If you choose Common Ground's hybrid open access option, you may post the final version of your work here, available to anyone on the web if you select the 'make my site public' option.
- **Image:** Add a photograph of yourself to this page; hover over the avatar and click the pencil/edit icon to select.
- **Publisher:** All Common Ground community members have free access to our peer review space for their courses. Here they can arrange for students to write multimodal essays or reports in the Creator space (including image, video, audio, dataset or any other file), manage student peer review, coordinate assessments, and share students' works by publishing them to the Community space.

A Digital Learning Platform

Use Scholar to Support Your Teaching

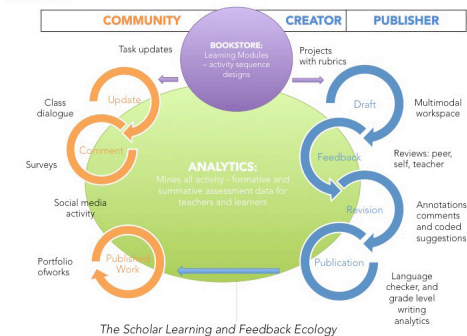
Scholar is a social knowledge platform that *transforms the patterns of interaction in learning by putting students first*, positioning them as knowledge producers instead of passive knowledge consumers. Scholar provides scaffolding to encourage making and sharing knowledge drawing from multiple sources rather than memorizing knowledge that has been presented to them.

Scholar also answers one of the most fundamental questions students and instructors have of their performance, “How am I doing?” Typical modes of assessment often answer this question either too late to matter or in a way that is not clear or comprehensive enough to meaningfully contribute to better performance.

A collaborative research and development project between Common Ground and the College of Education at the University of Illinois, Scholar contains a Research Network space, a multimedia web writing space, a formative assessment environment that facilitates peer review, and a dashboard with aggregated machine and human formative and summative writing assessment data.

The following Scholar features are only available to Common Ground Research Network members as part of their membership. Please email us at support@cgscholar.com if you would like the complimentary educator account that comes with participation in a Common Ground conference.

- Create projects for groups of students, involving draft, peer review, revision, and publication.
- Publish student works to each student’s personal portfolio space, accessible through the web for class discussion.
- Create and distribute surveys.
- Evaluate student work using a variety of measures in the assessment dashboard.



Scholar is a generation beyond learning management systems. It is what we term a *Digital Learning Platform*—it transforms learning by engaging students in powerfully horizontal “social knowledge” relationships. For more information, visit: <http://knowledge.cgscholar.com>.

Climate Change: Impacts & Responses Journal

*Committed to being a definitive resource for discussions
of evidence of climate change: its causes, its eco-systemic
and human impacts, and strategic responses*



About

The International Journal of Climate Change: Impacts and Responses seeks to create an interdisciplinary forum for discussion of evidence of climate change, its causes, its eco-systemic impacts, and its human impacts. The journal also explores technological, policy, strategic, and social responses to climate change.

The International Journal of Climate Change: Impacts and Responses is peer-reviewed, supported by rigorous processes of criterion-referenced article ranking and qualitative commentary, ensuring that only intellectual work of the greatest substance and highest significance is published.

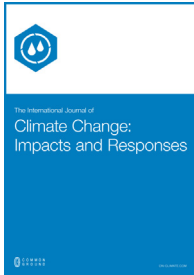
Editor



Michel Gueldry, Professor, International Relations and Sustainability Studies, Middlebury Institute of International Studies, Monterey, USA

Reviewers

Articles published in *The International Journal of Climate Change: Impacts and Responses* are peer reviewed by scholars who are active members of the Climate Change: Impacts & Responses Research Network. Reviewers may be past or present conference delegates, fellow submitters to the journal, or scholars who have volunteered to review papers (and have been screened by Common Ground's editorial team). This engagement with the Research Network, as well as Common Ground's synergistic and criterion-based evaluation system, distinguishes the peer review process from journals that have a more top-down approach to refereeing. Reviewers are assigned to papers based on their academic interests and scholarly expertise. In recognition of the valuable feedback and publication recommendations that they provide, reviewers are acknowledged as Reviewers in the volume that includes the paper(s) they reviewed. Thus, in addition to *The International Journal of Climate Change: Impacts and Responses* Editors and Advisory Board, the Reviewers contribute significantly to the overall editorial quality and content of the journal.



Indexing

CAB Direct
China National Knowledge Infrastructure (CNKI Scholar)
Environment Index (EBSCO)
Environment Complete (EBSCO)
The Australian Research Council (ERA)
Ulrich's Periodicals Index

DOI

10.18848/1835-7156/CGP

Founded:

2009

Publication Frequency:

Quarterly (March, June, September, December)

Acceptance Rate:

25% (2017)

ISSN:

1835-7156

Network Website:

on-climate.com





The Publication Process

Our long-time authors are no-doubt familiar with using our CGPublisher system to submit and track the progress of articles for publication. After fifteen years of dependable service, we are making preparations to give CGPublisher a well-deserved retirement. As we preparing for this exciting change, some of the familiar processes will be changing. Authors will still receive messages throughout each phase of the publication process and can contact support@cgnetworks.org with any questions or concerns.

Step 1: Review the Requirements

All article submissions must meet the Article Requirements listed on our Author Guidelines page: <http://cgnetworks.org/support/author-guidelines>. Before submitting your article, please thoroughly review these requirements, and revise your article to follow these rules. Initial submissions that do not meet these requirements will be returned to the author(s) for revision.

Step 2: Upload the Submission

Once you have revised your initial submission to meet the article requirements, please visit our Article Submission page: <http://cgnetworks.org/support/submit>.

Step 3: Checking Progress

Once your article is received, you will receive updates on the status of its progress. During this time, legacy submissions will continue to be managed in CGPublisher while newer submissions will be managed internally by the editorial staff. Authors of both newer and legacy submissions will continue to receive status updates on the progress of their article.

- CGPublisher users can see the status an article by logging into CGPublisher at www.cgpublisher.com and status updates will be sent via email from cgpublisher.com.
- Authors of newer submissions can learn the status an article by contacting articlestatus@cgnetworks.org and status updates will be sent via email from articlestatus@cgnetworks.org.

Step 4: Initial Submission Accepted for Peer Review

Submitted articles are then verified against the Article Requirements (listed in the Author Guidelines). If your article satisfies these requirements, your identity and contact details are then removed, and the article is matched to two appropriate referees and sent for review. Please note, during this time authors are eligible to be selected as a reviewer for other articles in this same stage. Full details regarding the rules, expectations, and policies on peer review can be found on our Publication Ethics page listed under the Peer Review Policies section and our Publication Ethics and Malpractice Statement section: <http://cgnetworks.org/journals/publication-ethics>.

Step 5: Peer Review Decision

When both referee reports are returned, and after the referees' identities have been removed, you will be notified by email and provided with the reviewer reports. Articles that have been rejected once in the peer review process are allowed a second opportunity to be reviewed by two new reviewers. To be reviewed by two new reviewers, you will need to make revisions based on the comments and feedback of the first round of review, and these changes must be detailed using a change note: <http://cgnetworks.org/support/change-note-journal-article>. If an article is not accepted by peer review after this second opportunity, it will be withdrawn from consideration.



Step 6: Membership Confirmation

If your article has been accepted or accepted with revisions, it will enter the membership confirmation stage. We require at least one author associated with the article to have a unique Network Membership or Conference registration: <http://cgnetworks.org/support/register-for-a-membership>. Please note, a paid conference registration includes a complimentary Research Network Membership, which will allow you to skip this step.

Step 7: Publication Agreement

Next you will be asked to accept the Publishing Agreement. If you are interested in Hybrid Open Access, this step is the best time to register for Open Access Publication: <http://cgnetworks.org/journals/hybrid-open-access>.

Step 8: Prepare the Final Submission

After the publication agreement is final, you will have thirty days to complete any revisions to your final submission and return your article. Please ensure your final submission meets the Final Submission Requirements before returning your article: <http://cgnetworks.org/support/final-submission-downloads-and-guides>. This includes such criteria as the correct use of the Chicago Manual of Style (seventeenth edition) and the other listed requirements: <http://cgnetworks.org/support/chicago-manual-of-style-citations-quick-guide>. Articles that have been accepted with revisions will require a change note to be included with the final submission. Articles that do not meet these requirements will be returned for revision until these requirements are satisfied.

Step 9: Final Checks (“Ready for Typesetting” in CGPublisher)

Once we have received the final submission of your article, our Publishing Department will give your article a final review. During this step, CGPublisher users will see a workflow status listed as “Ready for Typesetting,” indicating that the final submission is ready for inspection.

Step 10: Copy Editing and Proof Inspection

If the final submission meets the Final Submission Requirements, the article will enter Copy Editing. During Copy Editing, our editorial staff will note minor problems with citations, references, grammar, spelling, or formatting. The author(s) will be responsible for correcting these noted problems. Careful adherence to the article template and the citation style guide will greatly minimize the need for corrections. After all copy editing notes have been resolved, we will create a typeset proof for the author(s) to inspect.

Step 11: Article Publication

Individual articles are published “Web First” to our CG Scholar Bookstore: <https://cgscholar.com/bookstore>. After web-first publication, complete journal issues follow annually, biannually, or quarterly depending on the journal. Web-first published articles include a full citation and a registered DOI permalink. Be sure to keep your CG Scholar profile up-to-date (<https://cgscholar.com/identity>) and add your ORCID iD (<https://orcid.org/register>) to maximize your article visibility.





Submission Timeline

You may submit your article for publication to the journal at any time throughout the year. The rolling submission deadlines are as follows:

- Submission Round One – 15 January
- Submission Round Two – 15 April
- Submission Round Three – 15 July
- Submission Round Four – 15 October

Note: If your article is submitted after the final deadline for the volume, it will be considered for the following year's volume. The sooner you submit, the sooner your article will begin the peer review process. Also, because we publish "Web First," early submission means that your article will be published with a full citation as soon as it is ready, even if that is before the full issue is published.



Hybrid Open Access

All Common Ground Journals are Hybrid Open Access. Hybrid Open Access is an option increasingly offered by both university presses and well-known commercial publishers.

Hybrid Open Access means some articles are available only to subscribers, while others are made available at no charge to anyone searching the web. Authors pay an additional fee for the open access option. Authors may do this because open access is a requirement of their research-funding agency, or they may do this so non-subscribers can access their article for free.

Common Ground's open access charge is \$250 per article—a very reasonable price compared to our hybrid open access competitors and purely open access journals resourced with an author publication fee. Digital articles are normally only available through individual or institutional subscriptions or for purchase at \$5 per article. However, if you choose to make your article Open Access, this means anyone on the web may download it for free.

Paying subscribers still receive considerable benefits with access to all articles in the journal, from both current and past volumes, without any restrictions. However, making your paper available at no charge through Open Access increases its visibility, accessibility, potential readership, and citation counts. Open Access articles also generate higher citation counts.

Institutional Open Access

Common Ground is proud to announce an exciting new model of scholarly publishing called Institutional Open Access.

Institutional Open Access allows faculty and graduate students to submit articles to Common Ground journals for unrestricted open access publication. These articles will be freely and publicly available to the whole world through our hybrid open access infrastructure. With Institutional Open Access, instead of the author paying a per-article open access fee, institutions pay a set annual fee that entitles their students and faculty to publish a given number of open access articles each year.

The rights to the articles remain with the subscribing institution. Both the author and the institution can also share the final typeset version of the article in any place they wish, including institutional repositories, personal websites, and privately or publicly accessible course materials. We support the highest Sherpa/Romeo access level—Green.

For more information on how to make your article Open Access, or information on Institutional Open Access, please contact us at support@cgnetworks.org.





International Award for Excellence

The International Journal of Climate Change: Impacts and Responses presents an annual International Award for Excellence for new research or thinking in the areas of evidence of climate change, its causes, its ecosystemic impacts, and its human impacts as well as technological, policy, strategic, and social responses to climate change. All articles submitted for publication in *The International Journal of Climate Change: Impacts and Responses* are entered into consideration for this award. The winning article is selected from the ten highest-ranked articles emerging from the review process and according to the selection criteria outlined in the reviewer guidelines.

Award Winners, Volume No. 10

Robert Newell, School of Environment and Sustainability, Royal Roads University, Victoria, Canada
Ann Dale, Professor, Royal Roads University, Victoria, Canada
Mark Roseland, Professor, Simon Fraser University, Vancouver, Canada

For the Article

"Climate Action Co-benefits and Integrated Community Planning," *The International Journal of Climate Change: Impacts and Responses*, Volume 10, Issue 4, pp. 1–23

DOI: 10.18848/1835-7156/CGP/v10i04/1-23

Abstract

Engaging in climate action through integrated sustainability strategies can yield benefits for communities in more effective ways than through compartmentalized approaches. Such strategies can result in co-benefits, that is, community benefits that occur from acting on climate change that extend beyond mitigation and adaptation. For example, creating more walkable cities can be a strategy for reducing greenhouse gases, but can also lead to healthier communities. Climate strategies with co-benefits can result in "win-win" situations and thus improve practices for integrated community planning. However, this planning approach also presents challenges because it requires understanding complex relationships between community development practices and identifying synergies. In addition, some co-benefit strategies may also have associated challenges and trade-offs. This research examines climate action co-benefits and trade-offs in order to develop a comprehensive picture of the relationships and potential effects of implementing certain plans and strategies. The research consisted of collecting data on climate action efforts occurring in eleven BC (Canada) communities and coding it to identify climate strategies, co-benefits, challenges, and trade-offs. Relationships between codes were then identified through a coding matrix, and these were used to build a series of models that illustrate co-benefits, challenges, and trade-offs associated with local climate action. Each model centered on a particular area of climate action, including energy innovation, urban densification, mixed-use and downtown revitalization, building stock, ecological capital, trails and transportation, and waste and water. The models provide a holistic impression of the advantages and disadvantages associated with different plans and strategies, which in turn can guide both quantitative analyses and qualitative explorations that contribute toward integrated community planning and decision-making.



Network Membership and Personal Subscriptions

As part of each conference registration, all conference participants (both virtual and in-person) have a one-year digital subscription to *The International Journal of Climate Change: Impacts and Responses*. This complimentary personal subscription grants access to both the current volume of the journal as well as the entire backlist. The period of complimentary access begins at the time of registration and ends one year after the close of the conference. After that time, delegates may purchase a personal subscription.

To view articles, go to <https://cgscholar.com/bookstore> and select the "Sign in" option. An account in CG Scholar has already been made on your behalf; the username/email and password are identical to your CG Publisher account. After logging into your account, you should have free access to download electronic articles in the bookstore. If you need assistance, select the "help" button in the top-right corner, or contact support@cgscholar.com.

Journal Subscriptions

Common Ground offers print and digital subscriptions to all of its journals. Subscriptions are available to *The International Journal of Climate Change: Impacts and Responses* and to custom suites based on a given institution's unique content needs. Subscription prices are based on a tiered scale that corresponds to the full-time enrollment (FTE) of the subscribing institution.

For more information, please visit:

- <http://on-climate.com/journal/hybrid-open-access>
- Or contact us at subscriptions@cgnetworks.org

Library Recommendations

Fill out the Library Recommendation form from our website to recommend that your institution subscribe to *The International Journal of Climate Change: Impacts and Responses*: <https://cgnetworks.org/support/recommend-an-index>.



Climate Change: Impacts & Responses **Book Imprint**

*Aiming to set new standards in participatory knowledge
creation and scholarly publication*



Call for Books

Common Ground Research Networks is setting new standards of rigorous academic knowledge creation and scholarly publication. If your book is a brilliant contribution to a specialist area of knowledge that only serves a small intellectual community, we still want to publish it.

Book Proposal Guidelines

Books should be between 30,000 and 150,000 words in length. They are published simultaneously in print and electronic formats. To publish a book, please send us a proposal including:

- Title
- Author(s)/editor(s)
- Draft back-cover blurb
- Author bio notes(s)
- Table of contents
- Intended audience and significance of contribution
- Sample chapters or complete manuscript
- Manuscript submission date

Submit proposals by email to books@cgnetworks.org. Please note the book imprint to which you are submitting in the subject line.

What We Publish?

We welcome proposals or completed manuscripts between 30,000 words and 150,000 words in length that fall into one of the following categories:



New Works

We accept proposals that are individually or jointly authored books.



Collections

Edited collections addressing a clear theme or collections of articles previously published in Common Ground Research Networks journals.



Classics

Re-issued or out-of-copyright classics with new introductions.

Why Publish With Us?

We're not focused solely on the size of potential markets or competition from other books. We're only interested in the quality of the work.



Inclusive

Submissions from across national origins, experiences, and disciplinary perspectives.



Broad or Niche

We are not driven solely by potential sales, but by the quality of the work. Books on niche topics or specialized subjects are welcome.



Better Feedback

Our process pairs authors with reviewers specialized in the area topic.





Author Support

Meet The Author

Registration

Notify us two months prior to the conference if you plan on attending via support@cgnetworks.org

Book Launch

At the conference you are able to hold a meet and greet with delegates to promote your book.

Five Minute Q&A Video

Newly published authors are encouraged to send in a five minute video about themselves that will allow them to interact with their readers. Once approved, the video will be uploaded to scholar, and shared through Common Ground Research Networks social media.

- What made you write about this subject?
- What is your favorite chapter of the book?
- What is your writing process like?
- What is the message that you would take away from your book?



Scholar Account

Every author is given a Common Ground Scholar Account. This account will allow learners to represent their knowledge multi-modally in the 'cloud' - with text, image, audio, video and dataset, all in the one space. A space to interact with people who have read or who are interested in your book. Scholar acts as your own scholarly social network for you to promote your book and interact with peers in a similar field of study.

Call for Book Reviewers

Common Ground Research Networks is seeking distinguished peer reviewers to evaluate book manuscripts.

As part of our commitment to intellectual excellence and a rigorous reviewing process, Common Ground sends book manuscripts that have received initial editorial approval to peer reviewers to further evaluate and provide constructive feedback. The comments and guidance that these reviewers supply is invaluable to our authors and essential part of the publication process.

We recognize the important role of reviewers by acknowledging book reviewers as members of the Editorial Review Board for a period of at least one year. The list of members of the Editorial Review Board will be posted on our website.

If you would like to review book manuscripts, please send an email to books@cgnetworks.org with:



A brief description of your professional credentials



A list of your areas of interest and expertise



A copy of your CV with current contact details



Climate Change: Impacts & Responses Conference

*Curating global interdisciplinary spaces, supporting
professionally rewarding relationships*



Conference History

Founded in 2008, the International Conference on Climate Change: Impacts and Responses aims to create an interdisciplinary forum for the discussion of evidence of climate change, its causes, its eco-systemic impacts, and its human impacts. The conference also explores technological, policy, strategic, and social responses to climate change.

The International Conference on Climate Change: Impacts and Responses is built upon four key features: Internationalism, Interdisciplinarity, Inclusiveness, and Interaction. Conference delegates include leaders in the field as well as emerging scholars, who travel to the conference from all corners of the globe and represent a broad range of disciplines and perspectives. A variety of presentation options and session types offer delegates multiple opportunities to engage, to discuss key issues in the field, and to build relationships with scholars from other cultures and disciplines.

Past Conferences

- 2009 - Bharati Vidyapeeth Institute of Environment Education and Research, Pune, India
- 2010 - University of Queensland, Brisbane, Australia
- 2011 - Rio De Janeiro, Brazil
- 2012 - University of Washington, Seattle, USA
- 2013 - Port-Louis, Mauritius
- 2014 - University of Iceland, Reykjavik, Iceland
- 2015 - UBC Robson Square in Vancouver, Canada
- 2016 - NU University of Science (HUS), Vietnam National University (VNU), Hanoi, Vietnam
- 2017 - Anglia Ruskin University, Cambridge, UK
- 2018 - University of California at Berkeley, Berkeley, USA

Plenary Speaker Highlights

The International Conference on Climate Change: Impacts and Responses has a rich history of featuring leading and emerging voices from the field, including:

- **Alison Anderson**, Professor, University of Plymouth, Plymouth, UK (2011)
- **Ken Anthony**, Principal Research Scientist, University of Queensland, Brisbane, Australia (2010)
- **Thomas Pedersen**, Professor, University of Victoria, British Columbia, Canada (2015)
- **Gavin Schmidt**, Director, Goddard Institute for Space Studies at the National Aeronautics and Space Administration (NASA), USA (2015)





Past Partners

Over the years, the International Conference on Climate Change: Impacts and Responses has had the pleasure of working with the following organizations:



Bharati Vidyapeeth Institute of
Environment Education and
Research,
Pune, India (2009)



Climate Impacts Group,
University of Washington,
Seattle, USA (2012)



COLLEGE OF THE ENVIRONMENT
UNIVERSITY of WASHINGTON

College of the Environment,
University of Washington,
Seattle, USA (2012)



Globalism Institute,
RMIT University,
Melbourne, Australia (2009)



Global Sustainability Institute
(GSI),
Anglia Ruskin University
Cambridge, UK (2017)



International Institute for the
Inclusive Museum (iiiM)
(Network Partner)



Pacific Institute for
Climate Solutions,
Vancouver, Canada (2015)



University of Mauritius,
Mauritius (2013)



University of Queensland,
Brisbane, Australia (2010)



VNU University of Science,
Hanoi, Vietnam (2016)



Vietnam National University,
Hanoi, Vietnam (2016)

Become a Partner

Common Ground Research Networks has a long history of meaningful and substantive partnerships with universities, research institutes, government bodies, and non-governmental organizations. Developing these partnerships is a pillar of our Research Network agenda. There are a number of ways you can partner with a Common Ground Research Network. Contact us at support@on-climate.com to become a partner.





Conference Principles and Features

The structure of the conference is based on four core principles that pervade all aspects of the research network:

International

This conference travels around the world to provide opportunities for delegates to see and experience different countries and locations. But more importantly, the International Conference on Climate Change: Impacts & Responses offers a tangible and meaningful opportunity to engage with scholars from a diversity of cultures and perspectives. This year, delegates from over 22 countries are in attendance, offering a unique and unparalleled opportunity to engage directly with colleagues from all corners of the globe.

Interdisciplinary

Unlike association conferences attended by delegates with similar backgrounds and specialties, this conference brings together researchers, practitioners, and scholars from a wide range of disciplines who have a shared interest in the themes and concerns of this network. As a result, topics are broached from a variety of perspectives, interdisciplinary methods are applauded, and mutual respect and collaboration are encouraged.

Inclusive

Anyone whose scholarly work is sound and relevant is welcome to participate in this research network and conference, regardless of discipline, culture, institution, or career path. Whether an emeritus professor, graduate student, researcher, teacher, policymaker, practitioner, or administrator, your work and your voice can contribute to the collective body of knowledge that is created and shared by this network.

Interactive

To take full advantage of the rich diversity of cultures, backgrounds, and perspectives represented at the conference, there must be ample opportunities to speak, listen, engage, and interact. A variety of session formats, from more to less structured, are offered throughout the conference to provide these opportunities.





Plenary

Plenary speakers, chosen from among the world's leading thinkers, offer formal presentations on topics of broad interest to the community and conference delegation. One or more speakers are scheduled into a plenary session, most often the first session of the day. As a general rule, there are no questions or discussion during these sessions. Instead, plenary speakers answer questions and participate in informal, extended discussions during their Garden Conversations.



Garden Conversation

Garden Conversations are informal, unstructured sessions that allow delegates a chance to meet plenary speakers and talk with them at length about the issues arising from their presentation. When the venue and weather allow, we try to arrange for a circle of chairs to be placed outdoors.



Talking Circles

Held on the first day of the conference, Talking Circles offer an early opportunity to meet other delegates with similar interests and concerns. Delegates self-select into groups based on broad thematic areas and then engage in extended discussion about the issues and concerns they feel are of utmost importance to that segment of the community. Questions like "Who are we?", "What is our common ground?", "What are the current challenges facing society in this area?", "What challenges do we face in constructing knowledge and effecting meaningful change in this area?" may guide the conversation. When possible, a second Talking Circle is held on the final day of the conference, for the original group to reconvene and discuss changes in their perspectives and understandings as a result of the conference experience. Reports from the Talking Circles provide a framework for the delegates' final discussions during the Closing Session.



Themed Paper Presentations

Paper presentations are grouped by general themes or topics into sessions comprised of three or four presentations followed by group discussion. Each presenter in the session makes a formal twenty-minute presentation of their work; Q&A and group discussion follow after all have presented. Session Chairs introduce the speakers, keep time on the presentations, and facilitate the discussion. Each presenter's formal, written paper will be available to participants if accepted to the journal.



Colloquium

Colloquium sessions are organized by a group of colleagues who wish to present various dimensions of a project or perspectives on an issue. Four or five short formal presentations are followed by a moderator. A single article or multiple articles may be submitted to the journal based on the content of a colloquium session.



Focused Discussion

For work that is best discussed or debated, rather than reported on through a formal presentation, these sessions provide a forum for an extended “roundtable” conversation between an author and a small group of interested colleagues. Several such discussions occur simultaneously in a specified area, with each author’s table designated by a number corresponding to the title and topic listed in the program schedule. Summaries of the author’s key ideas, or points of discussion, are used to stimulate and guide the discourse. A single article, based on the scholarly work and informed by the focused discussion as appropriate, may be submitted to the journal.



Workshop/Interactive Session

Workshop sessions involve extensive interaction between presenters and participants around an idea or hands-on experience of a practice. These sessions may also take the form of a crafted panel, staged conversation, dialogue or debate—all involving substantial interaction with the audience. A single article (jointly authored, if appropriate) may be submitted to the journal based on a workshop session.



Poster Sessions

Poster sessions present preliminary results of works in progress or projects that lend themselves to visual displays and representations. These sessions allow for engagement in informal discussions about the work with interested delegates throughout the session.



Virtual Lightning Talk

Lightning talks are 5-minute “flash” video presentations. Authors present summaries or overviews of their work, describing the essential features (related to purpose, procedures, outcomes, or product). Like Paper Presentations, Lightning Talks are grouped according to topic or perspective into themed sessions. Authors are welcome to submit traditional “lecture style” videos or videos that use visual supports like PowerPoint. Final videos must be submitted at least one month prior to the conference start date. After the conference, videos are then presented on the network YouTube channel. Full papers can based in the virtual poster can also be submitted for consideration in the journal.



Virtual Poster

This format is ideal for presenting preliminary results of work in progress or for projects that lend themselves to visual displays and representations. Each poster should include a brief abstract of the purpose and procedures of the work. After acceptance, presenters are provided with a template and Virtual Posters are submitted as a PDF. Final posters must be submitted at least one month prior to the conference start date. Full papers based on the virtual poster can also be submitted for consideration in the journal.





Thursday, 16 April

8:00–9:00	Conference Registration Desk Open
9:00–9:30	Conference Opening—John Garvey, President, The Catholic University of America, Washington, D.C., and Dr. Homer Stavely, Common Ground Research Networks, Champaign, USA
9:30–10:00	Plenary Session—Dr. D. James Baker, Former Under Secretary of U.S. Department of Commerce and Administrator of NOAA, University of Delaware, School of Marine Science and Policy, United States
10:00–10:30	Garden Conversation
10:30–11:15	Talking Circles Room 1: Scientific Evidence Room 2: Assessing Impacts in Divergent Ecosystems Room 3: Human Impacts and Impacts on Humans Plenary Room: Technical, Political, and Social Responses
11:15–11:25	Transition Break
11:25–13:05	Parallel Sessions
13:05–13:55	Lunch
13:55–14:40	Parallel Sessions
14:40–14:50	Coffee Break
14:50–16:30	Parallel Sessions
16:30–16:40	Transition Break
16:40–18:20	Parallel Sessions
18:30–19:30	Conference Welcome Reception and Poster Session



Wednesday, 17 April

8:30–9:00	Conference Registration Desk Open
9:00–9:15	Daily Update—Dr. Homer Stavely, Common Ground Research Networks, Champaign, USA
9:15–9:45	Plenary Session—Michele Mossa, Professor, Polytechnic University of Bari, Italy
9:45–10:15	Plenary Session—Allen Thompson, Associate Professor of Ethics and Environmental Philosophy, Oregon State University, United States - Allen Thompson
10:15–10:45	Garden Conversation
10:45–10:55	Coffee Break
10:55–12:10	Parallel Sessions
12:10–13:15	Lunch
13:15–13:45	Plenary Session—David Titley, Professor, Director of the Center for Solutions to Weather and Climate Risk, The Pennsylvania State University, United States
13:45–14:00	Garden Conversation
14:00–15:00	Catholic University of America Special Focus Session
15:00–15:10	Coffee Break
15:10–17:00	Catholic University of America Special Focus Session (Continued)
17:00–18:00	Panel— "Focusing on Solutions and Action Items with Our Heads, Hands, and Hearts"
18:00–18:30	Conference Closing and Award Ceremony





Special Events

Catholic University of America Special Focus Session

Wednesday, 17 April | Time: 13:15 (1:15 PM)

Location: Great Room A, Pryzbyla Center, Catholic University of America

The Special Focus Session, titled A Multi-faceted Perspective on the Challenges of Climate Change, will include prominent speakers focusing on coastal resilience. The session will start with a plenary presentation by Dr. David Titley. There will be a short question and answer session held at the end of each presentation.

Special Focus Session Speakers:

Dr. David Titley, Rear Admiral, Director of Center for Solutions to Weather and Climate Risk, Penn State University

“Climate Change and National Security: People Not Polar Bears”

Emanuela Midoli and Cardinal Sgreccia

“Personalist Bioethics and Its Care to the Ecosystem”

Rev. Dr. John Chryssavgis, Ecumenical Patriarchate

“Reflecting on and Responding to God’s Creation”

Edward Yim, Esq., Energy Policy Advisor, DC Department of Energy and Environment

“Rising to the Climate Challenge: Radically Reducing Energy Consumption and Self-supplying Power for Resiliency”

Dr. Kevin Forbes, Professor of Economic, Catholic University

“Wind Energy, The Price of Carbon Allowances and CO2 Emissions: Evidence from Ireland”

Martin O’Malley, 61st Governor of Maryland

“Designing Coastal Resilience”

Giovanni Cecconi, Venice Resilience Lab

“Venice Lagoon Adaptation as a Socio-ecological Evolution Process”

Kathleen McLaughlin, Senior Vice President and Chief Sustainability Officer, Walmart, Inc.

“Enhancing Sustainability in Retail Operations and Global Value Chains”

The Session will be followed by a panel, “Focusing on Solutions and Action Items with Our Heads, Hands, and Hearts.” Speakers on the panel will include Dr. David Titley, Edward Yim, Governor Martin O’Malley, Debra-Nauto Rodriguez, Massimo Ciarla, Patricia Andrasik, and Dr. David Cloutier. The panel will be moderated by Christian de la Rosa, WPGL.



Conference Welcome Reception and Poster Session

Tuesday, 16 April | Time: Directly following the last session of the day

Location: Pryzbyla Center, Catholic University of America | Cost: Complimentary to all conference delegates

Common Ground Research Networks and the International Conference on Climate Change: Impacts and Responses will be hosting a welcome reception and poster session at the Pryzbyla Center of the Catholic University of America. This will be held directly following the last parallel session of the first day, Tuesday, 16 April 2019. Join other conference delegates and plenary speakers for a poster session while enjoying drinks, light hors d'oeuvres, and a chance to converse.





Dr. D. James Baker

“From Megacities to Mangroves: Creating Coastal Resilience in the Context of Economic Growth and Climate Change”



Former Under Secretary of Commerce and NOAA Administrator D. James Baker is an internationally recognized authority on applications of science and technology to environmental issues. He has also served as Director of Forest and Land-Use Management at the Clinton Foundation, the President and CEO of the Academy of Natural Sciences in Philadelphia, the President of Joint Oceanographic Institutions Incorporated in Washington, D.C., and Dean of the College of Ocean and Fisheries Sciences at the University of Washington. He has advised UNESCO, the World Bank, and the UN Food and Agriculture Organization; served on Presidential Commissions; chaired numerous national and international advisory committees; and testified frequently to the United States Congress on oceans, climate, and environmental issues. He is currently on the affiliate faculty of the School of Marine Science and Policy at the University of Delaware and has taught oceanography and geophysical fluid dynamics at the University of Washington, Harvard University, and the University of Rhode Island. For his work in applications of satellite technology, he was awarded the Vikram Sarabhai Medal for “Outstanding Contributions to Space Research in Developing Countries” from the Committee on Space Research and the Indian Space Research Organization. For his work in oceanography he was awarded the Lifetime Achievement Award from Oceanology International. He co-founded and was the first President of The Oceanography Society and is a Fellow of the American Meteorological Society and the American Association for the Advancement of Science. He has published more than 100 research papers; is author of the book “Planet Earth: The View from Space” published by Harvard University Press; and has a joint U.S. patent for the design of a deep-sea pressure gauge which was used to make the first deep-sea tide measurements in the Antarctic. Dr. Baker was educated at Stanford University and Cornell University. He has a PhD in physics and three honorary degrees.

Dr. Michele Mossa

“Alteration of Spreading Processes in Natural Flows in Times of Climate Change”



Michele Mossa is a professor of Hydraulics at the Polytechnic University of Bari (Italy), with a PhD in hydraulic engineering for the environment and land. He is the chief scientist of the Coastal Engineering Laboratory – LIC, a member of the board of directors of the National Consortium of Universities for Marine Sciences (CoNISMa) for the Polytechnic University of Bari, and a member of the Fluid Mechanics Committee of the International Association for HydroEnvironment Engineering and Research (IAHR). At the University, he was elected as the representative for the Academic Senate, is the coordinator of the PhD course in “Environmental and Building Risk and Development,” and is Deputy Rector of Research and Transfer for the University. He has served as a member of the IAHR council, as president of the IAHR Education and Professional Development Section, and as the expert reviewer of research project grant applications in Hydraulics and Oceanography for both the Research Council of Norway and the OeAD (Österreichische Austauschdienst) GmbH Austrian Agency for International Cooperation in Education and Research. He is associate editor of *Scientific Reports - Nature*, *Journal of Hydraulic Research*, *Environmental Fluid Mechanics*, *Engineering & Computational Mechanics*, *Journal of Multidisciplinary Science*, *Insight - Civil Engineering*, *Global Journal of Engineering Science and Researches*, *SCIRES-IT - SCientific REsearch and Information Technology*, *Water*, and *Heliyon*. The main topics of his research are relevant to Environmental and Maritime Hydraulics. He is author of many papers and books, and is actively involved in international and Italian research projects.



Dr. Allen Thompson

"A Future They Don't Deserve"



Allen Thompson is an Associate Professor of Ethics and Environmental Philosophy at Oregon State University, Corvallis OR. His research concerns broadening our conception of environmental virtue and moral responsibility as a part of understanding human excellence in adapting to the Anthropocene. Thompson is Vice President and President-elect of the International Society of Environmental Ethics, a past Fellow at the Rachel Carson Center (Munich, Germany), and the OSU The Center for the Humanities. He is writing a book on the ethics of novel ecosystems (Routledge, under contract), and has co-edited *The Oxford Handbook of Environmental Ethics* (OUP 2017) and *Ethical Adaptation to Climate Change* (MIT 2012). Thompson also serves as book review editor for the journal *Environmental Ethics* and was a guest on the nationally-syndicated NPR program, *Philosophy Talk*, discussing climate ethics.

Dr. David Titley

"Climate Change and National Security: people Not Polar Bears"



Dr. David Titley is a professor of practice in meteorology and a professor of international affairs at the Pennsylvania State University. He is the founding director of Penn State's Center for Solutions to Weather and Climate Risk. After graduating from Penn State, Dr. Titley served as a naval officer for 32 years and rose to the rank of Rear Admiral. Dr. Titley's career included duties as commander of the Naval Meteorology and Oceanography Command, and Oceanographer and Navigator of the Navy. While serving in the Pentagon, Dr. Titley initiated and led the U.S. Navy's Task Force on Climate Change. After retiring from the Navy, Dr. Titley served as the Deputy Undersecretary of Commerce for Operations, the chief operating officer position at the National Oceanic and Atmospheric Administration. In 2017 Dr. Titley gave a TED talk on Climate Change and National Security that has been viewed nearly 950,000 times. He serves on numerous climate and security related advisory boards and National Academy of Science (NAS) committees; he currently chairs the National Academies of Science, Engineering and Medicine Climate Communication Initiative committee, and is a member of the NAS Board on Atmospheric Sciences and Climate. He received an honorary Doctorate degree from the University of Alaska Fairbanks and is a Fellow of the American Meteorological Society.





Theodora Dame Adjin-Tettey



Theodora is a lecturer at the Department of Public Relations at the University of Professional Studies, Accra, Ghana, where she also serves as a departmental research officer. She recently graduated from the University of South Africa (UNISA) with a PhD in Communication Science. She also has a master of philosophy degree in Communication from the University of Ghana.

Theodora's current research interests include climate change communication, new media use and appropriation, open and distance learning, and e-learning.

Fides del Castillo



Dr. Fides del Castillo is currently the associate dean of the College of Liberal Arts at De La Salle University Manila. She finished her doctoral degree in Religious and Values Education at De La Salle University Manila and took her post-doctoral course on leadership and culture in Warwick University London. She is serving as the president of the Network of Professional Researchers and Educators. She is also the directress of Lumina Montessori de Calamba. Dr. Del Castillo has written books such as *Teaching Values Using Creative Strategies*. She also co-authored *Kenosis: The Life Giving Sacrifice of Jesus, Threskia: Introduction to World Religions*, and *Arete: Towards Filipino Moral Excellence of Don Bosco Press Inc*. She has published academic journal articles and facilitated international conferences. In 2015 and 2018, she was selected as a scholastic referee in the International Journal of Religion and Spirituality.

Awa Bousso Drame



Awa Bousso Drame is a student-researcher in coastal geomorphology and GIS, and is affiliated to Sorbonne University and Columbia University. With 3 years of research experience, her research areas focus on coastal hazards in West Africa (Senegal and Benin) on which she worked at the French National Research Institute for Sustainable Development, the Institute of Geomorphology and Soils of Malaga, the Senegalese Ministry of Environment-West African Coastal Observation Mission. She also has an international career with her experience in Senegal, France, Sweden, Italy, United Arab Emirates, Oman, Cyprus, Spain, and the United States. Miss Drame received a research stipend from Columbia University, the IDEX-Initiative-d'Excellence fellowship (Sorbonne, French Ministry of Higher Education), and the 2nd Prize of the Senegalese National Schools Competition of Geography of Senegalese Ministry of Education.

Brianna Haugen



Brianna Haugen is completing her master's degree in Marine Resource Management at Oregon State University. Growing up in Minnesota, the land of 10,000 lakes, fostered an appreciation for the multiple uses of water resources. Her experience in water quality monitoring with lakes and streams led her to pursue her dream of working with coastal communities. Her passion for interdisciplinary climate change research stems from a belief that humans are part of the environment, not separate from it. After graduate school, she hopes to find work addressing climate change that connects the physical environment with human interaction.

David Krantz



David Krantz is a Wrigley Fellow and National Science Foundation IGERT-SUN Fellow at Arizona State University's School of Sustainability, where he researches the intersection of environmentalism with public policy and culture, predominantly religion. He serves on the board of directors of three non-profits, including Interfaith Moral Action on Climate, and Aytzim: Ecological Judaism, which he also runs. He has completed three master's degrees at New York University and at the University of California, Berkeley.



Tek Jung Mahat



Tek Jung Mahat is a UC Berkeley trained environmental leader with over 15 years of professional experience across the Himalayan countries. He developed the first and still the largest “youth” and “media” programme for mountain advocacy during his term at the International Centre for Integrated Mountain Development (ICIMOD), where he managed the Asia Pacific Mountain Network (APMN), Mountain Thematic Node of the Asia Pacific Adaptation Network (APAN), Rio+20 (UNCSD) Preparations of the Himalayan countries. He coordinated ICIMOD’s UNFCCC and Rio+20 engagements, including support to Nepal’s Mountain Initiative (MI), Bhutan’s Climate Summit for a Living Himalayas, India’s Indian Mountain Initiative (IMI) among others. Apart from ICIMOD, Tek has worked for the Asian Development Bank-Government of Nepal’s Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME) project, Nepal River Conservation Trust, and has taught undergraduate students at the Tribhuvan University in Nepal. Tek also founded the Climate Himalayan Initiative (CHI) in 2007 as the voluntary climate knowledge alliance in the Himalayan Countries and prepared foundation to set-up the Centre for Climate Research and Advocacy (CCRA) at the Central Department of Environmental Science (CDES), Tribhuvan University. Tek is currently pursuing his PhD focusing on climate policy and governance in Nepal from the Masaryk University in Brno, Czech Republic.

Claudia Ribeiro Pereira Nunes



Professor Nunes holds a PhD in Law. She is the institutional research coordinator and national and international relations coordinator of the Associated College of Rondônia. She is also co-coordinator of International Research Center (which spans Brazil - Spain - United States) on global comparative law. She received numerous scholarships and honorable mentions by several institutions in the last 5 years. At the Yale MacMillian Center, Professor Nunes conducts research aimed to a better understanding of the impact of global law and governance issue in respect to innovation technology challenges, with a view in the traditional societies.

Michael Pascucilla



Michael Pascucilla was appointed as the director of health for the East Shore District Health Department (ESDHD) in 2010 which serves the towns of Branford, East Haven and North Branford. Prior to ESDHD, he served as the assistant director of health for the City of Hartford, Department of Health & Human Services, and held positions at both the University of Connecticut and Yale University. Michael holds a BS degree in Public Health/Nutrition from Southern Connecticut University and a masters degree in Public Health from the University of Connecticut. He is a Registered Sanitarian and has over 27 years experience as a public health official in local, state and federal government. Michael also is an adjunct professor at Southern Connecticut State University and a lecturer at Yale University in the School of Public Health located in New Haven, Connecticut. Michael resides in the town of Guilford, Connecticut with his wife and two sons.

Muha Abdullah Al Pavel



Muha Abdullah Al Pavel is a PhD student in Climate Change and Sustainable Development Policies at University of Lisbon, Portugal. His research focuses on the impact of climate change and management scenarios on forest ecosystem services using the PREBAS model. He holds a MSc in Forestry from Shahjalal University of Science and Technology, Bangladesh; MSc in Forest Science from University of Padova, Italy; and MSc in Mediterranean Forestry and Natural Resources Management from University of Valladolid, Spain. He also served as a Research Assistant at Bangladesh University of Engineering and Technology.



Tuesday, 16 April	
08:00-09:00	Conference Registration Desk Open
09:00-09:30	Conference Opening—John Garvey, President, The Catholic University of America, Washington, D.C., and Dr. Homer Stavely, Common Ground Research Networks, Champaign, USA
09:30-10:00	Plenary Session—Dr. D. James Baker, Former Under Secretary of U.S. Department of Commerce and Administrator of NOAA, University of Delaware, School of Marine Science and Policy, United States
	<p>"From Megacities to Mangroves: Creating Coastal Resilience in the Context of Economic Growth and Climate Change"</p> <p>Former Under Secretary of Commerce and NOAA Administrator D. James Baker is an internationally recognized authority on applications of science and technology to environmental issues. He has also served as director of forest and land-Use management at the Clinton Foundation, the president and CEO of the Academy of Natural Sciences in Philadelphia, the president of Joint Oceanographic Institutions Incorporated in Washington, D.C., and dean of the College of Ocean and Fisheries Sciences at the University of Washington. He has advised UNESCO, the World Bank, and the UN Food and Agriculture Organization; served on Presidential Commissions; chaired numerous national and international advisory committees; and testified frequently to the United States Congress on oceans, climate, and environmental issues. He is currently on the affiliate faculty of the School of Marine Science and Policy at the University of Delaware and has taught oceanography and geophysical fluid dynamics at the University of Washington, Harvard University, and the University of Rhode Island.</p> <p>For his work in applications of satellite technology, he was awarded the Vikram Sarabhai Medal for "Outstanding Contributions to Space Research in Developing Countries" from the Committee on Space Research and the Indian Space Research Organization. For his work in oceanography he was awarded the Lifetime Achievement Award from Oceanology International. He co- founded and was the first president of The Oceanography Society and is a fellow of the American Meteorological Society and the American Association for the Advancement of Science. He has published more than 100 research papers; is author of the book Planet Earth: The View from Space published by Harvard University Press; and has a joint U.S. patent for the design of a deep-sea pressure gauge which was used to make the first deep-sea tide measurements in the Antarctic. Dr. Baker was educated at Stanford University and Cornell University. He has a PhD in physics and three honorary degrees.</p>
10:00-10:30	<p>Garden Conversation</p> <p>Garden Conversations are informal, unstructured sessions that allow delegates a chance to meet plenary speakers and talk with them at length about the issues arising from their presentation. When the venue and weather allow, we try to arrange for a circle of chairs to be placed outdoors.</p>
10:30-11:15	<p>Talking Circles</p> <p>Held on the first day of the conference, Talking Circles offer an early opportunity to meet other delegates with similar interests and concerns. Delegates self-select into groups based on broad thematic areas and introduce themselves and their research interests to one another.</p> <p>Room 1: Scientific Evidence Room 2: Assessing Impacts in Divergent Ecosystems Room 3: Human Impacts and Impacts on Humans Plenary Room: Technical, Political, and Social Responses</p>
11:15-11:25	Transition Break
11:25-13:05	PARALLEL SESSIONS



Tuesday, 16 April

11:25-13:05

PARALLEL SESSIONS

Room 1

Food Vulnerabilities

Impacts and Vulnerability in the Rice Terraces of Ifugao, Philippines

Ria Jhoanna Ducusin, Science Research Specialist, School of Environmental Science and Management, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

María Victoria Espaldon, Professor, School of Environmental Science and Management, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

Carmelita Rebanco, Professor, School of Environmental Science and Management, University of the Philippines Los Baños, Los Baños, Laguna, Philippines

Lucille Elna De Guzman, University Researcher, Institute of Crop Science

The pressing issue of climate change poses a serious threat to agriculture specifically to rice production and its impacts could be devastating since rice is a staple food and serves as a subsistence agriculture in Ifugao, Philippines. However, little is known on the impacts of climate change at the rice terraces; hence, vulnerability assessment to climate change impacts of the Batad Rice Terraces, a UNESCO Inscribed World Heritage Site and one of the Globally Important Agricultural Heritage Systems in the Philippines, was conducted. Reviewed, adopted, and modified indices were used as deemed fit to the area to assess the vulnerability as a function of exposure, sensitivity, and adaptive capacity. The data were gathered through literature review, actual measurements, key informant interview, and household interview in 2017. Results revealed that sensitivity indicators contribute to the vulnerability of the rice terraces to climate change impacts. Overall, socially and culturally appropriate adaptation strategies should be critical considerations to decrease the vulnerability of the system.

Human Impacts and Impacts on Humans

Climate Vulnerability, Diet Diversity and Household Nutrition Insecurity among Small-holder Farmers of Eastern Region of India

Anup Das, Deputy Director, Tarina- Livelihoods, Care India, Bhubaneswar, Odisha, India

Arabinda Acharya, Knowledge Management & Learning Expert, Tarina, Care India, Bhubaneswar, India

Diet diversity, a preventive approach to address malnutrition is influenced by household consumption pattern. Climate vulnerability affects crop production thereby impact household's access to nutrition. Using primary data from tribal dominant regions, the study seeks to examine effect of climate vulnerability on nutrition outcomes. Evidences reveal weather variability results in low productivity (25% less crops) triggering low diet diversity (less than two food groups >80% households). Limited diet diversity coupled with deficiency of vitamins and protein exposes small-holders to nutrition insecurity. Households consume more than five food groups per day are less likely to have stunted children than those consume less than five food groups [OR=0.52; P<0.005; CI:0.40-0.67], but more likely to have low BMI level [OR=1.20(0.80-1.80)]. Empirical evidences suggest that beyond household dietary diversity, positive nutrition outcomes at household level could be achieved ensuring other dimensions of nutrition, such as nutrition behaviour, enabling environment and climate smart agriculture practices.

Technical, Political, and Social Responses

Projected Impacts of Climate Change on Maize Production in Central Uganda

Alex Nimusiima, Lecturer, Geography, Geo-Informatics and Climatic Sciences, Makerere University, Kampala, Central, Uganda

Changes in air temperature and rainfall pattern brought about by climate change are likely to affect agricultural production system both directly and indirectly. In addition to the direct effect of climate on crop growth and development, weather also affects other process that may impact agricultural production system as a whole. A study was carried out using a crop simulation model (CERES) to examine the relationship between maize yields and changes in weather and climate and other related factors in order to forecast possible future yields using projected climate for a future period in central Uganda. Results show that in all climate scenarios future maize yields are projected to decrease by 5-50% in the near future and 10-60% in mid century climate period compared to the 1980-2010 maize yields. However early planting in both seasons was found to reduce the yield reductions by about 5% and should therefore be taken advantage of by the communities

Human Impacts and Impacts on Humans



Tuesday, 16 April

11:25-13:05

PARALLEL SESSIONS

Room 2

Coastal Ecosystems

Coastal Erosion and Flooding in Saint-Louis, Senegal: Increasing Exposition or Cross-border Coastline Resilience

Ava Boussou Drame, Graduate Student Researcher, Earth and Environmental Sciences Department and Geography Department, Columbia University (USA) and Sorbonne University (France), United States

Denis Mercier, University distinguished professor, Sorbonne university, France

Publicized during the Bonn COP23, coastal areas have particular ecological potential and are often hubs of natural disasters. Their attractiveness readable in the economy and population coastalisation, especially in the developing world including West Africa. Located on an island in the mouth of the Senegal River, Saint-Louis is an old French colonial settlement, frequently exposed to floods and coastal erosion. After the Sahelian drought, the construction of Diama and Manantali dams hugely impacted on the estuary hydro-sedimentary dynamics. In 2003, a significant flood threatening Saint-Louis, led Senegalese authorities to notch the Langue de Barbarie sandspit to permit water flow and spare it from flooding.

Natural barrier protecting the Senegal river estuary, the Langue de Barbarie has become more exposed to coastal erosion and submergence threatening 825 inhabitants/km². Using remote sensing, geographical information system through digital shoreline analysis system, annual erosion rates have been calculated between 2003, 2010 and 2018. Saint-Louis vulnerability to floods have been mapped following the hydrogeomorphological methodology of digital flood areas model. Globally exposed to marine and fluvial erosion, the sandspit shows sectors of distal accretion, erosion that can be linked to an actual dyke construction to protect communities from recurrent floods by marine submergence. The lowest, between 0 and 1.75m (flooding alert in Saint-Louis) are located on Langue de Barbarie, in Saint-Louis peripheral districts. The Saint-Louis case is a grim picture of how anthropogenic footprint amplifies impacts of flooding and erosion in the actual context of sea level rise and climate changes.

Human Impacts and Impacts on Humans

Crude Oil and Gas Installations' Vulnerability to Climate Impacts: A Case Study in the Niger Delta

Justin Udie, Lecturer/Senior Lecturer, Business, Law and Social Sciences, Nottingham Business School, Nottingham Trent University, Leicestershire, United Kingdom

The coastal Niger Delta is being severely threatened by impacts of climate change exacerbated by floods, corresponding rise in ambient temperature, and Atlantic tidal intrusion, persistent heavy rainfall, and windstorms. These events have continued to disrupt the operations of critical crude oil and gas installations and calls for urgent ranking of the most sensitive system vulnerable to these threats. To adapt effectively, ranking crude oil and gas installations based on stakeholder perception of sensitivity is crucial. We applied analytic review of fifty-two journal articles to synthesise explicit sensitivity assessment indicators for evaluation of selected installations. MCDA tool was implemented in indicator-based pairwise evaluation and ranking of selected installation. We engaged carefully stratified practitioners and experts with a minimum of ten years field experience in the industry in structured focus groups and elite interviews for data collection. The result was analysed using Goepel (2015) multiple-input AHP software and indicates the global sensitivity ranks (eigenvector, EV) for each installation. The result shows the first three most sensitive installation in the following order; terminals (27.3%), flow stations (19.2%) and roads/bridges (15.6%). Ranking of other installations shows transformers/high voltage cable (14.0%) as the mid sensitive installation while the less sensitive installations to climate change are Pipelines (11.1), loading bays (9.3%) and wellheads (5.0%). We recommend that the oil and gas industry could leverage sensitivity analysis outcome from this study to plan effective and efficient adaptation mechanisms to protect most sensitive installations from climate change impact in the coastal Niger Delta.

Assessing Impacts in Divergent Ecosystems

Shifting Shorelines: Adaptation Strategies for the Fraser River Delta

Kees Lokman, Assistant Professor, School of Architecture and Landscape Architecture, University of British Columbia, Vancouver, Canada

Climate change is arguably the greatest challenge facing contemporary societies. The effects of sea level rise, hotter/drier summers, warmer/wetter winters, and increased frequency of extreme weather events will have far-reaching impacts on coastal communities, including people's livelihoods, critical infrastructures and ecosystems. At the same time, sea level rise provides an opportunity to envision new ways of living with coastal dynamics. In this context, the Fraser River Delta provides a perfect case study. Situated along the Cascadia fault line, and home to a rapidly growing population of nearly 3 million people, the region is in urgent need of comprehensive approaches to coastal resilience. This paper highlights initial outcomes of an ongoing project involving a collaboration between academics, student researchers, design professionals, local experts and decision-makers. Key research questions include: How can visualization assist in raising awareness about climate change risks? Which coastal communities and critical habitats in the Fraser River Delta are vulnerable to sea level rise? And, what are the potential impacts of flooding on critical infrastructures? By applying geospatial analysis, visualization and systems thinking, the research shows the implications of sea level rise on key issues in the region (urban growth, logistics, intertidal habitats, food security). It also reveals opportunities and limitations for coastal adaptation when considering current local, provincial and federal regulations, policies and zoning guidelines. In doing so, this project aims to offer new tools, knowledge and insights to support policymakers, scientists, planners, engineers, and designers in analyzing, visualizing and re-imagining a resilient delta.

2019 Special Focus: Coastal Resilience



Tuesday, 16 April

11:25-13:05

PARALLEL SESSIONS

**Room 2
Continued**

Modeling the Coastal Inundation

Matteo Postacchini, Assistant Professor , Department of ICEA, Università Politecnica delle Marche, Ancona, Italy
Francesco Memmola, Italy
Francesco Lalli, Italy
Debora Bellafiore, Italy
Maurizio Brocchini, Italy

Coastal inundation is an increasing threat for many nearshore regions worldwide, and has significantly increased in the last years also due to sea-level rise and increased impact of extreme events, like sea storms. Many countries and regions have recently invested to overcome such problems, which commonly lead to structure damages, beach erosion and many other consequences. A series of regulations and legislative approaches has also been proposed and/or applied, with the aim to mitigate such negative effects. Numerical modeling is an important tool for coastal inundation prediction, being a valuable support for management issues to mitigate the inundation risk or suggest resilient solutions. The present work illustrates a novel approach, based on a numerical model chain that exploits a tide-surge-wave operational modeling system (Kassandra), a phase-averaged model (ROMS-SWAN) for the wave propagation towards the shore, and a phase-resolving solver (NSWE) for the prediction of runup and coastal inundation. Such a chain is applied to the bay of Alghero (Sardinia, Italy), where the results of the mentioned chain are compared to those obtained using, in place of the phase-averaged model, an analytical model for the wave propagation. Results confirm that both chain approaches provide comparable inundations, though the use of the analytical, more approximate (e.g., less accurate and reliable description of wave breaking dissipation), model suggests more severe conditions and larger flooded areas. The present contribution provides a methodological approach for an accurate and reliable estimate of coastal flooding.

2019 Special Focus: Coastal Resilience



Tuesday, 16 April

11:25-13:05

PARALLEL SESSIONS

Room 3

Impacts of the Unprotected

Brazilian Climate Induced Migration and Displacement: Caatinga as an Area Susceptible to Desertification in Brazil

Claudia Ribeiro Pereira Nunes, Institutional Research Coordinator, Law School, Associated Colleges of Rondônia, Rio de Janeiro and New Haven, RJ and CT, Brazil

Pedro Diaz Peralta, Researcher, UVA and UCM, Brazil

The Brazilian government announced it is withdrawing its candidacy to host the Conference of the Parties of the United Nations (UN) Conference on Climate Change (COP-25). In this context, the purpose of this research is to draw attention to the scope and complexity of climate migration and Brazilian Caatinga displacement issues as the fall UNFCCC discussions and conclusion of the Global Compact on Migration approaches, and to produce useful outcomes that may accelerate global action on climate induced migration and displacement. The paper addressed a number of perspectives including the economic, social and legal impacts of climate migration and displacement. The research key component addressed to the role of climate information in the legal and policy frameworks national e international, and data tools, climate reports, and perspectives on future global climate change around the limits of in-habitability.

Human Impacts and Impacts on Humans

Climate Change and Occupational Heat Stress Risks and Adaptation Strategies of Mining Workers: Perspectives of Supervisors and Other Stakeholders in Ghana

Victor Fannam Nunfam, PhD Candidate, Edith Cowan University, Perth, Australia

Eddie Van Etten, Edith Cowan University, Perth, Australia

Jacques Oosthuizen, Associate Professor, Edith Cowan University, Perth, Australia

Kwadwo Adusei-Asante, Edith Cowan University, Perth, Australia

Kwasi Frimpong, Edith Cowan University, Perth, Australia

Increasing air temperatures as a result of climate change are worsening the impact of heat exposure on working populations, including mining workers, who are at risk of suffering heat-related illnesses, injury and death. However, inadequate awareness of climate change-related occupational heat stress risks and adaptation strategies have been shown to render occupational heat stress management ineffective. A concurrent mixed-methods approach was used to assess the perceptions of climate change and occupational heat stress risks and adaptation strategies of mining workers among supervisory personnel and other stakeholders in Ghana. Questionnaires and interviews were used to elicit data from 19 respondents. Data were processed and interpreted using descriptive statistics, chi-square and Fisher's exact tests, and thematic analysis.

Supervisors' climate change risks perception was adequate, and their concern about workplace heat exposure risks was moderate. Mining workers' occupational heat stress risks experiences were linked to heat-related illness and minor injuries. Mining workers' adaptation strategies included water intake, use of cooling mechanisms, work-break practices, and clothing use. The related differences in job experience in the distribution of climate change risk perception and occupational heat stress risk experiences, and the difference in educational attainment in the distribution of adaptation strategies of occupational heat stress were significant ($p < 0.05$). Hence, an effective workplace heat management policy requires adequate understanding of occupational heat stress risks and adaptation policies and continued education and training for mining workers.

Human Impacts and Impacts on Humans



Tuesday, 16 April

11:25-13:05

PARALLEL SESSIONS

Room 4

Economic Implications

Regional Income Distribution and Poverty: Vulnerability to Climate Change

Shah Alamgir, Graduate Student, Agricultural Economics, University of Tsukuba, Ibaraki, Japan

Climate change is the reality and a major development challenge to Bangladesh, made the mostly vulnerable country in the world. It is expected to adversely affect all economic sectors specifically agriculture and threatens to escalate the magnitude of poverty. Regional poverty under climate change impacts on farm production is an important challenge to Bangladesh. This study employs cluster analysis, Gini coefficient, variance decomposition analysis, and lognormal distribution under two scenarios (baseline and yield loss) to check the vulnerability of farm income and regional poverty. Estimated poverty rates are for yield loss of rice production due to potential climate change impact. The analytical results show that income inequality exists among the regions while variance of rice income significantly contributes to agricultural income differences. The reduction of the farm income appears to be increase the poverty rates in Jamalpur and Netrokona districts. Overall, this analysis may help to establish links between the farm income distribution and poverty under the potential impact of climate change. Therefore, this study has to evaluate and predict the potential implications and recommend that appropriate technology interventions could substantially reduce losses of farm income from climate change impact in Mymensingh region and elsewhere, where similar conditions prevail.

Assessing Impacts in Divergent Ecosystems

Climate Change's Effect on US Pacific Homeland Security

Shannon Welch, Graduate Candidate, National Security, Daniel Morgan Graduate School of National Security, Washington DC, United States
Since the establishment of the United States, the Pacific has been a crucial interest for both economic and security reasons. As early as 1825, U.S. president John Adams required a better navy to ensure the "flourishing of commerce and fishery extending to the islands of the Pacific." And, as recently as 2012, former secretary of state Hillary Clinton affirmed that America knew the Pacific Islands were "strategically and economically vital and becoming more so." The Trump administration tried to reintroduce this long standing concept with its call for a "free and open Indo-Pacific," and extended the strategic geography of the Western Pacific to spread into the Indian Ocean region. Though it seems to many global risk analysts that we are making the shift to the Pacific too late, the U.S. has had over a century of homeland security built up in the region. This presence of the military has been split into three main regions in the South Pacific: Hawaii, Guam and the Federated States of Micronesia. The region remains strategically vital to the U.S. for two key reasons. First, it is in U.S. interests to prevent the emergence of a regional hegemon that could threaten America and its allies; and second, the U.S. wants to maintain the free flow of goods and ideas to Asia.

Technical, Political, and Social Responses

Adaptation Cost and Benefit to Sea level Rise in a Vulnerable Coastal City in Sub-Saharan Africa, Banjul, The Gambia

Nfamaara K Dampha, Research Assistant/PhD Student, Applied Economics, Natural Capital Project, Institute on the Environment, University of Minnesota, United States

Several studies explore the nexus between migration, climate change, and other environmental challenges. However, there is limited investigation using both qualitative and quantitative methods in establishing the above linkages based on households' risk perception. Using a household survey approach, we find that avoiding climate and environmentally-induced migration requires pro-activeness in reducing households' risk and enhancing their adaptive capacity. Anchored on the New Economics Theory, households in The Gambia's capital city, Banjul are employing migration, as an early avoidance behavior strategy to avert devastating climate change impacts (e.g. rising sea levels) threatening the island city. Accordingly, the findings of our study revealed as follows. First, the net migration rate in Banjul has declined by 113% between 1983 and 2013. Second, 64% of current households in Banjul express positive Willingness to Migrate (WTM) any time before 2050 with and if condition. Third, on average, current households in Banjul are 53% more likely to migrate if they perceive that climate and environmentally-induced factors are primarily responsible for the city's high out-migration rate, ceteris paribus. Fourth, over 30,000 Islanders in Banjul are at risk of becoming Environmental Migrants (EMs) with a mean global Sea Level Rise of 1.0m by 2100, if no aggressive adaptation is considered now. Among others, we recommend that The Gambia government and Islanders in Banjul utilize internal migration as a risk-reduction and adaptation strategy for sustainability purposes.

Assessing Impacts in Divergent Ecosystems

Economic Reform and Environmental Policies in Response to Climate Change in Vietnam

Lam Tran Dinh, Director, Center for Viet Nam and Southeast Asian Studies, Viet Nam National University Ho Chi Minh City- University of Social Sciences and Humanities, Ho Chi Minh, Viet Nam

Vietnam economic reform brought about many encouraging achievements. From a poor country whose food import reached 450,000 tons due to inefficient management in planning the economy, it rose to a middle-income country after 35 years of reform since the opening policy in 1986 as it became the 2nd rice exporter in the world. However, the promotion of economic reform towards sustainable development, adaptation to climate change is essential to Vietnam as of now: what should be done to apply governmental policies into practice more efficiently, help people aware of the importance of climate change in order to reduce its impact on livelihood. Long term cooperation between government, enterprises, and people to create a practical development model with close attention to growth quality is a crucial key to the successful development of Vietnam.

Human Impacts and Impacts on Humans

13:05-13:55

Lunch

13:55-14:40

PARALLEL SESSIONS



USE THE HASHTAG - #CCIR19

Tuesday, 16 April

13:55-14:40

PARALLEL SESSIONS

Room 1

Focused Discussions

Analysis of The Market Choice Act: A Republican Bill Pricing GHG Emissions

Ross Astoria, University of Wisconsin, Parkside, Kenosha, Wisconsin, United States

In July of 2018, Representative Curbelo (R-FL), introduced a carbon tax bill (The MARKET CHOICE Act). This is the first carbon pricing bill from a Republican member of Congress since 2009 and represents a significant breakthrough on the path towards passing effective climate legislation in the U.S. The Market Choice Act places a Pigouvan Price on greenhouse gases in exchange for eliminating the federal excise tax on gasoline. It also includes a border carbon adjustment on emission-intensive trade-exposed products, a streamlining of Clean Air Act regulations, and a partial carve out for existing state-level greenhouse gas pricing policies. The Market Choice Act also funds various research programs and invests in the resiliency of coastal infrastructure. The proposed presentation will provide the details of the Market Choice Act, such as the details of CAA regulatory streamlining, and evaluate those details from the perspective of effective mitigation and economic fairness

Technical, Political, and Social Responses

Songs of Northern California: Sound-Ecology and the Music of Nature

Nicholas Virzi, DMA Candidate, Music, Stanford University, United States

In a world where technological advancements and the “manifest destiny” approach to societal expansion dominate, moments of undisturbed nature have become truly rare, even in preserves like Yosemite National Park – a location of particular interest in my work as a field recording artist and environmental activist. To experience the beauty of untouched nature, one must often travel far abroad in search of the few places which still remain to us, and even these are fast disappearing. In order to understand humanity’s impact on the environment, visual means are simply not enough. Sound often tells us more about how ecological systems are impacted than sight alone, allowing us the ability to perceive the differences in the behavior of species caused by human intervention even when visually it might appear as if nothing has changed at all. My focused discussion would feature original natural soundscape recordings from my ongoing research, as guided aural exercises intended to endow participants with essential perspectives and techniques for listening to, analyzing, and appreciating natural sound, and to illustrate the ecological significance of both scenes of undisturbed nature and those in which species have reacted and adapted to an evermore invasive human presence. Passing through idyllic locations such as Yosemite Valley and Russian River, and suburban environments such as Silicon Valley’s Palo Alto, participants learn to unravel auditory illusions and discern complex acoustic phenomena, identify oscines through musical and spectral analysis of birdsong, and note adaptations in species’ behavior in response to changes in acoustic environments.

Human Impacts and Impacts on Humans

Empathetic Openness, the Role of Youth and Women in the Climate Crisis: Building a People’s Movement in an Era of Human Rights

Carol L. Simpson, President, non-profit, Newpeace, Malibu, CA, United States

With the climate change crises underway, extreme weather events, raising sea levels, and the impact on agricultural production, it is the most vulnerable members of society who will ultimately bear the brunt. Global warming’s ravaging effects are already the cause of untold suffering to masses of people throughout the globe. The optimism of the Paris Agreement has been recently replaced by the consensus that a much more rapid shift than previously understood is imminent. The world is way off target and the challenge much greater than previously understood, with the potential for catastrophic human consequences if the world’s emissions don’t decisively decline by 2020. But it is not just targets that must be reached if genuine international cooperation is to succeed. Less tangible yet no less important will be an understanding of the need for a much deeper empathetic openness to the suffering of others, one whose focus is the common interest of humanity. This empathetic openness is the most vital element for successfully halting global warming and it is the inspiration and involvement of grass roots individuals, especially youth and women, who must assume the vanguards.

Technical, Political, and Social Responses

Global Climate Change and World Politics: A Challenge to International Security

Tooba Ahmad, Lecturer, Humanities, COMSATS University Islamabad, Lahore Campus, Lahore, Pakistan

Today, climate change has become a crucial global priority as it affects national and global security of the nation states. The non-traditional nature of these threats has altered the conventional security paradigm. Incidents like a melting Arctic, rising sea level, unprecedented precipitation or exceptional droughts, extra ordinary flooding, intense wildfires are just a few examples that how this climate phenomenon will threaten societies. Climate change security implications in the form of: water scarcity, food shortage, natural resources depletion can not only cause war, but also accelerate instability and make scenarios worse. Politics of resentment will increase between different regions. The Arab Spring, Pakistan-India water conflict, competition over resources in Middle East, situation of conflict and fragility in South China Sea, Russian-American tussle over Arctic’s energy reserves are some prime examples to predict what future may look like. The states’ interests and security is shared and not independent any longer, therefore, the responses of the world governments to increased instability will define whether wars and military conflicts will happen or not. The only way to address this issue is by dialogue and negotiation on reducing carbon emissions by mankind. There is a long list of ineffective climate protocols and treaties latest of which is The Paris Agreement, but what this world needs is a binding and highly effective climate treaty to mitigate international climate change threats. If the world governments fail to combat this challenge, they will be unable to get through any other security challenge of this century.

Technical, Political, and Social Responses



Tuesday, 16 April

13:55-14:40

PARALLEL SESSIONS

Room 1
Continued

Disaster Mitigation, Deaf Leadership, Adaptation and Resilience: Deaf People's Climate Change Preparedness and Community-based Action

Caroline Solomon, Professor, Science, Technology and Mathematics, Gallaudet University, Washington, United States

Audrey Cooper, Assistant Professor, Gallaudet University, United States

Natural disasters are becoming both more frequent and severe around the world, necessitating short- and long-term mitigation planning and preparedness. Often this planning process does not take in account of people with disabilities (PWD). There is an estimated 1 billion people (15% of the world's population) with disabilities and within this group are deaf and hard of hearing people. Deaf people's information access and participation in disaster mitigation and preparedness is limited due to attitudinal, communication, and educational barriers warranting research into Deaf people's disaster adaptation and resilience. Preliminary research indicates that Deaf organizations are at the forefront of disaster response and recovery, leveraged via established organizational and social media networks. We will present case studies from Ecuador, Puerto Rico, and Viet Nam to guide discussion on how deaf communities are empowering themselves to undertake disaster mitigation efforts. Drawing insights from the ways these cases might inform community-based advocacy, capacity-building, research and training activities around the world, discussion will focus on best practices for mitigation planning, preparedness, and advocacy.

Technical, Political, and Social Responses

The Impact of Refrigeration, Air Conditioning and Heat Pump Sectors on Climate Change: How to Minimize Direct and Indirect Greenhouse Gas Emissions

Fabio Polonara, Professor, Dipartimento di Ingegneria Industriale e Scienze Matematiche, Università Politecnica delle Marche, Ancona, Italy

The refrigeration, air conditioning and heat pump sectors are responsible for almost 8% of global greenhouse gas emissions. One third of such are the so called "direct emissions," linked to the venting into the atmosphere of the working fluid, or refrigerant, used in vapor compression equipment, which is the most extensively used refrigeration technology. Two third of such are the so called "indirect emissions," linked to the energy consumed to run the equipment. To minimize the impact on climate change of the sector, both causes have to be addressed. To reduce the impact caused by refrigerants, the Kigali Amendment of Montreal Protocol, adopted in 2016, will progressively phase-down the HFCs (HydroFluoroCarbons), the refrigerants adopted after the phase-out of CFCs (ChloroFluoroCarbons) and HCFCs (HydroChloroFluoroCarbons) due to the fact that they deplete the stratospheric ozone layer. To reduce indirect emissions the refrigeration, air conditioning and heat pump industry are strongly committed to enhance the energy efficiency of the equipment they produce.

Technical, Political, and Social Responses



Tuesday, 16 April

13:55-14:40

PARALLEL SESSIONS

Room 2

Virtual Lightening Talks

New Defense of the Coasts to Prevent the Sea Level Rising

Pierfranco Ventura, STES Secretary, STES, Rome, Italy

Manlio Palmarocchi, President, STES, Italy

New defense location is in the seabed transition zone between enormous offshore pulsing vertical waves energy and conversion into inshore horizontal currents energy. Artificial reef, articulated in staggered barriers of the turbines, compose a soft defense of the coasts that mimics the coral reef, especially for its location far from the storms. The barriers reduce the sea currents speed below sea level with the consequent deposition of the suspended sand for natural nourishment. The patented vertical turbines are made up of helix fixed to a floating spinning top so as to be in indifferent equilibrium in water, for which they turn by the minimum currents. The electric energy is produced even at low number of laps but long lasting and therefore with hours of production higher than the eolic and photovoltaic. The costs of these barriers are very advantageous compared to the actual coastal defenses, based on the nourishment and on the cliffs, because the direct electrical dispatching cover the cost of amortization, and specially of the maintenance. The new defense, in order to prevent sea level rise due to climate change, also embank the coast flooding through the natural nourishment and re-growth of the marine grasslands, so as recovering hectares of the beaches, with great economic benefits. The reconversion of the usual nourishment and the cliffs by proposed energized reef recoveries the marine ecosystem, the landscape and promotes the sea de-pollution.

2019 Special Focus: Coastal Resilience

On the Assessment of Shoreline Resistance and Resilience

Alec Torres Freyermuth, Associate Professor, Instituto de Ingeniería, Universidad Nacional Autónoma de México, Sisal, México

Gabriela Medellín, Assistant Professor, Universidad Nacional Autónoma de México, México

Giuseppe Roberto Tomasichio, Full Professor, Università del Salento, Italy

Antonio Francone, Università del Salento, Italy

Peter A. Tereszkiewicz, University of West Florida, United States

Leonardo Palemon Arcos, Professor, Universidad Autónoma del Carmen, México

Jose Lopez, Universidad Nacional Autónoma de México, México

Michael Blendonohy

We investigate beach resistance and resilience by means of field observations and a numerical model. A field experiment was conducted on a sea-breeze dominated and micro-tidal beach located in the northern Yucatan peninsula. A temporary groin was deployed for 24 hours to induce a beach perturbation. Beach surveys were conducted with a high spatial and temporal resolution to investigate the beach resistance to the presence of the groin. Moreover, beach surveys continued after the structure removal to estimate the beach resilience. A numerical model was calibrated with the field observation and was further employed to investigate beach resilience and resistance. Numerical results suggest that diffusion is an important mechanism for beach recovery in the study area.

2019 Special Focus: Coastal Resilience

14:40-14:50

Coffee Break

14:50-16:30

PARALLEL SESSIONS



Tuesday, 16 April

14:50-16:30

PARALLEL SESSIONS

Room 1

Measuring Change

CO2 Concentration Increase versus US Bodies of Water Temperature Increase

Warren Hahn, CEO, Mechanical, Electrical, Plumbing and Fire Protection Engineering, Expert Witness & Forensic Engineering, Hahn Engineering Inc., Tampa, FL, United States

A study of the water temperature of eight bodies of water recorded for up to 89 years compared to the quantity of CO2 concentrations recorded during the latter 58 years of this period, conclusively shows that carbon dioxide has no proportional effect on the change in water temperature. Water temperature data for the study included Lake Erie 30 foot depth water temperature 1927 through 2015; the five Great Lakes water temperature 1955 through 2014; Charleston Harbor highest and lowest water temperatures per year 1950 through 2011 and the Keswick Power Plant Dam, California 1950 through 1964. Recorded CO2 concentrations in micro-mol per mole (ppm) from 1958 through 2015 were graphed. Also, an exponential curve of the total U. S. BTU energy consumption from wood, coal, natural gas and petroleum from 1775 through 2009 was created. Exponential curves for the above fossil products were compared to recorded 1958 through 2016 CO2 ppm concentration data. From this a comparative exponential curve of the CO2 concentration from 1828 through 2016 was created. When comparing the CO2 concentration and fossil fuel usage exponential curves with the gradual linear water temperature increase curves from 1850 (when coal use in the U.S began in earnest) through 2016 (166 years) it is abundantly clear that the relatively flat linear water temperature increase as graphed for the eight bodies of water has no correlation with the recorded exponential increase of fossil fuel usage and CO2 concentration for the 166 year time period.

Scientific Evidence

Perceptions of a Changing Ocean: Resilience, Flexibility and the Commercial Fishing Industry

Brianna Haugen, Graduate Research Assistant, Marine Resource Management, Oregon State University, Corvallis, United States

Although there has been an increase in the acknowledgement and research of coupled social-ecological systems, there is still much to be explored to understand the effects of change from various drivers within our communities and ecosystems. These drivers include climate change, management regulations, societal shifts, and market trends. This research identifies the relationships and feedbacks that connect climate change to fisheries management and the fishing industry on the Oregon Coast. In order to inform community members and management of decision impacts, this research situates these relationships within the context of the "graying of the fleet" and, within the broader conversation of resilience and adaptive capacity of a community. Semi-structured interviews with members of the fishing industry were conducted and analyzed. Analysis reveals a shift in social networks, collective knowledges, and the intergenerational transfer of this knowledge. Additionally, results reveal the perception of a shrinking window of opportunity. This window is limited by resource inequality such as access to permits and cost of entry, as well as by external factors such as weather and competing interests. Flexibility to respond to change is dampened by timeliness and responsiveness on all levels. Regardless, fishermen maintain a high level of optimism and perception of ability to adapt. The connections identified through this research allows insight into ways that decisions create barriers or enhance flexibility and resilience to climate change, providing management and communities with the right tools to make the best possible decisions.

Human Impacts and Impacts on Humans

Risk, Preparedness, and Partnership: Are Force Majeure Clauses in Offshore Wind Contracts in Taiwan Ready?

Tsung-Sheng Liao, Professor, Law Department, National Chung Cheng University, Chiayi, Taiwan

Long-term operations and maintenance of offshore wind projects imply that supervening events may stop, damage or destroy those projects. The guaranteed profits and benefits may be suddenly gone. Force majeure clauses function as a precautionary mechanism against those unexpected risk. It excuses the non-performance of a party's obligation in the contracts when extraordinary circumstances render the performance impossible. However, in contrast to the significance of force majeure, force majeure clauses do not draw contract drafters' attention very much. The drafters may omit force majeure clauses intentionally or unintentionally, or just insert clause templates of force majeure into the contracts without being tailored, and cause serious disputes between parties later. Hence, this article argues that offshore wind developers and governments should collaborate as partners to carefully draft force majeure clauses in their offshore wind contracts to allocate future unexpected risks. By examining and analyzing the case of Taiwan, this article proposes fundamental elements and model clauses of force majeure in offshore wind contracts for the parties.

Technical, Political, and Social Responses



Tuesday, 16 April

14:50-16:30

PARALLEL SESSIONS

Room 2

Colloquium

Applied Skills for Climate Change Solutions: Grant Writing, Geographical Information System, and Stakeholders Engagement

Jonathan Berkey, Founder & President, International School-to-School Partnerships, United States

Denise Keele, Western Michigan University, Kalamazoo, MI, United States

Neal Samuel Eash, Assistant/Associate/Professor, Biosystems Engineering & Soil Science, University of Tennessee, Knoxville, TN, United States

Forbes Walker, Environmental Soil Specialist, University of Tennessee Extension, Knoxville, TN, United States

Michelle McCauley, Middlebury College, United States

Michel Gueldry, Professor, GSTILE, Middlebury Institute of Institute Studies, Monterey, CA, United States

Kyle Burnett, Specialist, Ocean and Coastal Resource Management, Middlebury Institute of Institute Studies, Monterey, United States

Six experts examine pragmatic and tested approaches for addressing climate change. Together, they bring instruments and hope for change that address the seemingly prevalent deadlock. Jonathan Berkey (President, International School-to-School Partnerships) is a non-profit and international development manager. He brings his expertise on grant writing strategies for CC projects, and how to approach donors and foundations. Kyle Burnett (Middlebury Institute) specializes in ocean and coastal resource management. He introduces Geographical Information

Systems programs, data sources, and the power of visual software and specialized maps for communication and action. He discusses his field applications and lessons learned in Ireland. Dr. Forbes Walker and Dr. Neal Eash teach engineering and soil science at the TN Institute of Agriculture, Knoxville, TN. They mobilize their experience with agricultural communities to help farmers manage droughts, floods, and soil chemistry, without raising the divisive notion of climate change. Dr. Michelle McCauley, Professor of Psychology (Middlebury College), shares her team's field experience with various stakeholders. She discusses narrative strategies for overcoming the divide between climate change advocates and skeptics, and to get Liberals and Conservatives to work together. Finally, Dr. Denise Keel proposes "ten tips for effective grass-roots advocacy." A professor of Political Science and Environmental and Sustainability Studies at Western Michigan University (Kalamazoo), she draws on her own and her students' engagement with local officials to show that citizen-based advocacy is an effective and powerful way to communicate with decision-makers and elected representatives about climate change solutions.

Technical, Political, and Social Responses

Technical, Political, and Social Responses

Technical, Political, and Social Responses

Technical, Political, and Social Responses

Technical, Political, and Social Responses



Tuesday, 16 April

14:50-16:30

PARALLEL SESSIONS

Room 3

Examining the Data

Carbon Reduction by Novel Triple-/Quadruple-Cycles for Electric Power Generation

Sen Nieh, Catholic University of America, United States

Mariella Leporini, Grant Holder, Università Politecnica delle Marche, Italy

Francesco Corvaro, Visiting Associate Professor, Catholic University of America, United States

Barbara Marchetti, Associate Professor, Industrial Engineering, Università degli Studi eCampus, Washington DC, United States

The United States consumed 38% of its total primary energy of 97.7 quadrillion Btu on its largest energy sector, the electric power generation in 2017. Adverse environmental impacts, carbon-induced global warming, and climate change and natural disasters from fossil-fuel fired electric utility power plants have caused much increased concerns in the past two decades. Performance improvement becoming a major need of the power sector aims at increasing energy efficiency, lowering air pollutants and CO₂ emission, and reducing costs for electricity. This paper explores different natural gas fueled triple- and quadruple-cycle for stationary electric power generation. The novel design can consist of a hybrid of modern gas turbine (GT) - steam turbine (ST) combined cycle integrated with pressurized solid oxide fuel cell (SOFC) and/or waste heat recovery organic Rankine cycle (ORC), totaling to three or four cycles (SOFC-GT-ST-ORC). A math model and numerical simulation of different design configurations of novel triple-/quadruple-cycle power plants are performed, optimized and assessed. Parametric studies for optimal efficiency and power output under different design/operation of major components and ORC fluids were conducted. Encouraging results of 70%-75% overall system efficiency can be obtained, which exceeds the current coal-fired ST power plants of 30%-45%, the modern ST-GT combined cycle power plants of 45% - 60%, and many proposed novel power plants of 55% - 65%. Effects and benefits of highly efficient power plants on fuel saving, carbon reduction, global warming and climate change will also be discussed.

Scientific Evidence

Water Shortages Supply Fuel to Raging Middle East Wars

Ashraf Ghaly, Professor & Director of Engineering, Engineering, Union College, United States

Variations in weather patterns have recently intensified as can be seen in the extreme events the whole world is witnessing, including the Middle East. In addition to these changes in weather patterns, the Middle East experienced man-made factors that aggravated the effects of changing weather. Wars have been raging in Syria and Iraq for many years. Iraq's share of rainfall is very negligible and the country is almost entirely dependent on both the Tigris and Euphrates Rivers for its water needs. Syria receives some rain but the agriculture communities in the eastern part of the country are very much dependent on the waters of the Euphrates River to irrigate their crops. Coupled with decreased amount of rainfall was decisions made by Turkey, where both the Tigris and Euphrates originate, to heavily dam the rivers. Gigantic dams were constructed north of the borders of Syria and Iraq resulted in depriving the rivers of significant amount of their flow. The Ilisu Dam was constructed on the Tigris near the border with Iraq, and the Birecik Dam was erected on the Euphrates just north of the border with Syria. Furthermore, several other dams are presently under construction as part of the Southeastern Anatolia Project, which includes the building of 22 dams and 19 power plants that could cut water flow into Syria and Iraq by fifty percent. This paper aims to show how water shortage sparked conflicts that have been burning for years, and will probably keep burning for some time.

Human Impacts and Impacts on Humans

The Dynamics of Land Cover in Nigeria Using Remotely Sensed Data

Esther Oluwafunmilayo Makinde, Senior Lecturer, Department of Surveying and Geoinformatics, Faculty of Engineering, University of Lagos, Akoka, Akoka, Lagos State, Nigeria

The Nigerian environment changes from time to time. This change is attributed to man's anthropogenic activities of utilizing nature's resources to meet his needs and climate variation. This study assesses the land cover dynamics and the impact of climate between 1986 and 2018 in North-East and South-West of Nigeria. Aqua MODIS NDVI C6 on a geographical mapping grid at approximately 250m and LANDSAT imageries (30m) from the U.S. Geological Survey to assess land cover change were used while the climate data was derived from CHIRPS (0.05o). Based on the spectral characteristics analysis of the MODIS images, five distinct eco-regions for Nigeria were established and land cover change detected.

Subsequently, two hotspots were identified and selected for further analysis. The Landsat images were used to characterise land cover change in these hotspots. Findings show that in Nigeria (2003-2017), there is a decrease in the Desert (3.3%) in the dry season and further decreased (3.5%) in the rainy season, while in the North-East of Nigeria (1987-2018), there is an increase in the Woodland/Gallery Forest (3.51%) and a decrease in Sand Dunes (3.42%). In the South West (1986-2016), there is a decrease in the Open Forest (33.8%) and an increase in the Built-up area (22.8%).

Assessing Impacts in Divergent Ecosystems



Tuesday, 16 April

14:50-16:30

PARALLEL SESSIONS

Room 4

Protection and Resiliency

Educating Engineers in Coastal Resiliency with a Global Perspective on Climate Change

Corinna Fleischmann, Program Chair, Civil Engineering, US Coast Guard Academy, New London, United States
Hudson Jackson, Professor, US Coast Guard Academy, United States

From the assessment of the resiliency of coastal infrastructure due to rising sea level to an understanding of the future impacts of forces of nature on our built environment, the importance of educating future generations of engineers with respect to coastal resiliency is becoming increasingly obvious. At the United States Coast Guard Academy (CGA), the engineering faculty recognize the need to educate the future of our Service and have developed a Coastal Resiliency Course that provides exposure into the science of climate change, its impact on civil engineering infrastructure and on the planning and design of resilient structures. This course provides preparation for the real world practice of engineering by exposing students to the importance of risk and vulnerability assessment within the context of changing climatic conditions. As a sea-going service, the majority of the U.S. Coast Guard (USCG)'s assets are along the coastline. As the USCG's primary accession point for civil engineers, ensuring future engineers are exposed to the potential challenges that will likely occur due to rising sea level is an issue of readiness and therefore of the utmost importance. This paper will specifically address the manner in which CGA has incorporated climate science into engineering education and provides exposure to best practices used in civil engineering to promote infrastructure resiliency in a changing environment. The future demands that civil engineering graduates have an appreciation for the challenges that lie ahead and that they are exposed to current solutions or, at least, means of mitigation for these anticipated dilemmas.

Technical, Political, and Social Responses

Bacterial Contamination in Long Island Sound: Improving Beach Closure Policy and Assessing the Impact of Climate Change

Michael Pascucilla, University of Connecticut, United States

The regulations and policies concerning beach closure set forth by the Environmental Protection Agency and Connecticut Department of Public Health are inadequate in protecting public health. Under current conditions, contaminated beaches are left open to the public for extended periods of time. Current laboratory testing procedures take approximately 24 hours to be returned after the sample reaches the lab and the assay is set up. However, studies show that establishing beach closure on previous-day bacteria tests is accurate only 33% of the time—worse than at random (Morrison, 2005). Moreover, local CT health departments test water quality only once a week—most often on Mondays. This suggests that local health departments do not have the necessary information to determine whether their beaches are contaminated closer to the weekend, the most popular beach bathing days. Though these procedures are useful in evaluating the overall trend of a beach's water quality or detecting a significant contamination event, they are unhelpful for day to day safety. Therefore, new policies and procedures are needed to better protect public health and better determine when beaches are contaminated. This is especially true given recent climate change trends. The increased likelihood of changing and more severe weather patterns have raised the possibility that this threat will be magnified in the future. It is expected that climate change will likely increase the presence of bacterial contamination due to changing environmental factors such as increases in temperature, sea level, extreme precipitation, and other extreme weather events.

2019 Special Focus: Coastal Resilience

The Prevalence of Energy Poverty among Rural Households in Botswana

Sinah Kgosietsile, Associate Researcher, Climate Change, Botswana Institute for Technology Research and Innovation, Gaborone, Botswana
Even though Botswana has experienced exceptional economic growth in recent years, there is still limited access to modern energy services in rural areas. For instance, electrification rate in rural areas is standing at only 54% in Botswana. Rural communities rely mostly biomass fuels whose availability has reduced due to deforestation as a result of population growth. The problem is further compounded by climate change related issues in the energy sector. However, there is still lack of scholarly research on energy poverty among rural communities where climate change is already posing serious challenges. The study seeks to analyze determinants of energy poverty, household responses as well as willingness to use energy efficient measures. This study employs a household survey to assess 100 households in the Kweneng West District of Botswana among the Bakgalagadi. Data is obtained from 15 households per village in four villages in the district. Results are expected to show household's energy uses and how they are obtained, challenges on energy supply, coping strategies and their effectiveness as well as willingness to adopt energy efficient measures. The study is expected to provide a better understanding of the covert impacts of climate change on fuel scarcity directly or as a stress multiplier. It will also bring to light the needs of rural communities with regard to household energy needs to recommend improved measures that can strengthen the capacity of rural communities to adapt to energy poverty and mitigate climate change impacts

Human Impacts and Impacts on Humans

16:30-16:40

Transition Break

16:40-18:20

PARALLEL SESSIONS



Tuesday, 16 April

16:40-18:20

PARALLEL SESSIONS

Room 1

Responsive Initiatives

Using the BRACE Framework to Identify Climate Change Related Health Issues for Locally Relevant Park Education

Lisa Groshong, Doctoral candidate and Research Assistant, School of Natural Resources, University of Missouri, Columbia, United States

Sonja Wilhelm Stanis

Mark Morgan

Health concerns will increasingly impact state park visitors as climate change creates a more volatile environment for outdoor recreation. However, this threat also represents an opportunity to educate visitors. This study presents areas of health concern identified by study participants alongside data on local hazards. We propose integrating both of these into the CDC's Building Resilience Against Climate Effects (BRACE) public health framework as a way to prioritize locally suitable areas for education efforts. Method: This project is based on data from interviews conducted with 17 participants recruited from the Missouri Parks Association, an advocacy group. Participants were asked about perceived climate-related health threats and how these may affect their park visits. Information on local hazards was compiled from regional climate change projections and public health data. Implications: Climate-related health threats identified by study participants were compared to data on public health trends and projected threats. We explore how this information can be integrated into the BRACE framework to help prioritize locally relevant areas for intervention, such as warning park visitors about tick diseases and flash floods on rivers. The next step of this 5-year, NSF-funded project includes conducting facilitated workshops with regional stakeholders to develop locally tailored adaptation plans for state parks.

Technical, Political, and Social Responses



Tuesday, 16 April

16:40-18:20

PARALLEL SESSIONS

Room 2

Mitigation Policy and Practice

The Swedish Debate on Climate Impact from Electric Vehicles

Linda Olsson, Senior Researcher, RISE Viktoria, RISE Research Institutes of Sweden, Gothenburg, Sweden

To meet the Paris agreement, CO2 emissions from road transport need to be severely lowered. In Sweden, as in many other countries, the number of electric vehicles (EVs) is increasing rapidly. This development has led to a recurring debate on whether EVs will help reduce climate impact or not. The aim of this paper is to analyze the Swedish debate on the climate impact of EVs with respect to discourse and validity of the arguments. Thirty-one opinion pieces published between 2010 and 2018 are studied using discourse analysis and a literature study. There are two discourse coalitions; supporters and opponents of EVs. The opponents' main argument is that EVs are not carbon neutral although they lack tailpipes. Several opponents argue that EVs use imported, coal-fired electricity with high CO2 emissions. The supporters' main argument is that EVs use Swedish, fossil-free electricity, thereby causing no CO2 emissions. Supporters also tend to emphasize new technology's potential climate benefits. Neither coalition's arguments are wholly valid, but nor are they wholly false. Swedish electricity production is largely fossil free, but, at times of high electricity demand, fossil-based electricity is imported. Thus, Swedish EVs often use fossil-free electricity, but sometimes they do not. Both coalitions motivate their positions with a desire to reduce climate impact. However, as the debaters generally use principles and system boundaries to suit their arguments rather than to use them properly and consequently, the debate fails to incite a more meaningful dialogue on how to meet the Paris agreement.

Technical, Political, and Social Responses

Historical Responsibility in Climate Justice: A Response to the Non-identity Problem

Makoto Usami, Professor of Philosophy and Public Policy, Graduate School of Global Environmental Studies, Kyoto University, Kyoto, Japan
Many authors on climate justice, most notably Henry Shue, argue that citizens in each economically advanced country have moral responsibility for the emissions of greenhouse gases that their ancestors have made since industrial revolution occurred in the country. It is claimed that these citizens bear the obligation to undertake the extra reduction of current emissions (mitigation debt) and the duty to pay for a substantial portion of the cost of adaptation policies enacted and implemented in less developed countries (adaptation debt). Some proponents of the idea of historical responsibility invoke the polluter pays principle, presupposing that the past large emitters were morally liable. However, the PPP-based argument encounters two objections: the excusable ignorance of these emitters and the non-identity problem. Others apply the beneficiary pays principle by saying that current citizens are responsible for the past emissions because of the benefits they receive from industrialization in their society. The BPP-based argument also appears to be subject to the non-identity problem, while circumventing the ignorance objection. Despite many studies that have referred to this well-known problem, few writers explored the scope of its validity by distinguishing between mitigation debt and adaptation debt of peoples in the North. This gap in the literature is what the present paper intends to fill. After reviewing the state of the art in the study on historical responsibility, the paper seeks to show that the BPP-based justification for mitigation debt can avoid the non-identity problem, whereas such justification for adaptation debt cannot.

Technical, Political, and Social Responses

What Determines Investment in Renewable Energy?

Evelina Mengova, Associate Professor, Economics, Governors State University, University Park, IL, United States

Investment in renewable energy is an investment in our future. However, not every country in the world spends nearly enough on environmentally sustainable energy – either because there are not enough financial resources, or because there is not enough political will in the country to do so. This research attempts to explore what are the determinants of investment in renewable energy in both developed and developing countries, and what are the major constraints each of these types of countries may face in moving towards a more environmentally friendly generation and use of energy. The paper looks for evidence whether country performance indicators (GDP, GDP per capita, FDI), together with governance indicators (Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, and Rule of Law) and the current energy profile of a country have an impact on investment in clean energy.

Technical, Political, and Social Responses

Navigating Spiritual Depths: The Development of an Interfaith Ocean Ethic

David Krantz, Arizona State University, Tempe, Arizona, United States

Scientists famously have an aversion to faith, but there may be no greater leverage point in the world than religion for scientists to utilize. An estimated 84 percent of the world's population belongs to a spiritual faith, and many are fervent followers. Surely the success of any environmental sustainability solution for the planet will be dependent upon its adoption by people of faith. Yet the connections between religion and nature remain vastly under explored. This paper presents an event ethnography of when faith-based environmental leaders met for a week to bridge the divides between religion and science as well as between their own faiths, while delving into their own connections to nature, in order to create an interfaith ethic of the ocean. What was the result of their work? What challenges were faced in the process? And what lessons can be learned for others wishing to follow their path of interfaith cooperation on environmental issues? Research methods include document analysis, event observation and event participation.

Technical, Political, and Social Responses



Tuesday, 16 April

16:40-18:20

PARALLEL SESSIONS

Room 3

Coping Strategies

Climate Variability and Gender Differentials in Decision Making Processes among Farming Households: A Comparative Assessment

Lilian Ezenwa, Lecturer, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria

This paper describes the impact of household activities by gender in areas vulnerable to climatic variability. A multi-stage sampling technique was applied, using both quantitative and qualitative methods of data collection. Primary data was collected using a structured questionnaire while secondary data was obtained from the Meteorological Department Nairobi, Kenya and Lagos, Nigeria. Data obtained were analysed using frequency distribution, trend analysis, percentage and means. A total of 338 respondents were sampled in Baringo County and 158 respondents in Jigawa State. Trend in rainfall pattern has been unstable and fluctuates by 0.44mm and 19.96mm in Baringo County, Kenya and Jigawa State, Nigeria respectively. Majority of the respondents 94.1% (Baringo county) and 60.68% (Jigawa State) affirmed that the climate is no longer stable following observed variations in the elements of climate over time. Perception of respondents were in line with the climatic data records. A differential assessment on socially constructed roles of male and female respondents in farming households of Baringo County, Kenya revealed that the male are key decision makers in choice of crop/seed to plant (50.6%), livestock keeping/feeding (57.4%), land preparation (52.4%) and coping strategies to adopt for climate variability (57.1%). Similarly, the males in Jigawa State, Nigeria took charge, leading decisions on crop/seed to plant (60.7%), livestock keeping/feeding (51.6%), and coping strategies to adopt for climate variability (58.8%) while their females are key decision makers in land preparation activities (57.5%). This implies that female decisions (on agricultural activities and climate variability) in the study areas are undermined.

Human Impacts and Impacts on Humans

Climate Change and Service Learning: Reviewing Teacher's Perceptions

Fides del Castillo, De La Salle University Manila, Philippines

Integral ecology is a concept introduced by Pope Francis in writing Laudato Si (On Care for our Common Home). It is "integral" because the question of global warming that results to climate change is a shared issue of humanity. By integrating service learning in the curriculum, this can bring significant change in the preservation of the environment and reverse the effects of climate change. Service learning is introduced as an essential component in the formation of students to prepare them for lifelong learning. The aim of this study is to shed light to the understanding of Laudato Si and its relevance to climate change and service learning. The study also shows the perceptions of educators in their understanding about climate change and their response to make a better world.

Human Impacts and Impacts on Humans

A Flexible Framework for Process-based Hydraulic and Water Quality Modeling of Best Management Practices

Arash Massoudieh, Associate Professor, Civil and Environmental Engineering, Catholic University of America, Washington DC, United States
Models that allow for evaluation of the effects of design considerations on the performance of best management practices (BMPs) and green infrastructure (GI) to control urban and agricultural runoff and associated contaminants have received considerable attention in recent years. While popular, the GI models are relatively simplistic. However, GI model predictions are being relied upon by many municipalities and State/Local agencies to make decisions about gray vs. green infrastructure improvement planning. The goal here was to develop a sophisticated, yet flexible tool that could be used by design engineers and researchers to capture and explore the effect of design factors and properties of the media employed in the performance of GI systems at a relatively small scale. We deemed it essential to have a flexible GI modeling tool that is capable of simulating GI system components and specific biophysical processes affecting contaminants such as reactions, and particle-associated transport accurately while maintaining a high degree of flexibility to account for the myriad of GI alternatives. The mathematical framework for a stand-alone GI performance assessment tool has been developed and will be demonstrated. The process-based model framework developed here can be used to model a diverse range of GI practices such as green roof, retention pond, bioretention, infiltration trench, permeable pavement and other custom-designed combinatory systems. We will demonstrate the utility of this GI modeling framework to simulate flow and transport in a stream, bioretention, infiltration basin and permeable pavement GI systems.

2019 Special Focus: Coastal Resilience

18:30-19:30

PARALLEL SESSIONS



Tuesday, 16 April

18:30-19:30

PARALLEL SESSIONS

Room 4

Conference Welcome Reception and Poster Session

Perceptions and Awareness of Climate Change and Environmental Stewardship

Nisha Clavier, Instructor of Social Sciences, College of Liberal Arts and Social Sciences, University of the Virgin Islands, Kingsthill, U.S. Virgin Islands

Matthew Perry, University of the Virgin Islands, U.S. Virgin Islands

Wanda Rosario, University of the Virgin Islands, U.S. Virgin Islands

Sharon Honore, Associate Professor, University of the Virgin Islands, U.S. Virgin Islands

Kimarie Engerman, Dean of College of Liberal Arts and Social Sciences, University of the Virgin Islands, U.S. Virgin Islands

Despite the climate change debate, the climate is changing. Human society is impacted by a variety of factors such as new precipitation patterns, rising temperature, and other changes. Nevertheless, changes in human behavior can help reduce climate change. Therefore, a challenge for humans is to maintain a standard of behavior that improves the quality of life around the world while maintaining a viable ecosystem and sustainable climate. Also, human perceptions and attitudes are necessary for environmental stewardship. Thus the purpose of this study is to examine the relationship that exists between the awareness of climate change and environmental stewardship of local residents of St. Croix, Virgin Islands. Surveys via iPads will be administered to 100 individuals at two beaches on St. Croix, Cramer's Park in Christiansted and Rainbow Beach in Frederiksted. The goal of the project is to obtain preliminary data to incorporate in a larger proposal submitted to the National Science Foundation. This project aligns with the Human Dimension research focus area. Obtaining stakeholders' perspectives contribute to knowledge on how residents can contribute to managing the Virgin Islands' environment and natural resources.

Human Impacts and Impacts on Humans

Predictive Models of Functional Connectivity of Threatened Populations in Special Areas of Conservation of the Natura 2000 Network

Elvira Santiago Gómez, University of A Coruña, Spain

Sergio Baamonde, University of A Coruña, Spain

Horacio Naveira, Professor of Genetics, Biology, Universidade of A Coruña, Spain

In order to increase survival probability of the most valuable threatened species and habitats, the European Community (EC) defined a series of strategies to improve management of sites within Natura 2000, the largest coordinated network of protected areas in the world, so that citizens become involved in their maintenance and new tools are implemented to facilitate joint efforts addressed to biodiversity conservation. The general objective of this project, whose final results are due on May 31, 2019, is to develop a predictive tool that helps to orientate conservation efforts in Special Areas of Conservation (SAC) within Natura 2000 in response to ongoing climate change, so that its impact on reducing the loss of biodiversity can be maximized. Specific objectives include: determining habitat preferences and dispersal patterns of two indicator species of small land vertebrates, particularly sensitive to environmental changes, in the SAC Betanzos-Mandoe, NW Spain; estimating gene flow levels between different parts of the SAC through whole-genome molecular markers obtained by next-generation sequencing; fine-scale mapping of suitable habitats; modelling landscape connectivity with the aid of GIS tools; predicting consequences of landscape modification categorised by key elements on population conservation; assessing social attitudes toward environmental conservation in the SAC; and, setting territory management priorities assisted by high-resolution species distribution models. Our contribution will provide a general outline of the global warming scenario in this SAC and describe actions so far implemented under each specific objective of the project.

Scientific Evidence

Climate Change and Small-town Preparation: A Case Study in Pennsylvania Local Government

Olivia Termini, Student, Environmental Studies, Dickinson College, Mountain Top, United States

Since the 1990's, local governments have played a key role in climate change adaptation efforts because of the locality of climate change effects and the lack of international and national progress in mitigating greenhouse gases and preparing communities for climate change. However, while there is a clear body of literature that proposes approaches and adaptation options, few have systematically examined adaptation actions at the local level in developed countries. Additionally, existing analyses have focused on large cities, not small towns. This research will explore if small-town local governments in developed countries consider climate change in their planning processes using three Pennsylvania towns and their preparation for water issues as a case study. If they do prepare, how? If they do not prepare, why? The research approach is twofold: interviews with local government officials in three Pennsylvania towns and a keyword search in local government planning documents for terms related to climate change planning. The results will be presented to each local government participating and will add a new element to the large body of climate change adaptation literature with its discussion of when and why small-town local governments prepare for climate change in developed countries.

Technical, Political, and Social Responses

Green Conversion of Decommissioned Oil Rigs

Barbara Marchetti, Associate Professor, Industrial Engineering, Università degli Studi eCampus, Washington DC, United States

Francesco Corvaro, Visiting Associate Professor, Catholic University of America, United States

Mariella Leporini, Grant Holder, Università Politecnica delle Marche, Italy

Ozlem Kilic, Associate Dean of Engineering, Catholic University of America, United States

Maurizio Brocchini, Italy

This paper present a project for converting a decommissioned oil rig in the Adriatic Sea into an additional source of economic revenue, as well as implement clean, renewable energy in order to demonstrate that oil platforms can be repurposed towards the international objective of decreasing carbon emissions. Numerous methods of clean, renewable energy production were considered, and after careful consideration, a parabolic solar trough system was determined as the most practical. In regards to replacing the platform's operations, a fish farm was determined to be the most economical and environmentally beneficial system. Additionally, a restaurant and hotel are also being considered, however, further economical research is required.

Assessing Impacts in Divergent Ecosystems



Tuesday, 16 April

18:30-19:30

PARALLEL SESSIONS

**Room 4
Continued**

Dynamics of Global Atmospheric Circulation and Climate

Nina Kononova, Russia

Long-term fluctuations of the global atmospheric circulation and air temperature over the period 1899-2017, as well as weather extremes and the dangerous natural processes that are formed on their basis in the world and in Russia in the 21st century have been studied. The classification of the global atmospheric circulation was developed on the basis of the atmospheric circulation classification in the Northern Hemisphere by BL Dzerdzeevskii, VM Kurganskaya and ZM Witvitskaya. The same three circulation epochs are distinguished as for the Northern Hemisphere, as the periods with the greatest positive deviations of the total annual duration of one circulation group from the average multiyear value. Against the backdrop of secular fluctuations, the features of atmospheric dynamics in the 21st century are considered. During this period, the maximum meridional transport of air masses is observed in the lower troposphere. Macro processes with cyclones at the poles, with three or four simultaneous cyclone outlets from low latitudes in three or four sectors of the hemispheres are followed by macro processes with anticyclones at the poles, cyclone outlets from low latitudes in two or four sectors of the hemispheres, and Arctic / Antarctic intrusions in their rear, which form blocking processes. The global average annual air temperature follows the variations in the atmospheric circulation. Simultaneous cyclones outlets from low latitudes in different sectors of the hemispheres cause simultaneous occurrence of dangerous natural processes associated with abundant precipitation in different regions. The types of circulation under which this occurs are revealed.

Assessing Impacts in Divergent Ecosystems

Climate Change and Its Effects on the Hydrophysical Approach to Quantitative Morphology in Catchments

Lazaro Nonato Vasconcellos De Andrade, Professor, Earth Sciences, University of State Bahia, Bahia, Brazil

In the cartography evaluation, quantitative analysis of elements that characterize hydrographic networks in geomorphology has a methodology. However, with the development of remote sensing techniques, the studies that associate the behavior of the environment and the cartographic measurements have been made possible in order to identify the evolution of the flow in watersheds and, as such, to understand water scarcity in the rivers. The use of Horton's quantitative morphology, together with spatial and temporal analysis techniques of remote sensing, was applied in the study of how changes in climate and their consequences in the environment can be measured by the estimation of hydrophysical parameters.

Scientific Evidence

The Effects of Climate Change on Iceland's Renewable Energy Sources throughout the 21st Century

Michael Conway, Embry-Riddle Aeronautical University, United States

Iceland's energy comes almost completely from its renewable resources, with the majority being hydroelectric energy, and the remainder being geothermal energy. For several months, researchers from Embry-Riddle Aeronautical University (ERAU) conducted secondary-source research on the effect climate change will have on Iceland's renewable resources throughout the next century. Most importantly, the researchers emphasized the importance of the Icelandic Government's plans on responding to these upcoming changes. The Earth's rising temperatures are causing a shrinkage of Iceland's glaciers, and changing the water runoff from these glaciers at an alarming rate. The rate of glacial decay is currently overflowing Iceland's dams, but will soon peak, then begin to decrease within the century until the glaciers have completely melted. In order to discover more about the repercussions of climate change, the researchers from ERAU travelled to Iceland, and conducted in-person interviews with both industry professionals, and common Icelanders. Using secondary-source research, combined and cross-referenced with primary source interviews with professionals from Landsvirkjun, citizens from age groups varying between their twenties to their fifties, and other professional workers that came to Iceland from foreign nations, the conclusion was drawn, that the recession of the Icelandic glaciers will render a multitude of Iceland's hydroelectric power stations inert within the next century, and Iceland's response to this energy reduction will be defined by their actions taken within the next decade.

Human Impacts and Impacts on Humans

The Heat of Change : Icelanders Perceptions and Observations of Global Warming

Katalina Montalvo, Student, Ignite Research, Embry-Riddle Aeronautical University, Daytona Beach, United States

Iceland as a northern country glazed with snow and ice, beholding a diverse ecosystem. Temperature has a large impact and climate change has made its presence immediately felt. The increase in water temperature has brought new species to the land and seas of Iceland causing others to reduce in populations or having to move away to find more food or both. This research project reviews the effects of climate in Iceland, the damage the increase in temperature is causing to its fragile ecosystem, and Icelanders account of this change. Data was collected through interviews of native Icelanders, field observations, and second-hand sources. An analysis of the data showed that younger generations are more informed about what climate change means to the future of Iceland. Data also highlighted that older generations have seen firsthand the populations of puffins decreasing, the fish moving north, the glaciers shrinking rapidly, the increase in rains, winds, and less intense winters. The people of Iceland see adapting to new weather and rising rivers as not a very intense matter, but find the possible changes in the Gulf Stream and acidification of waters as horrifying. Many Icelanders are taking advantage of the warmth by growing new crops that could not grow in the harsh weathers before. The future is still unknown for Iceland.

Technical, Political, and Social Responses

Impact, Vulnerability and Adaptation of Brazilian Coastal Cities to Climate Change

Andrea Santos, Professor, Transport Engineering Programme, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

Jose Marengo, Researcher, CEMADEN INPE, Brazil

Suzana Ribeiro, Professor, Federal University of Rio de Janeiro, Brazil

Fabio Scarano, Professor, Federal University of Rio de Janeiro, Brazil

Half of the human population lives in cities and most of it is in the coastal strip. Brazil is no exception to this rule: more than 60% of the population lives in coastal cities. Current climate changes expose coastal cities to rising sea levels, changes in the frequency and intensity of storms, and increased precipitation and ocean temperatures. Each of these factors poses risks to the human population. Increasing the frequency and intensity of extreme rainfall events increases the risk of landslides, floods and floods. Rising sea levels may increase exposure to housing and infrastructure risks, such as schools, markets, hospitals, ports and highways, flooding and erosion in coastal areas. Also, the trend of more intense storms can increase the risk of populations in coastal cities to events such as floods, landslides and coastal flooding. In this context, Brazilian coastal cities demand investments and adaptation measures in the face of climate change, with a focus on reducing risks and minimizing the impacts caused by extreme climatic and oceanographic events observed in the present and projected for the future

2019 Special Focus: Coastal Resilience



Wednesday, 17 April	
08:30-09:00	Conference Registration Desk Open
09:00-09:15	Daily Update—Dr. Homer Stavelly, Common Ground Research Networks, Champaign, USA
09:15-09:45	Plenary Session—Michele Mossa, Professor, Polytechnic University of Bari, Italy
	"Alteration of Spreading Processes in Natural Flows in Times of Climate Change"
	<p>Michele Mossa is a professor of hydraulics at the Polytechnic University of Bari (Italy), with a PhD in hydraulic engineering for the environment and land. He is the chief scientist of the Coastal Engineering Laboratory – LIC, a member of the board of directors of the National Consortium of Universities for Marine Sciences (CoNISMa) for the Polytechnic University of Bari, and a member of the Fluid Mechanics Committee of the International Association for HydroEnvironment Engineering and Research (IAHR). At the University, he was elected as the representative for the Academic Senate, is the coordinator of the PhD course titled "Environmental and Building Risk and Development," and is deputy rector of research and transfer for the University.</p> <p>He has served as a member of the IAHR council, as president of the IAHR Education and Professional Development Section, and as the expert reviewer of research project grant applications in hydraulics and oceanography for both the Research Council of Norway and the OeAD (Österreichische Austauschdienst) GmbH Austrian Agency for International Cooperation in Education and Research. He is associate editor of Scientific Reports - Nature, Journal of Hydraulic Research, Environmental Fluid Mechanics, Engineering & Computational Mechanics, Journal of Multidisciplinary Science, Insight - Civil Engineering, Global Journal of Engineering Science and Researches, SCIRES-IT - SCientific REsearch and Information Technology, Water, and Heliyon. The main topics of his research are relevant to environmental and maritime hydraulics. He is author of many papers and books, and he is actively involved in international and Italian research projects.</p>
09:45-10:15	Plenary Session—Allen Thompson, Associate Professor of Ethics and Environmental Philosophy, Oregon State University, United States
	"A Future They Don't Deserve"
	<p>Allen Thompson is an associate professor of ethics and environmental philosophy at Oregon State University, Corvallis OR. His research concerns broadening our conception of environmental virtue and moral responsibility as a part of understanding human excellence in adapting to the anthropocene. Thompson is vice president and president-elect of the International Society of Environmental Ethics, a past fellow at the Rachel Carson Center (Munich, Germany), and the OSU The Center for the Humanities. He is writing a book on the ethics of novel ecosystems (Routledge, under contract), and has co-edited The Oxford Handbook of Environmental Ethics (OUP 2017) and Ethical Adaptation to Climate Change (MIT 2012). Thompson also serves as book review editor for the journal Environmental Ethics and was a guest on the nationally-syndicated NPR program, Philosophy Talk, discussing climate ethics.</p>
10:15-10:45	Garden Conversation
	Garden Conversations are informal, unstructured sessions that allow delegates a chance to meet plenary speakers and talk with them at length about the issues arising from their presentation. When the venue and weather allow, we try to arrange for a circle of chairs to be placed outdoors.
10:45-10:55	Coffee Break
10:55-12:10	PARALLEL SESSIONS



Wednesday, 17 April

10:55-12:10

PARALLEL SESSIONS

Room 1

Innovation Showcase

Precision Dairy Sensors to Counter the Impact of Climate Change for Small Farmers

Chandrasekar Vuppapapati, Senior Vice President, Data Science and Machine Learning, Hanumayamma Innovations and Technologies, Inc., Fremont, United States

Anitha Ilapakurti, CEO, Hanumayamma Innovations and Technologies, Sharat

Kedari, Engineer, Hanumayamma Innovations and Technologies, Jayashankar

Vuppapapati, CTO, Hanumayamma Innovations and Technologies, Santosh

Kedari, Director, Hanumayamma Innovations and Technologies

Climate change is impacting milk production worldwide. For instance, increased heat stress in cows is causing average-sized dairy farms losing thousands of milk gallons each year; drastic climate change, especially in developing countries, pushing small farmers below the poverty line and is triggering suicides due to economic stress and social stigma. It's profoundly clear that current dairy agriculture practices are falling short to counter the impacts of climate change. What we need are innovative and intelligent dairy farming techniques that employ best of traditional practices with data infused insights. However, there wasn't any heat stress-to-climate models nor were the data. To overcome the data challenge, we have developed low-cost (\$20 per cattle) dairy sensors and deployed in Punjab and Telangana states, and collected, at every 5-minute interval from 09/18/2015 to 11/22/2017, cattle activity, body temperature, and humidity. The application data science technique is known as Decision Tree on the data (approximately 168 million records) with medication, geospatial (ambient temperature/humidity) data has helped us to develop cattle heat stress-to-climate decision models with the accuracy of 73%. The deployment of this data science algorithm into sensors, making it a precision sensor, enabled to deliver early warning heat-stress related notifications to small farmers. This has led small farmers to take proactive actions such as cooling dairy cattle through watering or improving dairy farm ventilation air-flow systems. Finally, we staunchly believe that perpetual learning, by man or by machine, and dissemination of information are the best defense to counter the effects of climate change.

Technical, Political, and Social Responses

Solution to the Increasing Carbon Dioxide and Green House Gas Worldwide: Implementation and Benefits of Biochar

Tommy (Long Chen) Li, Project Manager, Climate Change Initiative, Chemist Without Borders, Taiwan

It has been proven and established by many international organisations and scholars of the benefits of Biochar. Our project objective is to find and connect the experts in various fields so that they can exchange their information, resulting in a strategy of sequestering the carbon that plants all over the Earth have already captured. Keeping that carbon from forming CO₂ will lower atmospheric CO₂, thus slowing and reversing global warming. I hope to take this opportunity to introduce Biochar to the experts that will be attending this conference, furthermore, we are only promoting this product and are not selling it.

Human Impacts and Impacts on Humans



Wednesday, 17 April

10:55-12:10

PARALLEL SESSIONS

Room 2

Educating for Change

Advancing Indigenous Ecological Knowledge for Climate Change Adaptation in Developing Nations

Stephen Chitengi Sakapaji, PhD Student, Graduate School of Global Environmental Studies, Sophia University Tokyo, Japan.

The current research seeks to investigate, define and advance Indigenous Ecological Knowledge (IEK) for climate change adaptation and mitigation in agriculture in developing countries. IEK is knowledge found in a particular region or cultural setting about its nature which has been passed on from one generation to another. To date there is still a gap in harnessing this valuable knowledge and how it can help developing communities around the globe to adapt, mitigate, build resilience and pave way for development to take root in the face of climate change. The study seeks to examine and advance IEK in selected regions of Southeast Asia and Africa. The main goal of this research is to analyze IEK and Practices of different types of indigenous and local communities of Bangladesh, Nepal, Zambia and Uganda relevant to climate change adaptation (CCA) and resilience-building measures with special emphasis on bridging the gap between this valuable knowledge and scientific knowledge at the local and national level and how these practices can be replicated in other regions with similar climate and ecological systems. This research study will be a comparative cross-cultural study to include different cultural groupings and their indigenous adaptation strategies in Agriculture. Overall, this research study seeks and aims to assist and educate governments, NGOs both local and international specifically in developing nations to be able to formulate and implement policies and programs that incorporate elements of IEK in responding to climate change impacts, adaptive responses and resilience building.

2019 Special Focus: Coastal Resilience

Socio-economic Vulnerability to Flash Flood Disasters in Port Harcourt Metropolis, Rivers State, Nigeria

Andrew A. Obafemi, Professor and Director, Centre for Disaster Risk Management & Development Studies, University of Port Harcourt, Port Harcourt, Nigeria

Natural processes variability has been linked to Climate scenario, just as most coastal cities around the world are increasingly facing impacts of climate change - induced flooding. Thus, the menacing impacts of flash flooding in urban and non urbanized communities in Nigeria comes with evidently discernible dangers to lives and properties, yet preparedness and response which are key drivers of mitigation, resilience and community adaptation to flood disasters are barely in place. This necessitated this study which investigated Socio-economic vulnerability to flash floods and how preparedness planning and response have enhanced or otherwise the strategies for down-scaling the losses to flood disasters. The study adopted survey research design in which vulnerability assessment and Disaster Loss Data Methods were employed in drawing up questionnaire on indicators used, while geospatial techniques were deployed to track, map areas prone to flash floods and analyse the pattern observed. Findings revealed severe flash flood impacts on lives and properties in the locality together with urban farmland and crops lost during the flooding. Health facilities, business activities, schooling as well as some sacred engagements were also disrupted. Sudden flood inundations were found to have displaced many people from their homes, with the elderly and the children in the locality highly affected and most vulnerable. The paper thus calls for a more effective and integrated flood control plan of action to mobilize stakeholders and the Municipal Council Authority to put in place preparedness strategies to flash floods occurrence to mitigate the pain, losses and their associated vulnerabilities.

Human Impacts and Impacts on Humans



Wednesday, 17 April

10:55-12:10

PARALLEL SESSIONS

Room 3 Economics of Adaptation

Climate Finance, Green Growth and Shared Prosperity: Reconsidering Climate-related Institutions, Investments and Priorities in Nepal

Tek Jung Mahat, PhD Student, Research Centre for Toxic Compounds in the Environment - RECETOX, Masaryk University, Brno, Czech Republic

Nepal, a least developed, mountainous and land-locked country is consistently ranked as one of the most vulnerable countries to the climate change. Poor socio-economic development, rough and highly unstable geography, inadequate institutional capacity to deal with research, development and policy and mostly underdeveloped infrastructures, all have contributed to increasing vulnerability of communities and ecosystems, and have limited their adaptive capacity. Over past decade, Nepal has made significant progress in some of these areas, particularly in developing and implementing policies and frameworks, and establishing institutional mechanisms with the support of donor countries, UN and multilateral agencies, and will continue to access technologies and financial resources for next level actions, i.e. climate-proof and resilient socio-economic development. As the global climate politics is getting much more complicated, international financing patterns – both climate and development finance – are shifting their ways, forcing the countries like Nepal to diversify the funding base for climate change actions and integrate them within national development plans and strategies. In this paper, using the data and information currently available, we analyse the existing financing situations, discuss the future scenarios and suggest policy recommendations to develop a set of long-term adaptation and impact mitigation strategies in specific and environmental change at large. When short-term adaptation strategies funded from existing financial arrangements seem to be encouraging, we stress the need of “public-private partnership driven full-fledged green economy” focusing on renewable energy and transport, agriculture and forestry, water and water-induced disasters, as well as tourism and hospitality.

Technical, Political, and Social Responses

Econometric Evaluation of Extreme Weather and Climate Events in Atlantic Canada

Yuri Yevdokimov, Professor, Economics and Civil Engineering, University of New Brunswick, Fredericton, Canada, Fredericton, New Brunswick, Canada

In recent years Atlantic Canada has seen many examples of extreme weather and climate events such as floods, hurricanes, thunderstorms, severe rainfalls and snowstorms, storm surges, heat waves and others. These extreme weather events resulted in significant economic damage which has affected lives of people in the region as well as public finances. The existing literature on extreme weather and climate events claims that frequency and magnitude of these events are going to increase in the future due to changing climate. In this regard, this study address two issues - establishing the link between climate change and extreme weather events on the one hand and evaluating economic damage from those events on the other – by means of a rigorous statistical analysis. The relationship between frequencies of floods, hurricanes, heavy rainfalls and snowstorms and climate variables such as temperature, precipitation and sea level is established on the basis of log-log complimentary model and Poisson regressions. Other specific factors associated with each extreme weather event are used as control variables. Our estimation on the basis of these statistical methods has shown a strong and statistically significant positive correlation between frequencies of the above mentioned extreme weather events and climate variables which proves the link between frequencies of these events and climate change in Atlantic Canada. These results are the basis for estimation of the so-called damage functions associated with extreme weather events in Atlantic Canada that will provide economic justification for the investments into preventive and mitigation measures in the region.

Assessing Impacts in Divergent Ecosystems

Public Financing of Intermodal Transport to Reduce GHG Emissions: Challenges Underestimated by Public Decision Makers

David Talbot, Assistant Professor, École Nationale D'administration Publique, United States
Olivier Boiral, Professor, Business Administration, Université Laval, Canada

In 2013, the Government of Quebec (Canada) set up a carbon market (QC ETS) under the Western Climate Initiative. All income from the sale of emission permits on this market is transferred to a Green Fund. This fund made it possible to finance the Program for the reduction and avoidance of greenhouse gases by the development of intermodal transportation (PREGIT). Despite the various strategies to promote the program, only 23% of the budget envelope (\$33 million) was committed between 2013 and 2017. In addition, the low impact of funded initiatives in terms of GHG reduction has also been heavily criticized in the media. The objective of this article is to better understand the difficulties related to the financing and development of intermodal transport. It is based on 36 interviews conducted with key players in the Quebec maritime sector (ports, maritime industry, regional and local communities, and government). This study allowed us to identify 5 factors that could explain the difficulties related to the development of intermodality in Quebec: complexity in measuring GHG reductions, deficient application of the principle of additionality, uncertainty as to the viability and profitability of projects, difficulty in mobilizing stakeholders around a new paradigm of transportation, and, complexity of reporting mechanisms. This research has important managerial and political implications. In particular, it makes it possible to identify important parameters to be considered when developing GHG emission reduction programs in the field of intermodal transport.

Technical, Political, and Social Responses



Wednesday, 17 April

10:55-12:10

PARALLEL SESSIONS

Room 4

Impact Variables

Climate Impact on Survival and Biomass Production of Early Growth of *Pinus Pinaster Ait*

Muha Abdullah Al Pavel, Doctoral Student, Higher Institute of Agronomy (ISA), University of Lisbon, Portugal

Encarna Rodríguez García, Researcher, Research Institute of Sustainable Forest Management

Felipe Bravo Oviedo, Professor, Research Institute of Sustainable Forest Management

Cristóbal Ordóñez Alonso, Researcher, Research Institute of Sustainable Forest Management

Maritime pine seeds from the Meseta Castellana provenance were germinated in laboratory and grown in different nursery conditions of light and Nitrogen availability. The seedlings were transplanted and grown with watering/ non-watering to simulating summer rainfall in the same locality of the seeds source for several years. The objectives of our study were: to identify the most important factors affecting sapling survival in field; to analyse the effect of climate factors on biomass production and partitioning; to compare different methods for biomass estimation; and to analyse the effect of climate factors on the annual basal diameter growth. We led four inventories for measuring biometric variables and counting survival in field. The final harvest was done to estimate biomass and basal diameter growth in the laboratory. A set of equations were fitted to consistent estimation of biomass, and the best models for each biomass components were fitted simultaneously according to seemingly unrelated regression (SUR) method. The Dirichlet method was applied to estimation of the proportion of each biomass components. The cox and linear regression model were applied for survival and estimation of diameter growth, respectively. Our result found the rainfall in summer associate light and without light governed of survival and diameter growth of Maritime pine, respectively. Our result revealed the SUR method was better compared to Dirichlet methods for estimation of component biomass. Our results will helpful to establishing of forest management strategies from nursery products in the field condition, and to choosing the best methodologies to estimation of biomass.

Assessing Impacts in Divergent Ecosystems

Climate Impact and Vulnerability on Coastal Ecosystem of Marudu Bay, Sabah, Malaysia

Justin Sentian, Universiti Malaysia Sabah, Malaysia

Herman Franky, Postgraduate, Universiti Malaysia Sabah, Malaysia

The coastal zones are highly dynamic and are susceptible to the diverse climatic changes. Threats to coastal ecosystem such as in Marudu Bay in the northern part of Malaysian Borneo, which has been recently gazetted as the largest marine park in Malaysia and home to diverse natural habitats and socio-economics activities are eminent under future climate scenarios. Under climate change scenarios, this study presented the results of the coastal vulnerability assessment within the bay based on the climate change exposure, sensitivity and adaptive capacity. In this investigation, climate variables such as surface temperature, total precipitation and sea level rise were used and were analysed for the three time slices (2010, 2050 and 2100) under RCP 4.5 and RCP 8.5 climate scenarios. Under these climate scenarios, Climate Change Vulnerability Index (CCVI) was developed to assess climate change vulnerability of the 12 geographical zones within the bay during the two prominent monsoons (winter monsoon- January and summer monsoon- July). The level of coastal vulnerability at Marudu Bay was found to be moderate, both during winter monsoon and summer monsoon under RCP4.5 climate scenario for the year 2050 and 2100. However under RCP8.5, the coastal vulnerability has shifted to high level of vulnerability during summer monsoon in the mid century (2050) in five geographical zones, while at the end of the century (2100), all geographical zones except one were found to be highly vulnerable and therefore, these priority areas could potentially require high adaptations and mitigation investments.

Assessing Impacts in Divergent Ecosystems

Small Holder Farmers' Perceptions and Vulnerability to Climate Change in the Kyoga Plains of Uganda

Chombo Oketcho, Lecturer, Department of Geography, Gulu University, Gulu, Northern Uganda, Uganda

The sought to assess the vulnerability of small holder farmers of various socio-economic characteristics in the Kyoga plains of Uganda to climate change. It is thought that there is no spatial variation in the level of vulnerability to climate change among the small holder farmers and the level of vulnerability to climate change among them is not dependent on socioeconomic characteristics. The paper highlights the spatial dimensions of socioeconomic impacts of climate change in the communities. The conceptual framework is based on the link between perception of, vulnerability and adaptation to climate change. A post positivist research paradigm was adopted for the paper. The main strategy of quantitative inquiry was the cross sectional survey. The qualitative elements were carried out through narratives with intention of developing themes from the data. The study was done in the Kyoga plains agro-ecological zone of Uganda. Data was collected through data base review, focus group discussions, questionnaires and observation. Indicators for the components of vulnerability (Exposure, Sensitivity and Adaptive Capacity) were selected by Principle Component Analysis (PCA). The inter sub county vulnerability index showed a spatial variation in the level of vulnerability between the different sub counties. Cross tabulation of vulnerability with the ten socioeconomic characteristics of the farmers showed that level of income has the strongest positive correlation with the level of vulnerability. Policy measures should therefore focus on place specific strategies of adapting to climate change rather than region wide strategies and policy should emphasize non-farm livelihood activities.

Human Impacts and Impacts on Humans

12:10-13:15

Lunch



Wednesday, 17 April	
13:15-13:45	Plenary Session—David Titley, Professor, Director of Center for Solutions to Weather and Climate Risk, The Pennsylvania State University, United States
	<p>"Climate Change and National Security: People Not Polar Bears"</p> <p>Dr. David Titley is a professor of practice in meteorology and a professor of international affairs at Pennsylvania State University. He is the founding director of Penn State's Center for Solutions to Weather and Climate Risk. After graduating from Penn State, Dr. Titley served as a naval officer for 32 years and rose to the rank of rear admiral. Dr. Titley's career included duties as commander of the Naval Meteorology and Oceanography Command, and Oceanographer and Navigator of the Navy. While serving in the Pentagon, Dr. Titley initiated and led the U.S. Navy's Task Force on Climate Change. After retiring from the Navy, Dr. Titley served as the deputy undersecretary of commerce for operations, the chief operating officer position at the National Oceanic and Atmospheric Administration.</p> <p>In 2017 Dr. Titley gave a TED Talk on Climate Change and National Security that has been viewed nearly 950,000 times. He serves on numerous climate and security related advisory boards and National Academy of Science (NAS) committees; he currently chairs the National Academies of Science, Engineering and Medicine Climate Communication Initiative committee, and is a member of the NAS Board on Atmospheric Sciences and Climate. He received an honorary doctorate degree from the University of Alaska Fairbanks and is a fellow of the American Meteorological Society.</p>
13:45-14:00	Garden Conversation
	Garden Conversations are informal, unstructured sessions that allow delegates a chance to meet plenary speakers and talk with them at length about the issues arising from their presentation. When the venue and weather allow, we try to arrange for a circle of chairs to be placed outdoors.
14:00-15:00	Catholic University of America Special Focus Session
	<p>The Special Focus Session will include prominent speakers focusing on Coastal Resilience. The Session will start with a plenary presentation by Dr. David Titley. There will be a short question and answer session held at the end of each presentation.</p> <p>Special Focus Session Speakers:</p> <p>Cardinal Sgreccia and Emanuela Midolo "Personalist Bioethics and Its Care to the Ecosystem"</p> <p>Dr. Kevin Forbes, Professor of Economic, Catholic University "Wind Energy, The Price of Carbon Allowances and CO2 Emissions: Evidence from Ireland"</p> <p>Edward Yim, Esq, Energy Policy Advisor, DC Department of Energy and Environment "Rising to the Climate Challenge: Radically Reducing Energy Consumption and Self-supplying Power for Resiliency"</p>
15:00-15:10	Coffee Break
15:10-17:00	Catholic University of America Special Focus Session (Continued)
	<p>Rev. Dr. John Chryssavgis, Ecumenical Patriarchate "Reflecting on and Responding to God's Creation"</p> <p>Giovanni Cecconi, Venice Resilience Lab "Venice Lagoon Adaptation as a Socio-ecological Evolution Process"</p> <p>Kathleen McLaughlin, Senior Vice President and Chief Sustainability Officer, Walmart, Inc. "Enhancing Sustainability in Retail Operations and Global Value Chains"</p> <p>Martin O'Malley, 61st Governor of Maryland "Designing Coastal Resilience"</p>
17:00-18:00	Panel—"Focusing on Solutions and Action Items with Our Heads, Hands, and Hearts"
	Speakers on the panel will include Patricia Andrasik, David Cloutier, Massimo Ciarla, Debra Nauta-Rodriguez, Dr. David Titley, Edward Yim, and Martin O'Malley. The panel will be moderated by Christian de la Rosa, WPGL.
18:00-18:30	Conference Closing and Award Ceremony—Dr. Homer Stavely, Common Ground Research Networks, Champaign, USA





Arabinda Acharya	Care India	India
Tooba Ahmad	COMSATS University Islamabad, Lahore Campus	Pakistan
Shah Alamgir	University of Tsukuba	Japan
Patricia Andrasik	Catholic University of America	United States
Ross Astoria	University of Wisconsin, Parkside	United States
D. James Baker	University of Delaware	United States
Andrew Breeling	Northern Arizona Univeristy	United States
Kyle Burnett	Middlebury Institute of Institute Studies	United States
Fred Byus	Catholic University of America	United States
Giovanni Cecconi	Venice Resilience Lab	Italy
John Chryssavgis	Greek Orthodox Archdiocese of America	United States
Massimo Ciarla	MC5 Consulting Group Inc	Italy
Nisha Clavier	University of the Virgin Islands	U.S. Virgin Islands
David Cloutier	Catholic University of America	United States
James Collis	The University of Texas at Austin	United States
Michael Conway	Embry-Riddle Aeronautical University	United States
Audrey Cooper	Gallaudet University	United States
Francesco Corvaro	Catholic University of America	United States
Nfamara K Dampha	Natural Capital Project, Institute on the Environment, University of Minnesota	United States
Anup Das	Care India	India
Jason Davidson	Catholic University of America	United States
Fides del Castillo	De La Salle University Manila	Philippines
Pedro Diaz Peralta		
Awa Bousso Drame	Columbia University (USA) and Sorbonne University (France)	United States
Ria Jhoanna Ducusin	University of the Philippines Los Baños	Philippines
Miles Dunlap	Northern Arizona Univeristy	United States
Lilian Ezenwa	Michael Okpara University of Agriculture	Nigeria
Corinna Fleischmann	US Coast Guard Academy	United States
Kevin Forbes	Catholic University of America	United States
Claiborn Gayden	Catholic University of America	United States
Ashraf Ghaly	Union College	United States
Lisa Groshong	University of Missouri	United States
Michel Gueldry	Middlebury Institute of Institute Studies	United States
Warren Hahn	Hahn Engineering Inc.	United States
Brianna Haugen	Oregon State University	United States
Emily Haworth	Northern Arizona Univeristy	United States
Michele Hill	Common Ground Research Networks	United States
John Judge	Catholic University of America	United States
Denise Keele	Western Michigan University	United States
Sinah Kgosietsile	Botswana Institute for Technology Research and Innovation	Botswana
Ozlem Kilic	Catholic University of America	United States
David Krantz	Arizona State University	United States
Elizabeth Lancione	Northern Arizona Univeristy	United States



Roger Lang	George Washington University	United States
Doug Levin	Washington College	United States
Tommy (Long Chen) Li	Chemist Without Borders	Taiwan
Tsung-Sheng Liao	National Chung Cheng University	Taiwan
Kees Lokman	University of British Columbia	Canada
Tek Jung Mahat	Masaryk University	Czech Republic
Esther Oluwafunmilayo Makinde	University of Lagos, Akoka	Nigeria
Barbara Marchetti	Università degli Studi eCampus	United States
Arash Massoudieh	Catholic University of America	United States
Michelle McCauley	Psychology	United States
Evelina Mengova	Governors State University	United States
Emanuela Midolo	Università Cattolica del Sacro Cuore / Ut Vitam Habeant Foundation	Italy
Katalina Montalvo	Embry-Riddle Aeronautical University	United States
Michele Mossa	Polytechnic University of Bari	Italy
Sen Nieh	Catholic University of America	United States
Alex Nimusiima	Makerere University	Uganda
Emily Norman	U.S. GAO	United States
Victor Fannam Nunfam	Edith Cowan University	Australia
Andrew A. Obafemi	University of Port Harcourt	Nigeria
Chombo Oketcho	Gulu University	Uganda
Linda Olsson	RISE Research Institutes of Sweden	Sweden
Michael Pascucilla	University of Connecticut	United States
Muha Abdullah Al Pavel	University of Lisbon	Portugal
David Perault	University of Lynchburg	United States
Fabio Polonara	Università Politecnica delle Marche	Italy
Matteo Postacchini	Università Politecnica delle Marche	Italy
Claudia Ribeiro Pereira Nunes	Associated Colleges of Rondônia	Brazil
Wanda Rosario	University of the Virgin Islands	U.S. Virgin Islands
Stephen Chitengi Sakapaji	Sophia University Tokyo	Japan
Andrea Santos	Federal University of Rio de Janeiro	Brazil
Justin Sentian	Universiti Malaysia Sabah	Malaysia
Elio Sgreccia	Ut Vitam Habeant Foundation	Italy
Carol L. Simpson	Newpeace	United States
Caroline Solomon	Gallaudet University	United States
Homer Stavely	Common Ground Research Networks	United States
David Talbot	École Nationale D'administration Publique	United States
Olivia Termini	Dickinson College	United States
Allen Thompson	Oregon State University	United States
David Titley	Pennsylvania State University	United States
Lam Tran Dinh	Viet Nam National University Ho Chi Minh City- University of Social Sciences and Humanities	Viet Nam
Justin Udie	Nottingham Business School, Nottingham Trent University	United Kingdom
Makoto Usami	Kyoto University	Japan
Nicholas Virzi	Stanford University	United States





Chandrasekar Vuppalapati	Hanumayamma Innovations and Technologies, Inc.	United States
Forbes Walker	University of Tennessee Extension	United States
Shannon Welch	Daniel Morgan Graduate School of National Security	United States
Yuri Yevdokimov	University of New Brunswick, Fredericton	Canada
Edward Yim	DC Department of Energy and Environment	United States







Ninth International Conference on Religion & Spirituality in Society

University of Granada
Granada, Spain | 25–26 April 2019
religioninsociety.com/2019-conference



IX Congreso Internacional sobre Religión y Espiritualidad en la Sociedad

Universidad de Granada
Granada, España | 25–26 de abril de 2019
la-religion.com/congreso-2019



Twelfth International Conference on e-Learning & Innovative Pedagogies

Hotel Grand Chancellor Hobart
Hobart, Australia | 2–3 May 2019
ubi-learn.com/2019-conference



Fourth International Conference on Tourism & Leisure Studies

Florida International University
Miami, USA | 16–17 May 2019
tourismandleisurestudies.com/2019-conference



Ninth International Conference on The Constructed Environment

Centro Cultural Vila Flor
Guimarães, Portugal | 23–24 May 2019
constructedenvironment.com/2019-conference



Nineteenth International Conference on Diversity in Organizations, Communities & Nations

University of Patras
Patras, Greece | 5–7 June 2019
ondiversity.com/2019-conference



Fourteenth International Conference on the Arts in Society

Polytechnic Institute of Lisbon
Lisbon, Portugal | 19–21 June 2019
artsinsociety.com/2019-conference



Tenth International Conference on Sport & Society

Ryerson University
Toronto, Canada | 20–21 June 2019
sportandsociety.com/2019-conference



Twelfth Global Studies Conference

Jagiellonian University
Kraków, Poland | 27–28 June 2019
onglobalization.com/2019-conference



Seventeenth International Conference on New Directions in the Humanities

University of Granada
Granada, Spain | 3–5 July 2019
thehumanities.com/2019-conference



XVII Congreso Internacional sobre Nuevas Tendencias en Humanidades

Universidad de Granada
Granada, España | 3–5 de julio de 2019
las-humanidades.com/congreso-2019



Seventeenth International Conference on Books, Publishing & Libraries

University of Granada
Granada, Spain | 5 July 2019
booksandpublishing.com/2019-conference



Fourteenth International Conference on Interdisciplinary Social Sciences

Universidad Autónoma Metropolitana
Mexico City, Mexico | 10–12 July 2019
thesocialsciences.com/2019-conference



XIV Congreso Internacional de Ciencias Sociales Interdisciplinarias

Universidad Autónoma Metropolitana
Unidad Xochimilco
Ciudad de México, México | 10–12 de julio de 2019
interdisciplinasocial.com/congreso-2019



Twenty-sixth International Conference on Learning

Queen's University Belfast
Belfast, UK | 24–26 July 2019
thelearner.com/2019-conference



XXVI Congreso Internacional sobre Aprendizaje

Universidad de Queen
Belfast, Reino Unido | 24–26 de julio de 2019
sobreadaprendizaje.com/congreso-2019



Ageing & Social Change: Ninth Interdisciplinary Conference

University of Vienna
Vienna, Austria | 16–17 September 2019
agingandsociety.com/2019-conference



Ninth International Conference on Health, Wellness & Society

University of California at Berkeley
Berkeley, USA | 19–20 September 2019
healthandsociety.com/2019-conference



IX Congreso Internacional de Salud, Bienestar y Sociedad

Universidad de California, Berkeley
Estados Unidos | 19–20 de septiembre de 2019
saludsociedad.com/congreso-2019



Fourth International Conference on Communication & Media Studies

University of Bonn
Bonn, Germany | 26–28 September 2019
oncommunicationmedia.com/2019-conference



IV Congreso Internacional de Estudios sobre Medios de Comunicación

Universidad de Bonn
Bonn, Alemania | 26–28 de septiembre de 2019
medios-comunicacion.com/congreso-2019



Ninth International Conference on Food Studies

National Kaohsiung University of Hospitality and Tourism
Kaohsiung City, Taiwan | 24–25 October 2019
food-studies.com/2019-conference



Twelfth International Conference on the Inclusive Museum

Muntref, Museum of Immigration
Buenos Aires, Argentina | 7–9 November 2019
onmuseums.com/2019-conference



Sixteenth International Conference on Environmental, Cultural, Economic & Social Sustainability

Pontifical Catholic University of Chile
Santiago, Chile | 29–31 January 2020
onsustainability.com/2020-conference



XVI Congreso Internacional sobre Sostenibilidad Medioambiental, Cultural, Económica y Social

Pontificia Universidad Católica de Chile
Santiago, Chile | 29–31 de enero de 2020
lasostenibilidad.com/congreso-2020



Fourteenth International Conference on Design Principles & Practices

Pratt Institute, Brooklyn Campus
New York, USA | 16–18 March 2020
designprinciplesandpractices.com/2020-conference



XIV Congreso Internacional sobre Principios y Prácticas del Diseño

Pratt Institute, Brooklyn Campus
Nueva York, Estados Unidos | 16–18 de marzo de 2019
el-diseno.com/congreso-2020



Sixteenth International Conference on Technology, Knowledge, and Society

Illinois Conference Center at University of Illinois Research Park
Champaign, USA | 26–27 March 2020
techandsoc.com/2020-conference



Thirteenth International Conference on e-Learning & Innovative Pedagogies

University of the Aegean - Rhodes Campus
Rhodes, Greece | 23–24 April 2020
ubi-learn.com/2020-conference



XVI Congreso Internacional de Tecnología, Conocimiento y Sociadgies

Universidad del Egeo - Campus Rodas
Rodas, Grecia | 23–24 de abril de 2020
tecno-soc.com/congreso-2020



Twentieth International Conference on Knowledge, Culture, and Change in Organizations

University of Illinois at Chicago,
Student Center East
Chicago, USA | 27–28 May 2020
organization-studies.com/2020-conference



XX Congreso Internacional de Conocimiento, Cultura y Cambio en Organizaciones

Universidad de Illinois en Chicago,
Student Center East
Chicago, Estados Unidos | 27–28 de mayo de 2020
la-organizacion.com/congreso-2020



Twentieth International Conference on Diversity in Organizations, Communities & Nations

University of Milan
Milan, Italy | 10–12 June 2020
ondiversity.com/2020-conference



Fifteenth International Conference on The Arts in Society

NUI Galway
Galway, Ireland | 24–26 June 2020
artsinsociety.com/2020-conference



Twenty-seventh International Conference on Learning

University of Valencia
Valencia, Spain | 13–15 July 2020
thelearner.com/2020-conference



XXVII Congreso Internacional de Aprendizaje

Universidad de Valencia
Valencia, España | 13–15 de julio de 2020
sobreaprendizaje.com/congreso-2020



Fifteenth International Conference on Interdisciplinary Social Sciences

National and Kapodistrian University of Athens,
Athens, Greece | 20–22 July 2020
thesocialsciences.com/2020-conference



XV Congreso Internacional de Ciencias Sociales Interdisciplinares

Universidad de Atenas
Atenas, Grecia | 20–22 de julio de 2020
interdisciplinasocial.com/congreso-2020



Tenth International Conference on Health, Wellness & Society

Université de la Sorbonne Nouvelle Paris 3
Paris, France | 3–4 September 2020
healthandsociety.com/2020-conference



Tenth International Conference on Health, Wellness & Society

Université de la Sorbonne Nouvelle Paris 3
Paris, France | 3–4 September 2020
healthandsociety.com/2020-conference

Twelfth International Conference on

Climate Change: Impacts & Responses

Adaptation: Lessons from Venice

Ca' Foscari University of Venice
Venice, Italy

16–17 April 2020

on-climate.com/2020-conference

Call for Papers

We invite proposals for paper presentations, workshops/interactive sessions, posters/exhibits, colloquia, innovation showcases, virtual posters, or virtual lightning talks.

Returning Member Registration

We are pleased to offer a Returning Member Registration Discount to delegates who have attended the Climate Change Conference in the past. Returning research network members receive a discount off the full conference registration rate.



Ca' Foscari
University
of Venice

