

Mitigating Sea Level Rise

Session Co-chairs:

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Abstract:

Sea level rise (SLR) is one of the major factors impacting resilience and sustainable development of societies around the world. The extent of the impacts are more noticeable in coastal urban areas where millions of people and critical infrastructure are concentrated. The potential physical impacts are numerous but may include disappearance of certain low lying islands, nuisance flooding, coastal erosion and saltwater intrusion to freshwater aquifers.

As emissions of greenhouse gases continue to increase, the planet warms melting ice sheets and glaciers which leads to an increased volume of oceans. In this context, future projections show that SLR could have major implications on human civilization by disrupting economies and triggering crises in different areas around the world.

This session addresses state-of-the-art scientific and engineering technologies to better understand, adapt and mitigate impacts of SLR in a world undergoing climate change. Within this context, we will explore the different challenges and new solutions experienced in Japan and the United States.

Our first speaker, Dr. [Keren Bolter](#), Senior Planner and Sea Level Rise Expert in Urban and Coastal Resiliency at [Arcadis](#) will discuss SLR adaptation and mitigation pathways. Next, Dr. [Scott Kulp](#), Senior Computational Scientist and Senior Developer at [Climate Central](#) will discuss sea level rise variations and advanced technologies to better characterize sea level rise impacts at global scale and vulnerability of coastal communities. The third speaker, Dr. [Kazutaka Yasukawa](#), Lecturer from the University of Tokyo will talk about a recovery mechanism of the Earth from rapid global warming in the geological past known as "hyperthermals". However he will emphasize that it is difficult to apply similar mechanisms to current anthropogenic global warming. We have to consider reasonable solutions from both geoengineering and social adaptation. The fourth speaker, Dr. [Takeshi Tsuji](#), Professor of Kyushu University will talk about management of CO₂ in the atmosphere and ocean. His topic will cover Carbon Capture and Storage (CCS) techniques as one solution to reducing anthropogenic CO₂, describing their current status, problems, and future challenges and suggestions. However CCS techniques are not sufficient to decrease the current climate acceleration. We need to get a clue from discussions and other ideas in order to develop other solutions to the anthropogenic CO₂ problem, and these options will be described.

Specific questions to be addressed are:

- What are the current SLR challenges in Japan and the U.S., and how do the challenges in the two countries they compare?
- What is happening with Sea Level Rise? Past, present, future of sea level on earth ([Kazutaka Yasukawa](#) & Dr. [Scott Kulp](#))
- What are the latest advances in adaptation and mitigation pathways (Dr. [Keren Bolter](#) & Dr. [Takeshi Tsuji](#))
- Explore mitigation challenges and new solutions experienced in Japan and the US (All speakers)

Speaker Bios

Dr. [Keren Bolter](#), is an urban and coastal resiliency expert for Arcadis, US, specializing in GIS analysis of people, cities, and the environment to inform data-driven climate resilience. Dr. Bolter leads climate change and resilience initiatives, with a focus on communication that translates information to action. She conducts benefit cost analyses for pre-disaster mitigation to support funding, sea level rise adaptation planning, vulnerability analysis, green infrastructure, and outreach/engagement. She has worked as a professor and as a planner in local government, giving her a unique range of perspectives. She has presented her models and research via a TED talk, and on TV stations including NBC, PBS, National Geographic, the History Channel, and the Weather Channel. She is an excellent communicator and facilitator, bridging the climate literacy gap through hands-on stakeholder engagement. Her experience includes creating and teaching about risk mapping tools which foster data driven decision-making and collaboration. Dr. Bolter's background in climate research utilizes LIDAR elevation, storm surge, and groundwater data. Her analyses overlay assets and socioeconomic data to determine the consequences of climate-related shocks and stressors. More recently, Dr. Bolter has been working on funding of solutions and implementation. In 2018, Dr. Bolter led the development of five FEMA grant applications, all of which are being successfully awarded. These grants will provide nearly \$40 million to support planning and to protect infrastructure for jurisdictions in Florida and Virginia.

<https://www.linkedin.com/in/keren-bolter-23766970>

https://www.slideshare.net/slideshow/embed_code/key/ml0q9jcH6inphv

Dr. [Scott Kulp](#) serves as senior computational scientist for Climate Central's Program on Sea Level Rise, where his research interests include the impacts of sea level rise on coastal communities. Dr. Kulp leads Climate Central's CoastalDEM project, which has received international attention from thousands of media outlets around the world. Scott holds a Ph.D. in Computer Science from Rutgers University for his work on the topic of cardiac blood flow simulations. He also holds a B.S. in Computer Science and Mathematics from Ursinus College.

Dr. Kazutaka Yasukawa is a lecturer at the Frontier Research Center for Energy and Resources, School of Engineering, University of Tokyo. He earned his Ph.D. in engineering from The University of Tokyo in 2015. He worked as an assistant professor at the Department of Systems Innovation, School of Engineering, University of Tokyo from 2015 to 2019. His research interests are in linkages between the genesis of seafloor mineral resources and global environmental changes. He is also interested in past global warmings called “hyperthermals” in the early Cenozoic. He has specialist skills in geochemical analyses and multivariate statistical techniques. <http://www.sys.t.u-tokyo.ac.jp/en/memberpage/159>

Dr. Takeshi Tsuji is a professor at Department of Earth Resources Engineering, Kyushu University, and a lead principal investigator in International Institute for Carbon-Neutral Energy Research (I2CNER). He also works in Disaster Prevention Institute as Kyoto University Visiting Professor. In 2007, he obtained Ph.D. from the Department of Earth and Planetary Science, the University of Tokyo. During 2007-2012, he worked as an assistant professor at Kyoto University. His researches include a wide range of topics, such as geophysics, seismology, hydrology, geology and geodesy. In I2CNER, he is studying CO₂ geological storage in order to reduce CO₂ emission into atmosphere. Currently, he is supervising ~20 students. http://geo.mine.kyushu-u.ac.jp/tsuji/english/e_index.html