

Wed. Jul 15, 2020

[E] Oral | U (Union) : Union

9:00 AM - 10:30 AM JST | 12:00 AM - 1:30 AM UTC | Ch.1

[U-01] Great Debate: Geoscience and societal leadership in support of planetary stewardship

convener:Fumio Inagaki(Japan Agency for Marine-Earth Science and Technology), William F McDonough(Department of Earth Science and Research Center for Neutrino Science, Tohoku University, Sendai, Miyagi 980-8578, Japan), Susanne Buitter(Geological Survey of Norway), Chairperson:Fumio Inagaki(Japan Agency for Marine-Earth Science and Technology), William F McDonough(Department of Earth Science and Research Center for Neutrino Science, Tohoku University, Sendai, Miyagi 980-8578, Japan)

9:00 AM - 9:30 AM JST | 12:00 AM - 12:30 AM UTC

[U01-01] Challenges of the Anthropocene

*Will Steffen¹ (1.Climate Council of Australia)

9:30 AM - 9:40 AM JST | 12:30 AM - 12:40 AM UTC

[U01-02] Climate change: from security perspectives

*Yasuko Kameyama¹ (1.National Institute for Environmental Studies, Japan)

9:40 AM - 9:50 AM JST | 12:40 AM - 12:50 AM UTC

[U01-03] Multiscale stewardship for water-food-energy nexus

*Makoto Taniguchi¹ (1.Research Institute for Humanity and Nature)

9:50 AM - 10:00 AM JST | 12:50 AM - 1:00 AM UTC

[U01-04] Planetary Stewardship in AGU

*Robin E Bell¹ (1.American Geophysical Union)

10:00 AM - 10:30 AM JST | 1:00 AM - 1:30 AM UTC

[U01-05] Great Debate: Geoscience and societal leadership in support of planetary stewardship

*Fumio Inagaki¹, William F. McDonough¹, Susanne Buitter², Guy Brasseur³, Fumiko Kasuga⁴, William Steffen⁵, Makoto Taniguchi⁶, Yasuko Kameyama⁷, Robin E. Bell⁸, Alberto Montanari⁹, Hodaka Kawahata¹⁰ (1.JpGU-AGU Joint Meeting 2020 Program Committee Chair, 2. EGU General Assembly 2020 Program Committee Chair, 3. AGU Fall Meeting 2020 Program Committee Chair, 4. Future Earth Japan Global Hub, 5. Australian National University, 6. Research Institute for Humanity and Nature, 7. National Institute for Environmental Studies, 8. AGU President, 9. EGU President, 10. JpGU President)

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[U-01] Great Debate: Geoscience and societal leadership in support of planetary stewardship

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Chairperson:Fumio Inagaki(Japan Agency for Marine-Earth Science and Technology), William F McDonough(Department of Earth Science and Research Center for Neutrino Science, Tohoku University, Sendai, Miyagi 980-8578, Japan)

Since its emergence some 4.6 billion years ago, the Earth has experienced remarkable environmental changes. Life on this planet has adapted and evolved to these changes, maintaining itself despite several catastrophic perturbation events. Compared to the long history of the planet and life, humanity's brief history (*Homo sapiens*), about 300,000 years, represents a quasi-instantaneous event. Further, with the development of civilization and its agricultural and industrial revolutions, and in particular, since the 18th century with the use of fossil fuels as the primary energy source, the atmosphere, oceans, cryosphere, and biosphere have all changed at an unprecedented rate. This latter era -the Anthropocene- documents an epoch of change in the global system that is irrevocably recorded in the geological record of the planet. What will happen to our future, because the planet will continue to evolve? The geoscience community must continue and enhance its connections with society as it integrates fundamental knowledge into the stewardship of the Earth. Likewise, industrial leaders have a great responsibility in the stewardship of the planet, particularly in shaping policies and human response. The Great Debate will provide a range of viewpoints and disciplines the opportunities to discuss the global planetary stresses that are imposed on humans. We will address questions that focus on the role (code) of geoscience and society in planetary stewardship. Participants will be invited to share their latest knowledge, views, and perspectives on these questions. Please actively contribute to this interdisciplinary discussion during the JpGU-AGU Joint Meeting 2020.

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[U01-01] Challenges of the Anthropocene

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[U01-02] Climate change: from security perspectives

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[U01-03] Multiscale stewardship for water-food-energy nexus

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[U01-05] Great Debate: Geoscience and societal leadership in support of planetary stewardship

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Challenges of the Anthropocene

*Will Steffen¹

1. Climate Council of Australia

The Anthropocene is a unique point in time, where human history collides with Earth history. This talk will explore the origins of the Anthropocene, both as a concept and a term. Using Earth System and geological/stratigraphic frameworks, we will outline the trajectory of the Anthropocene in the context of recent and longer term Earth history, with a focus on both the physical climate system and the biosphere. However, it is humanity that now plays the dominant role in the trajectory of the Earth System, which demands an exploration of the human dimensions of the Earth System. As we look to possible future directions of the planet in the Anthropocene, a clear picture is yet to emerge. Where on Earth are we going?

Climate change: from security perspectives

*Yasuko Kameyama¹

1. National Institute for Environmental Studies, Japan

Climate change is widely recognized as one of the most serious threats to human beings and ecosystems. As our understanding of the climate change problem has increased, we have also witnessed a vast increase in the use of terms “climate security” by experts and practitioners worldwide. Numerous publications have addressed the issue of climate security, and many other studies have aimed at categorizing definitions and approaches of climate security. Four types of approaches emerged by reviewing existing literature; (1) long-term irreversible planetary changes, (2) short-term abrupt risks to individuals, (3) cause of conflict and violence, and (4) impacts on military and defense organizations. Table1 summarizes what is assumed as threat and what is assumed to be protected from the threat so that the differences become clearer. The four approaches also send different messages on how insecure conditions can be mitigated. The first approach considers the long-term climate change to be a serious threat, not to the national security of any one country, but to future generations and the global ecosystem. Advocates of this approach are worried that the progression of climate change could render Earth uninhabitable. The only way to avoid the crisis is to mitigate climate change by reducing GHG emissions. The long-term temperature goal such as 2°C needs to be achieved from the viewpoint of this approach. The second approach considers extreme weather events and other impacts of climate change at the regional level as a threat to individuals. Extremely high temperatures and epidemics of diseases could have serious health implications, and the food and water supply could be limited by serious droughts. All these concerns are less relevant to national security and much more related to human security, food security, and water security. Adaptation actions are required to improve the situation. The third approach focuses on the interactions between the impacts of climate change and conflict between people. With this approach, “threat” originates from people outside of your own community. Displaced people may immigrate due to damages caused by climate change, and the immigration could raise tensions between various groups of people. As the impacts of climate change do not always lead to conflict, regions need to increase social stability by improving the level of governance and building resilience to natural hazards. The fourth approach employs a narrower definition of security, one in which national security is conducted by the military. National security has been concerned with other countries’ armed forces to a nation state. With “climate security”, however, the threat has been expanded to include a wide variety of impacts of climate change. To avoid these losses, those using this approach emphasize the importance of military and national security strategies to take into account the impacts of climate change. Categorization of climate security concept is useful to recognize various types of threats we need to take into account, and to check if each country is well prepared for them.

Keywords: climate change, security, conflict, social instability

Table 1: Summary of the four categories of climate security discourse ↵

Category↵	Threat↵	Objects of protection↵	Means to improve level of security↵
Long-term irreversible planetary changes↵	Global changing climate, warming world↵	The planet, human beings, and the ecosystem↵	GHG emission reduction at global level↵
Short-term abrupt climate change risks↵	Extreme weather events and other impacts of climate change to individuals↵	People's daily life, including stable supply of basic human needs ↵	Adaptation measures, building resilience↵
Cause of conflict and violence↵	Migration and other causes of conflict between groups↵	Own group↵	Reduction of social instability ↵
Military and defense implications↵	Long- and short-term damages (i.e. sea level rise, extreme weather events)↵	National territory, military facilities, and defense forces↵	Adaptation in the area of defense and other military operations↵

Multiscale stewardship for water-food-energy nexus

*Makoto Taniguchi¹

1. Research Institute for Humanity and Nature

Water, energy, and food are fundamental resources for human beings and sustainable society with livelihood including agriculture and industries, and these resources are interlinked each other beyond the boundaries of single resource management. Therefore, integrated management and governance for water-energy-food (WEF) nexus is important by increasing synergies and reducing trade-offs among the three resources, environment/society/economy factors, and local/national/global scale. However, there are many disconnections of governances between not only three resources and different spatial scales, but also between sectors of production and consumption, and agencies of protection of environment and development of economy. Who should take responsibility of stewardship for multiscale water-food-energy nexus? How to manage the tradeoff between carbon footprint as global environmental impact and water footprint as local environmental impact through multiscale WEF nexus? Belmont Forum SUGI project "METABOLIC" has been analyzing the multiscale WEF nexus for sustainable resources management. Scenario and impact assessments by using system dynamics model and footprints analyses have been made for understanding how each area is inter- and intra- connected on WEF nexus by using three databases of resources, interlinkage, and scenario in multi-spatial scale. Analyses of the change in WEF nexus structure also have been made, and assessments of the changes in three resources, carbon emission, environmental and economic impacts are analyzed. These analyses with stakeholders can help to make future policies for sharing the roles of governance, land intensive policy and others to increase synergy for sustainable future.

Keywords: water-energy-food nexus, tradeoff and synergy, multiscale stewardship

Planetary Stewardship in AGU

*Robin E Bell¹

1. American Geophysical Union

Society today is facing many challenges, and opportunities, that critically depend on the Earth and space sciences. Planetary stewardship is intertwined throughout these topics as many of the challenges and opportunities in the 21st century are at the global scale. Societies, by catalyzing, leveraging, and engaging members of our science, play a key role in addressing these. Leadership is needed through strategic efforts, mobilizing our science, policy positions, programming, communication and engaging the public in new ways, expanding our scientific community and providing a welcoming culture that rewards planetary stewardship, and also developing partnerships with new stakeholders. Examples at AGU include our new strategic plan; position statements, for example on Addressing Climate Change and on Open FAIR data; and programs such as the Thriving Earth Exchange, Ethics, and Voices for Science.

Great Debate: Geoscience and societal leadership in support of planetary stewardship

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Keywords: Planetary Stewardship, Anthropocene, Geoscience, Sustainability, Resilience, Co-evolution