# IGC 2024

37th International Geological Congress
Busan, Republic of Korea, August 25-31, 2024

## T34 Energy and Carbon Neutrality

## Session: Offshore renewable energy systems and submarine geohazards

Conveners: Shinji Sassa, Yasukuni Okubo

Offshore renewable energy systems are rapidly advancing to meet global requirements for sustainable development and carbon neutrality. Underwater fiber optic cables, underwater power cables, and underwater pipelines have been laid over many parts of the seafloor, and their importance, either strategic and economic, increased dramatically in recent years. However, these marine and offshore infrastructures are at risk from cascading multi-geohazards that include landslides, tsunamis, earthquakes, and volcanic eruptions. Submarine landslide tsunamis are now seen from all geological environments; passive, convergent and strike-slip margins, as well as volcanoes. Due to their widespread occurrence across the globe, submarine geohazards that impact people's lives and critical infrastructures such as offshore renewable energy systems are a globally relevant and crucial issue to be better addressed in the face of global climate change. For the development of offshore renewable energy in a wide variety of geological settings including narrow continental shelves, plate subduction zones and steep seafloor topography, however, risk management and geohazard mitigation strategies need to be defined. Furthermore, the seabed is subjected to diverse forms of submarine geohazard risks owing to intensified environmental forcings under global climate change, amid an increase in needs for further offshore development. Hence, offshore renewable energy systems that are generally installed at water depths of up to 200m are at increasing risk from numerous submarine geohazards, including seabed liquefaction, seabed creeps, submarine slides, turbidity currents, shallow gas eruptions, mud volcanoes, large scale sand wave movements and scour and erosion around marine and offshore structures. These natural activities could cause damages and failures in offshore renewable energy systems, from foundations to arrays and export cables. With the transition to clean energy solutions, these submarine geohazards pose risks to power supply at regional and global levels. In these contexts, this session addresses new challenges toward the global development of offshore renewable energy systems in a wide range of geological settings susceptible to submarine geohazards.

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## T31 Geohazards

## Session 5: Our Tasks on Global Submarine Geohazard issue to our future earth

Conveners: Kiichiro Kawamura, Char-Shine Liu

This session is to discuss widespread submarine geohazards across the globe. Submarine geohazards range from volcano eruption to earthquakes, tsunamis, seabed liquefaction, seabed creep, submarine slides, turbidity currents, shallow gas eruptions, mud volcanoes, and sediment instability such as migrating bedforms and scour and erosion around marine and offshore structures. Submarine landslide tsunamis are now seen from all geological environments; passive, convergent and transform margins, as well as volcanoes. We target the full spectrum of such geohazards that impact people's lives and critical infrastructures. Offshore renewable energy systems are rapidly advancing to meet global requirements for sustainable development.

Underwater fiber optic cables, underwater power cables, and underwater pipelines have been laid over many parts of the seafloor, and their importance, either strategic and economic, increased dramatically in recent years. However, these marine and offshore infrastructures are at risk from multiple cascading multi-geohazards that include landslides, tsunamis, earthquakes, and volcanic eruptions. Due to their widespread occurrence across the globe, submarine geohazards are a globally relevant and critical issue to be better addressed in the face of global climate change.

In these contexts, this session addresses new challenges toward the global development of offshore renewable energy systems in a wide range of geological settings susceptible to submarine geohazards.