



Director Toshio Suga

Mission: Elucidate and project the response and adaptation mechanisms of marine ecosystems to Earth system dynamics

WPI-AIMEC will expound on the response and adaptation mechanisms of marine ecosystems to Earth system dynamics and will facilitate systematic forecasting of marine ecosystem change through fusional approaches that integrate marine physics, ecology, and mathematical information science. Consequently, a new academic field “Ocean-Ecosystem Change Systematics (OECS)” will be established.

※ Earth system changes: The complex and interactive changes in the Earth’s atmosphere, oceans, ecosystems, and other elements.

Missions

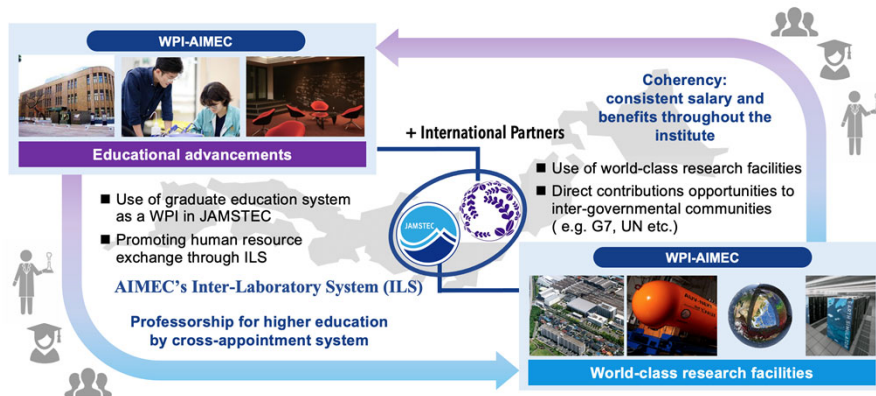
Global warming has caused rapid environmental changes in the ocean, which covers about 70% of Earth's surface. The mission of this center is to achieve the following goals by focusing on marine ecosystems:

- We will deepen our understanding of the **connectivity, stability, and adaptability** of factors vital to the maintenance of marine ecosystems through interdisciplinary approaches to establish advanced Earth system models that integrate marine ecosystem change.
- This will lead to the creation of a new academic field, “**Ocean-Ecosystem Change Systematics (OECS)**”, which will contribute to “**Planetary Stewardship**” for the restoration and recovery of the marine environment and ecosystems.

※ Planetary stewardship: Codes of conduct and principles for responsible management and protection of the Earth.

Features

As an alliance-type WPI center, **Tohoku University’s basic academic and higher education functions** and **JAMSTEC’s oceanographic research and computational platform functions** will be strongly linked to promote cutting-edge interdisciplinary research that contributes to the elucidation and projection of marine ecosystem change and fosters the establishment of human resource competencies globally.



Research

We will designate the Northwest Pacific Ocean as a priority area and conduct interdisciplinary research related to:

1. Clarification of the interactions between climate, ocean, and ecosystems
2. Elucidation of environmental response and adaptation mechanisms of marine ecosystems
3. Prediction of changes in marine ecosystems.



- We will conduct geophysical observations, environmental DNA (eDNA) analysis, and laboratory experiments while focusing on “regime shifts”, which are rapid structural shifts in marine ecosystems over a wide area.
- We will employ AI machine learning approaches to conduct integrated computational analysis of big data on ocean physics and ecosystems, and build an marine ecosystem change model for global application.

Partnerships

