

KITAZAWA LAB.

Marine Food and Energy Utilization



Large-Scale Experiment and Advanced-Analysis Platform

Marine Ecosystem Engineering
Department of Systems Innovation, Graduate School of Engineering

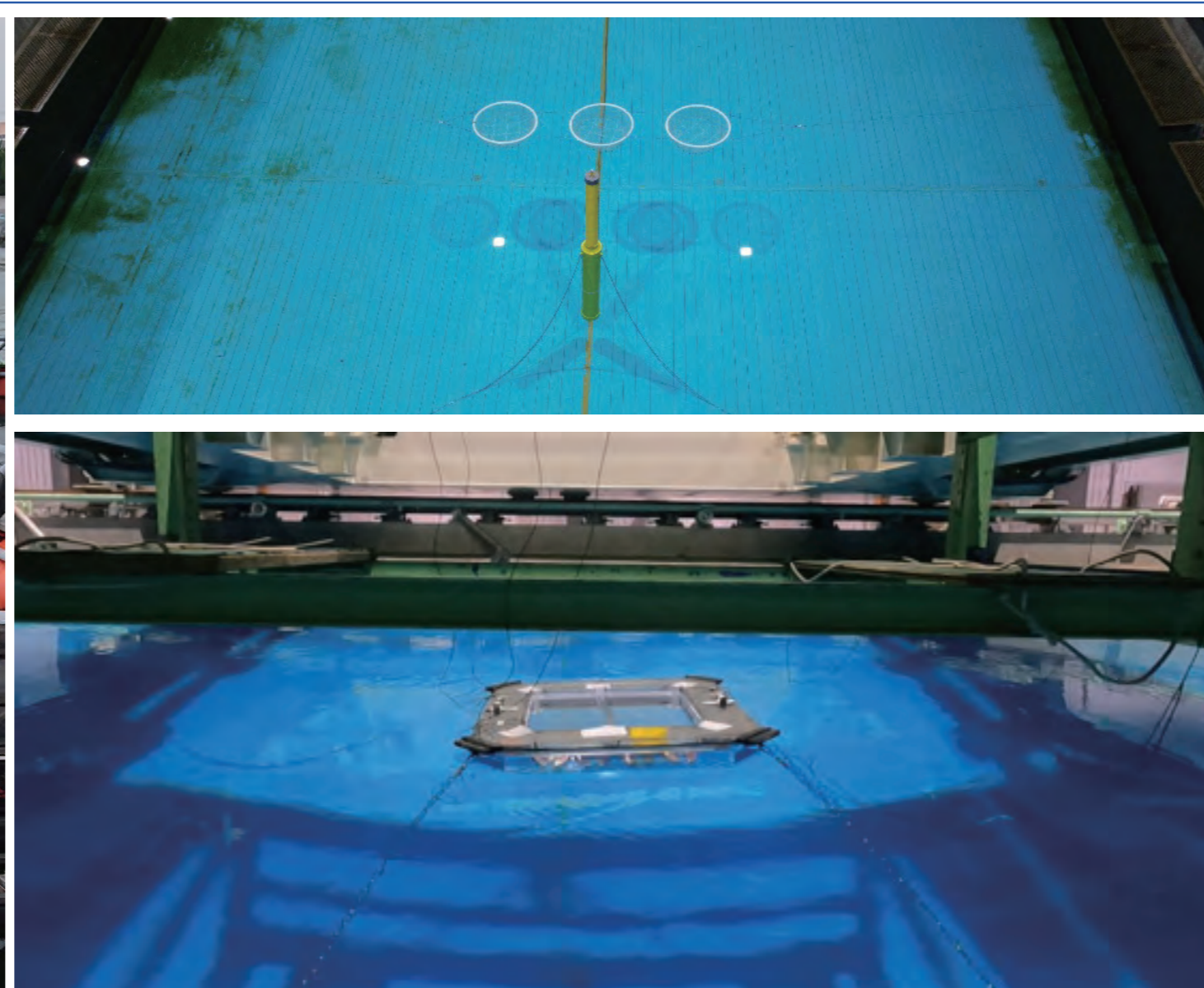
http://mefe.iis.u-tokyo.ac.jp/index_e.html

Utilize Marine Food / Energy and Preserve Ecosystem

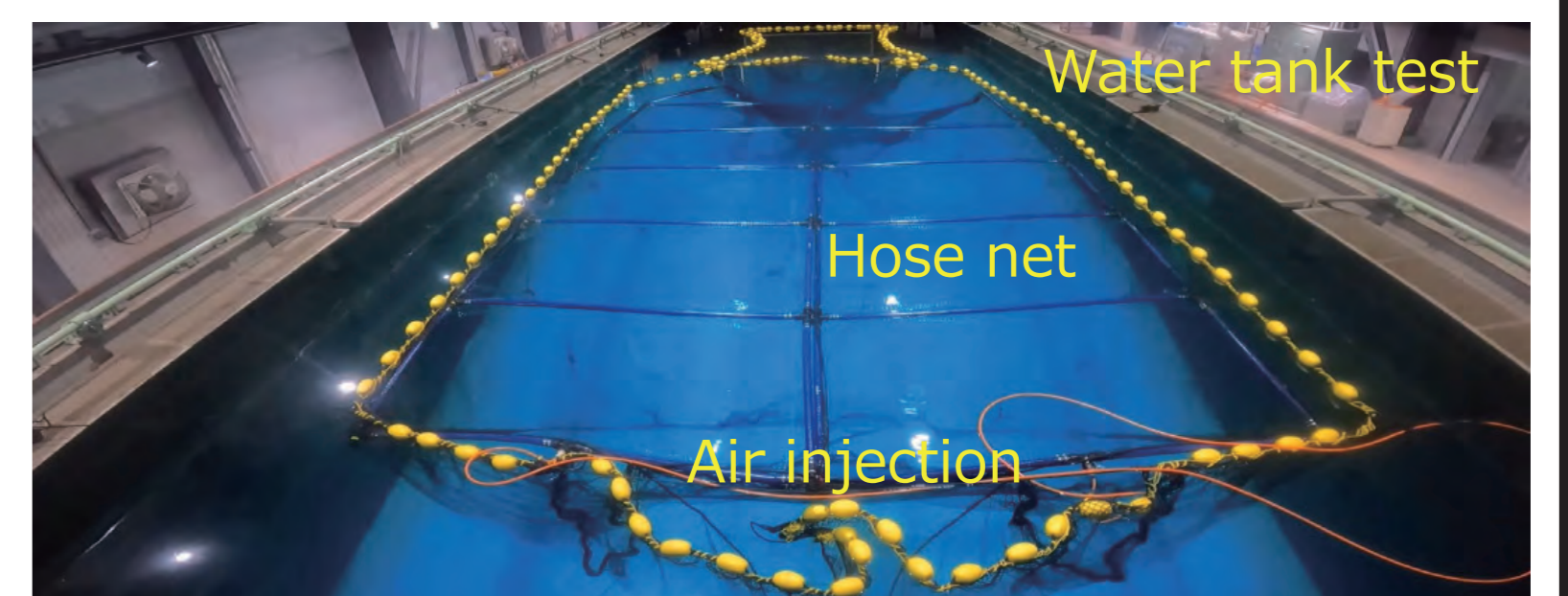
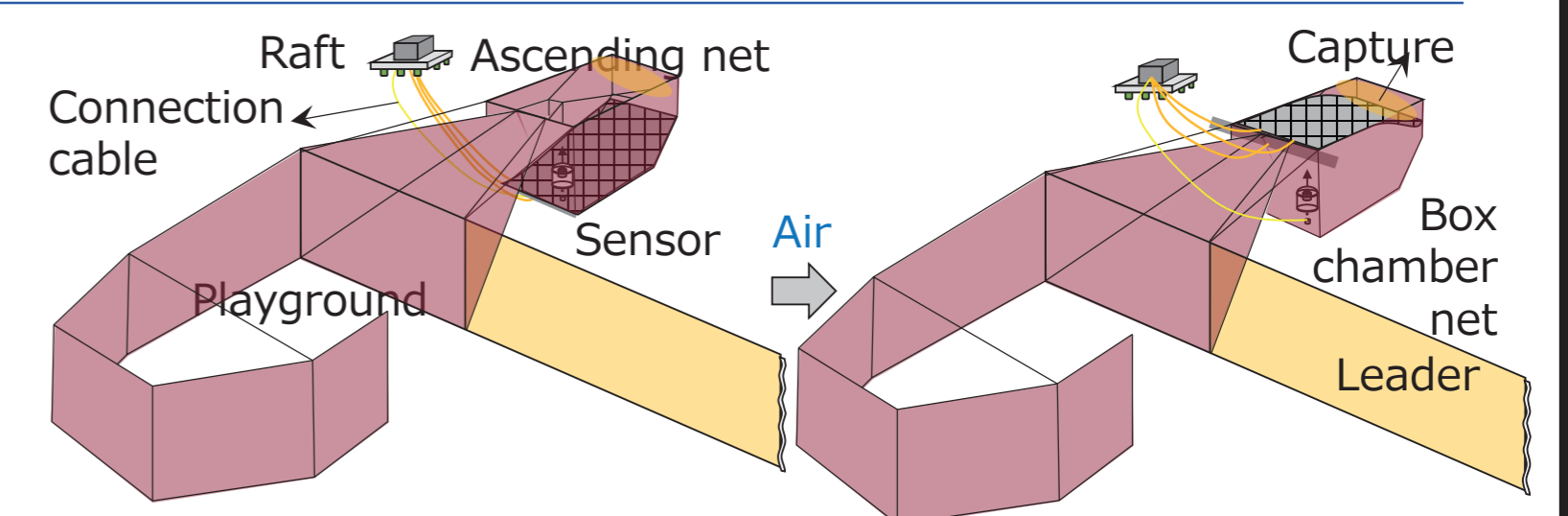
We are engaged in research on **the utilization of food and energy resources in harmony with marine ecosystem**. We study on aquaculture system that is robust against environmental changes and disasters, as well as the smart fishery and the use of wave energy using **water tank testing** and numerical simulation. We are also exploring **marine resource development in harmony with the ecosystem** through **hydrodynamic-ecosystem simulations** and **biological experiments**. We conduct not only laboratory experiments and simulations but also field experiments for societal implementation. Towards sustainable marine resource use, we aim to ensure **food and energy security**, **revitalize regions** with declining birthrates and aging populations, and promote **sustainable development**.



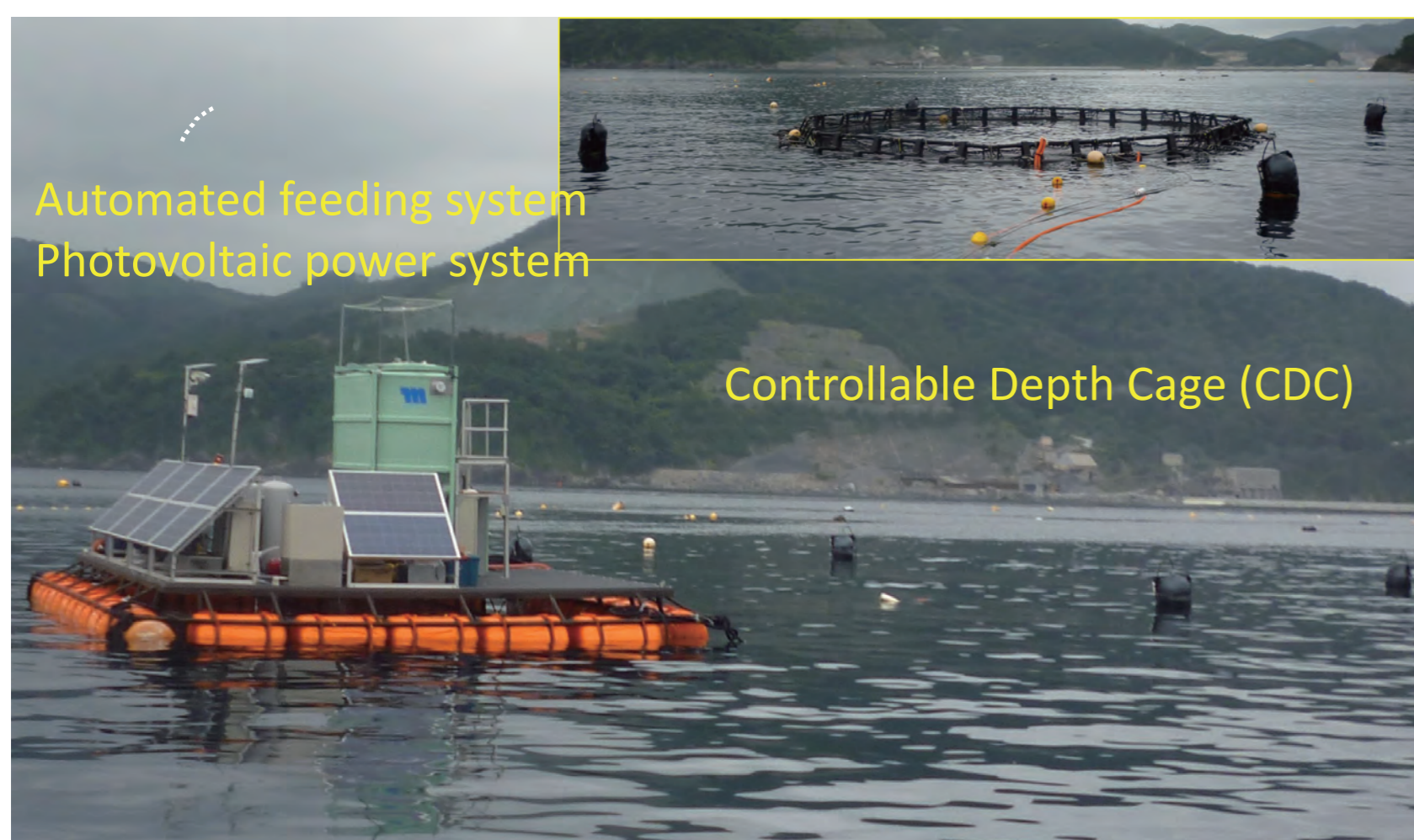
Marine Semi-closed Circulation Aquaculture System
Robust aquaculture against high water temperature and red tide



Collaboration between offshore wind and aquaculture
Multi-use of sea area



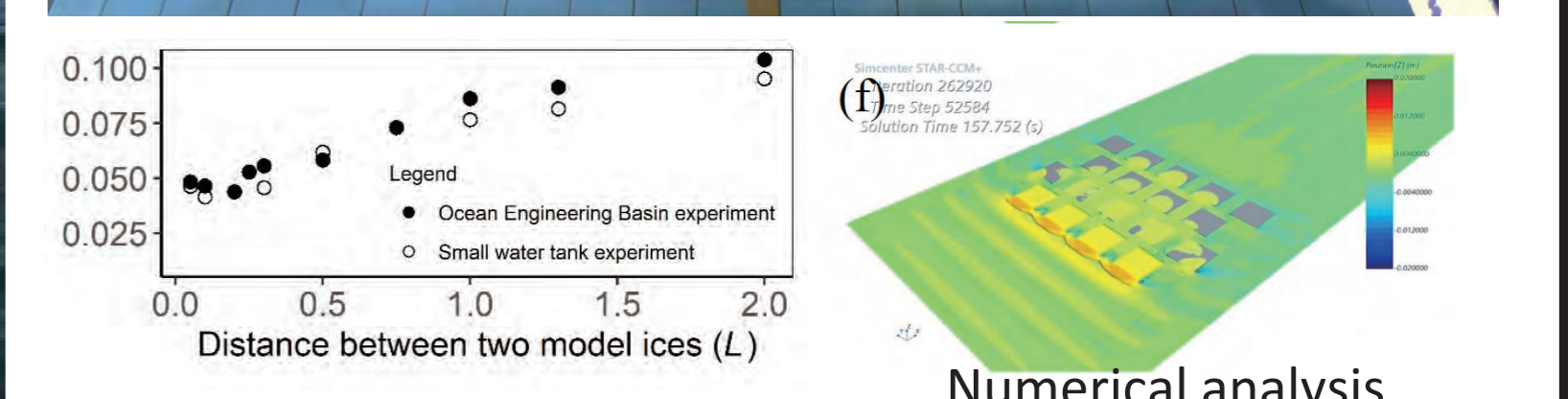
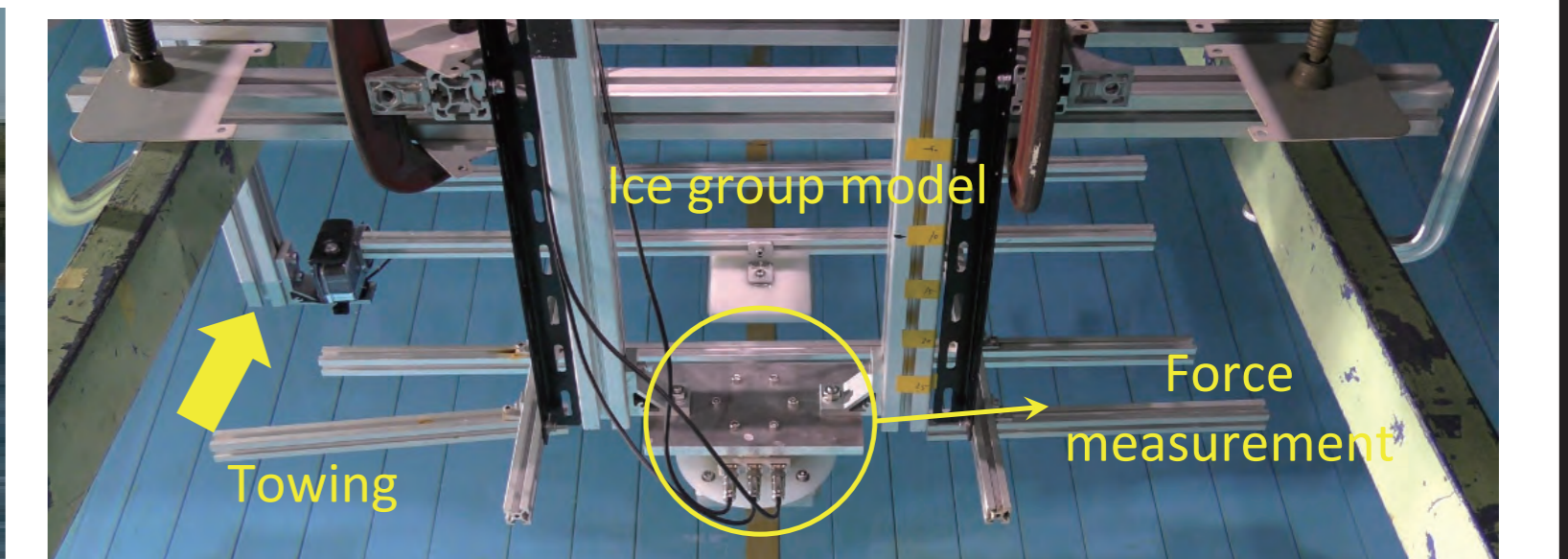
Automated Fish-guiding System
Labor-saving of net-hauling operation for resource management



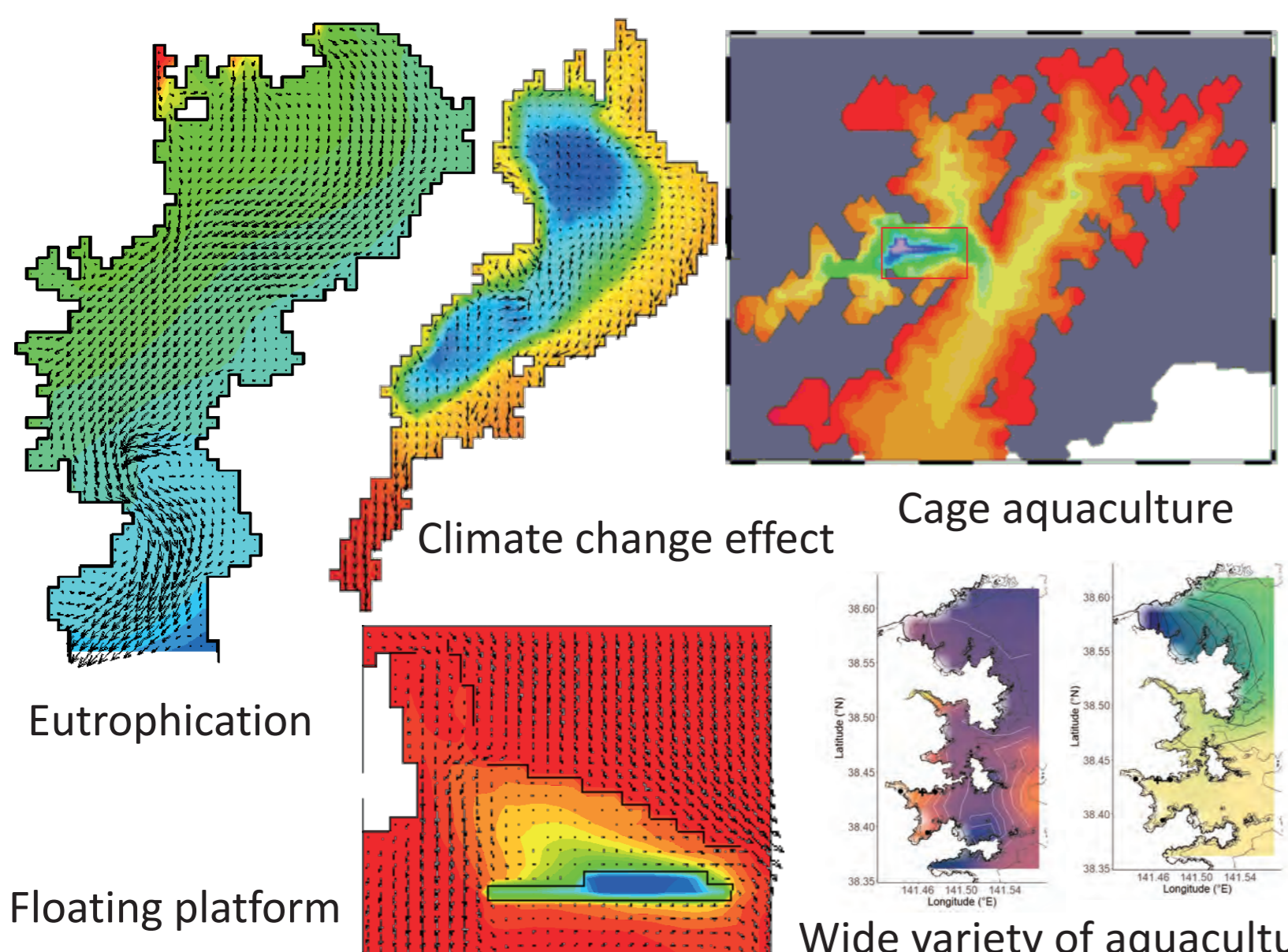
Controllable Depth Cage and Automated Feeding System
Controllable depth cage (CDC) can be installed at any depth.



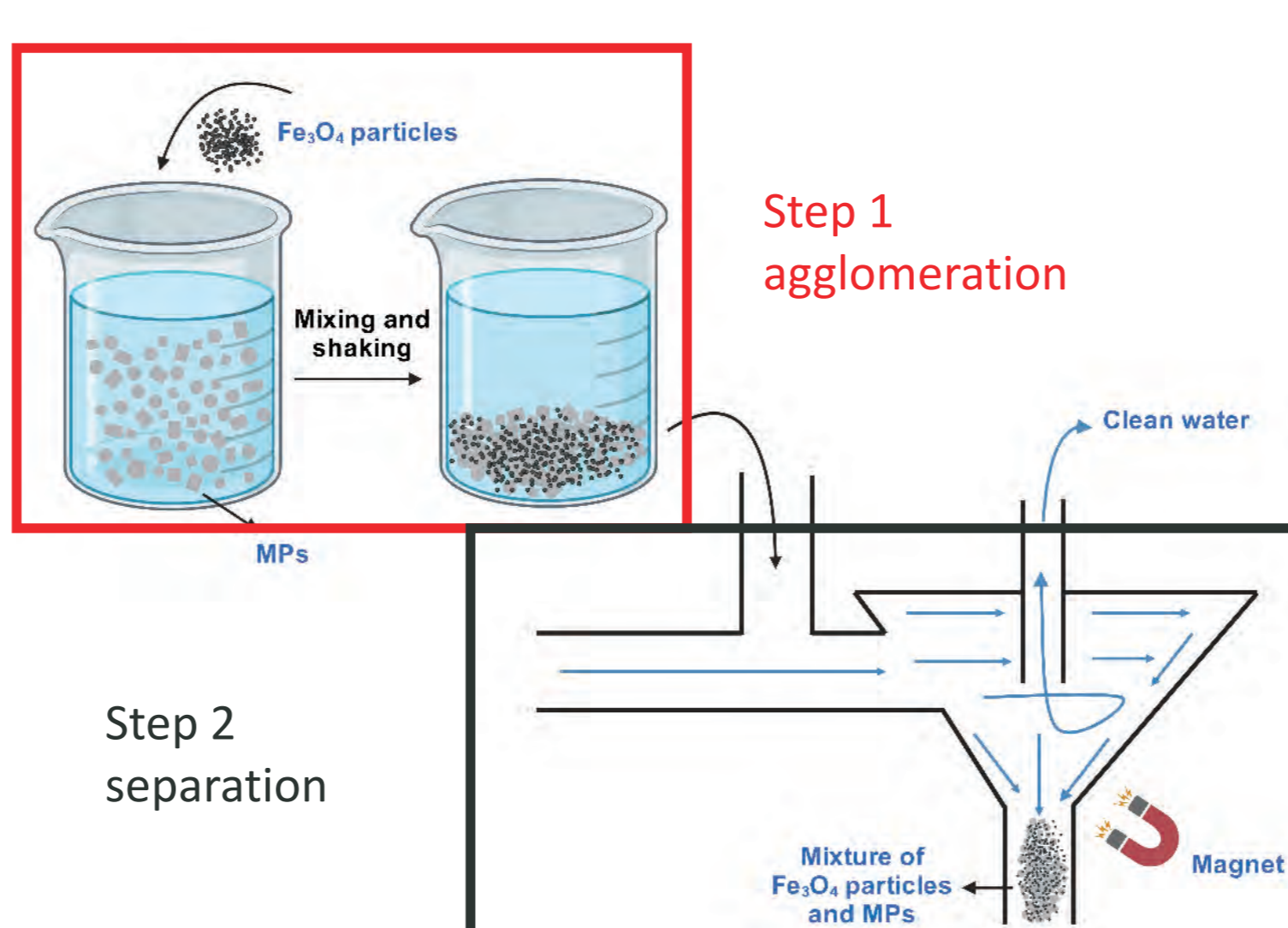
Wave Harmonizer
Motion-controlled ship with wave energy harvester



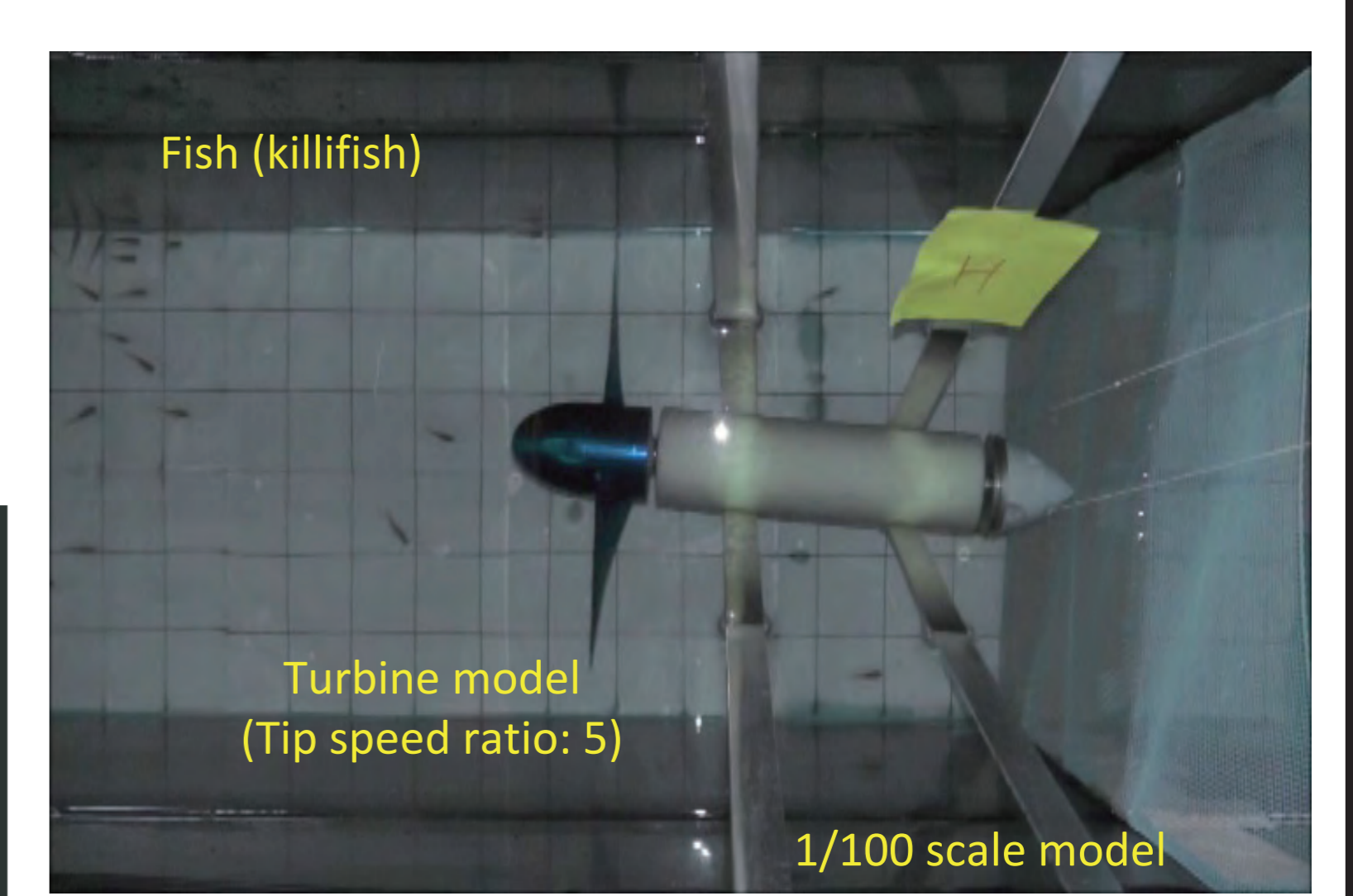
Ice Group Interfering with Marine Structure
Hydrodynamic force on a single ice in the group of ices



Numerical Simulation using Hydrodynamic and Ecosystem Coupled Model
Interaction between human activities and marine ecosystem



Efficient removal of microplastics from water
By integrating magnetic adsorption and hydro-cyclone technology



Collision Risk of Marine Animal to Turbine Blades
Observing collision and behavior of fish considering similarity law