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**Roles of benthic foraminifera in carbon cycling at
marginal oceans with active tectonic forcing:
in situ experiment and observations**

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Forearc region along arc-trench system is an active area of sedimentation. Sedimentary basins with thick piles of hemipelagic sediments are typically distributed in the area. Sagami Bay is one of typical sedimentary basins at forearc region. High rates of sedimentation at the basin are sustained by the lateral input of organic and inorganic particles from land or coastal areas. Hydrocarbon ore deposits are characteristically developed in the basins, as carbon burials actively take place at sediment-water interface (SWI). Benthic organisms, in particular to benthic foraminifera, should play roles to mineralize organic carbon at the sediment-water interface.

The aims to evaluate roles of benthic foraminifera in carbon budget at deep-sea floor, we have long been observing material cycles around sediment-water interface at a permanent station in Sagami Bay, Japan. Our basic strategy for research is to carried out both observations and experiments directly at deep-sea floor. For this purpose, we have developed both *in situ* feeding devices and planer optode systems. Mineralization potentials are measured through *in situ* feeding experiment with carbon-13 labeled food materials. Two dimensional images of both oxygen and pH are visualized through planer optode system. Respiration signals both by O₂ and CO₂ are excellent proxies for mineralization of organic carbon.

In this presentation, we try to figure out our deep-sea observation systems and to explain results obtained through the systems. Our observation shows that benthic foraminifera play important roles in carbon cycling at SWI. Benthic foraminifera consume and mineralize one third of deposited POM at SWI. Benthic foraminifers are also playing big roles in carbon burials at SWI by active plough of sediment particles.