B-10 Estimation of effects of sea level rise caused by global warming

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Rapid sea level rise (SLR) induced by global warming has been predicted in recent years. According to IPCC (Intergovernmental Panel on Climate Change) medium estimation, the rate of SLR would be 6mm per year during 21st century and the total SLR by 2100 would be 65cm. Global warming and SLR would change climates and hydrologic conditions in coastal regions all over the world. These changes will enhance natural disasters such as flood, innerflood, storm surge and salinization, along coastal regions. In order to adopt appropriate measures to these disasters and other effects of SLR, sufficient assessments of effects of SLR should be implemented.

Our group have studied the effects from various points of view. These studies are positioned as pilot cases for the future assessments. Studying both domestically and internationally, we intend our survey to be applicable around the world.

Our group consists of five sub-groups. The results by each sub-group are as follows.

a) Integrating ground elevation, landuse data and socio-economic statistics, we developed the method for grasping socio-economic loss of inundated area by SLR. In the case study in Thailand, ground elevation and landuse are acquired by Landsat Image.

b) Applying the recently developed cosmodetic survey method such as VLBI and GPS, we connected positions of some tidal survey stations in Japan to global datum, to confirm the precise amount of SLR. For more efficient survey, a portable VLBI antenna was developed and pilot surveys were practiced.

c) Examining the boring cores from Saroma lake and Tokoro plain in north-eastern Hokkaido, we revealed the paleo-environment change such as coastal ecosystem and paleogeography, and its relationships to sea level change in Sea of Okhotsk from the end of glacial period to the present. This result would be useful in predicting the future change of cosatal environment accompanied with SLR.

d) The research on impact evaluation to social infrasystems was carried out. First, "chains of affecting path" are drawn out, and analyzed in some studied areas. Then evaluating techniques for specific impacts were introduced in coastal areas in Japan, China and Tonga. Finally, the vulnerability of these regions were estimated.

e)Deformation of coral reef by enhanced storm surge by SLR has been assumed. In this study, aspects of land deformation of coral reef were experimentally clarified, and also the function of artificial barrier reef was evaluated.