

# Climate change impacts on flow field in the Seto Inland Sea based on RCP8.5 scenario

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We developed an integrated hydrodynamic environment assessment model to simulate hydrological discharge from river basins and subsequent hydrodynamic processes in coastal ocean. We have been performing numerical predictions of climate change impacts on water environment in the Seto Inland Sea, which is the largest semi-enclosed sea in Japan, using the model with 1 km spatial resolution under the Representative Concentration Pathway (RCP) scenarios for possible future climate conditions.

This study describes climate change impacts on flow field in the sea in accordance with the numerical predictions under the present (the end of 20th century) and the RCP8.5 future (the end of 21th century) climate conditions. Forcing meteorological data was extracted from “Regional Climate Change Projection Data” (Ministry of Environment) produced by the Non-Hydrostatic Regional Climate Model with 20 km spatial resolution (Meteorological Research Institute).

Under the present climate condition, from the climatological view, we found the clockwise flow trend (from Bungo Channel to Kii Channel) in the Seto Inland Sea, even though the flow field had large seasonal and interannual variations. Focusing on Harimanada, which has comparatively high biological productivity, there was constant eastward flow from Bisanseto (the region adjacent westerly to Harimanada), and it strengthened in summer and winter, weakened in spring and fall. The climatological flow at Akashi Strait (the eastern boundary of Harimanada) was eastward in summer and winter, which was same as Bisanseto, but turned to westward in spring and fall, meaning that there was a flow trend from Osaka Bay to Harimanada. Under RCP8.5 future climate condition, however, the winter eastward flow in Bisanseto and Akashi Strait was enhanced, yet other tendencies were basically similar to the ones under the present climate condition, which were described above. This consequence suggested that the winter transport from Osaka Bay to Harimanada would decrease then transportation of nutrients would weaken under RCP8.5 future climate condition.

Keywords: climate change, flow field, RCP8.5 scenario, the Seto Inland Sea