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Change of ocean circulation in the East Asian Marginal Seas under different climate conditions

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Global climate models do not properly resolve an ocean environment in the East Asian Marginal Seas (EAMS), which is mainly due to a poor representation of the topography in continental shelf region and a coarse spatial resolution. To examine a possible change of ocean environment under global warming in the EAMS, therefore we used North Pacific Regional Ocean Model. The regional model was forced by atmospheric conditions extracted from the simulation results of the global climate models for the 21st century projected by the IPCC SRES A1B scenario as well as the 20th century.

The North Pacific Regional Ocean model simulated a detailed pattern of temperature change in the EAMS showing locally different rising or falling trend under the future climate condition, while the global climate models simulated a simple pattern like an overall increase. Changes of circulation pattern in the EAMS such as an intrusion of warm water into the Yellow Sea as well as the Kuroshio were also well resolved.

Annual variations in volume transports through the Taiwan Strait and the Korea Strait under the future condition were simulated to be different from those under present condition. Relative ratio of volume transport through the Soya Strait to the Tsugaru Strait also responded to the climate condition.