

Development of an ocean-river-surface runoff seamless model

*Shinichiro Kida¹

1. Japan Agency for Marine-Earth Science and Technology

The ocean receives significant amount of freshwater through river discharges. One of the challenges of regional-scale numerical ocean models is to capture this input of freshwater that often occurs spontaneously. Weather events are not well captured by monthly data sets that are publically available. The boundary between river water and oceanic water masses are also difficult to capture with a lateral boundary condition that is physically fixed in space. In order to simulate the movement of freshwater cycle from land to the ocean, we have developed an ocean-river-surface runoff seamless model based on an oceanic isopycnal model. This approach enables simulations of river discharge events based on precipitation data, which is more publically available in space and time, compared to river discharge data. The movement of water based is also solved with a same dynamical core. We previously demonstrated the capability of this new approach through validation of Abukuma river discharge event during a typhoon. We now extend this model to solve the rivers of main Japanese islands for various other rivers. Preliminary results show promising results, with multiple freshwater plumes forming at various river mouths of Japan, small to large, as the center of the typhoon moves from south to north.

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