

3D Visualization of Characteristic Flows in the Ocean

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Ocean flow field is mixture of multi-scale vortices and streams that have ambiguous boundary lines in nature. Meanwhile, these vortices and streams change their form and velocity at every moment. The ambiguity of boundaries and unremitting transition make us difficult to recognize the ocean flow structure.

In order to support recognition, we introduced the new partition-based visualization methods that segment the ocean flow field to each vortex and stream, and visualized the scales of them in the previous workshop, the 6th OFES Workshop. In our methods, the boundaries of vortices are defined as the closed line that indicates tangency area of vortex-core region (which mass does not mix with outer mass) and outer flow region, and the boundaries of streams are defined as valley lines of the flow speed distribution. We proposed independent segmentation methods for vortices and for streams.

In this research, we extend our methods to 3D ocean flow field and apply them to OFES data set. The most difficult problem is reducing cluttering of visualization obstacles in the visualization results. We suggest a reducing strategy to avoid cluttering of visualization obstacles by considering ocean phenomena. Some prototype results will be shown in the workshop.