

Oceanography Seminar

“Multiyear prediction of ocean jets and eddies with an initialized eddy-resolving ocean general circulation model”

Thursday, February 29, 2024, 3:00p.m., MSB 100

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Increasing evidence from observational and modelling studies have demonstrated that frontal-scale ocean variability, such as meandering of jets and mesoscale eddies, plays an important role in water-mass formation, air-sea interaction, and transports of active and passive tracers. While our understanding on characteristics and driving mechanisms of oceanic fronts and eddies have been significantly advanced in recent decades, an accurate monitoring and prediction of these frontal-scale ocean variability and their possible coupling with the atmosphere are still difficult even for the state-of-the-art ocean and climate models. As a first step toward archive this goal, we have developed a novel ocean nowcasting and forecasting system (named as the JCOPE-FGO) that covers the quasi-global ocean (75°S-75°N) with a horizontal resolution of 0.1°x0.1°. By assimilating various kinds of satellite and in-situ observations into an eddy-resolving ocean general circulation model (OGCM), the JCOPE-FGO provides estimates of three-dimensional fields in the world oceans and forecasts of their evolutions at multiyear timescale. First, I will introduce a brief overview of the JCOPE-FGO system to demonstrate that our newly developed system can better capture observed frontal-scale ocean variability compared to other existing ocean reanalysis products with coarser spatial resolutions. Then, I will present results from a series of retrospective forecasting experiments and show that our system is skillful at predicting observed year-to-year variations in the intensities of the jets and eddies in the Kuroshio Extension and Gulf Stream regions up to the lead times of about 2 years. Multiyear predictability of ocean mesoscale eddy activity in other part of the global ocean will also be discussed with the aid of a 10-member ensemble integration of OGCM without data assimilation.

[Schedule of upcoming seminars](#): Thursdays, 3:00pm, MSB 100