

AT A GLANCE

What is it?

To determine how upwelling in the East China Sea and Yellow Sea (ECSYS) is dynamically controlled or modified by tides.

How does it work?

Use HYbrid Coordinate Ocean Model (HYCOM) in conjunction with observational data to investigate newly proposed dynamical hypotheses.

What will it accomplish?

The dynamical insights gained will lead to a better understanding of the dynamics related to upwelling in the ECSYS that will be applied to Navy's Global Ocean Forecast System (GOFS).

R&D Sponsor(s)

Office of Naval Research

Point(s) of Contact

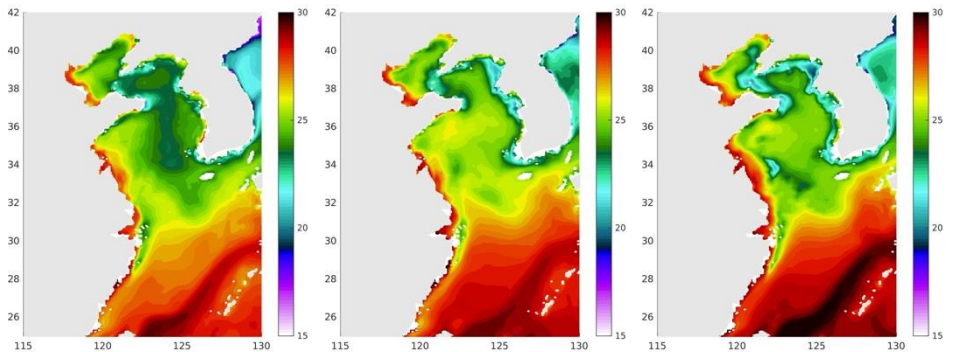
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July mean Sea Surface Temperature (SST) during 2017 to 2019
0.08° HYCOM simulation without tides NAVO satellite observations 0.08° HYCOM simulation with tides

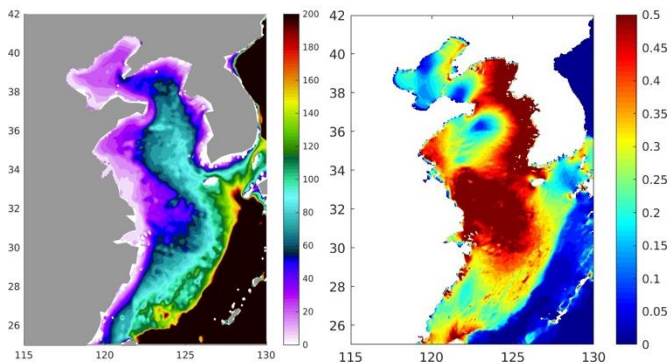


Mean July SST from HYCOM simulations with tidal forcing (left), without tidal forcing (right), and from NAVO satellite observations from 2017 to 2019. There is no data assimilation in the two HYCOM simulations and HYCOM is forced with surface forcing from the NAVy Global Environmental Model (NAVGEN).

Upwelling in the ECSYS

The main currents flowing into and out of the ECSYS are the Kuroshio that is the strong western boundary current flowing along the shelf break, the Taiwan Warm Current from Taiwan Strait, and the Tsushima Current exiting through Tsushima Strait. The seasonally reversing monsoon winds combine with these external sources to force the circulation in this region.

Upwelling is the upward vertical motion in the ocean to bring cold water from the deeper ocean to the surface. Isolated SST cold spots are good upwelling indicators in the summer. The ECSYS is mainly confined to the continental shelf with water depths less than 200 m and thus the tidal currents are strong. Tides can modify the circulation and upwelling processes in the area with a large tidal range.



Topography of ECSYS (m).

Semidiurnal tidal currents (m/s)