STORMFLUX: **S**ub-**T**ropical **O**cean **R**esponse **M**esoscale **Flux** Study

A proposal for the Navy/Office of Naval Research (ONR), NOAA, Air Force, and Coast Guard.

Proposal objectives and principal components:
The proposed study will field test of new sensor technologies and high bandwidth communication systems already under development by the Navy/ONR by combining use of ships with both manned and autonomous aircraft systems (UAS), and autonomous surface and underwater vehicles (ASVs and UAVs). The technological focus of the study is testing of advanced communication methods between these sensor platforms. The scientific focus of the study will be collection (and transmission) of data from these sensor platforms in a study of air-sea fluxes of heat, moisture and gases during the lifecycle of a tropical marine storms (hurricane). Intense storm systems over the ocean strongly affect air-sea fluxes at a potentially globally significant scale. Additional data to determine the importance of these systems can be most easily and predictably studied in the subtropical Pacific off the Gulf of Tehuanepec, Mexico during the month of August. This area plays an important role in exchange of heat, moisture and mixing energy between the Atlantic/Caribbean and the Pacific Ocean, and storms there strongly impact ocean primary production and gas flux during and after their passage. Enhanced fluxes from such storms are localized around nearby seamounts, and ships based near seamount locations can document these fluxes without being directly affected by storms under study when combined with use of ship-deployed autonomous aircraft and other vehicles. The goal of the experiment is to demonstrate high bandwidth communication between a ship at a distance from a storm, and manned aircraft and among unmanned autonomous systems, including autonomous aircraft and other autonomous systems which can collect data within a hurricane. Data obtained from unmanned assets under these conditions will be more complete than possible by manned platforms alone. Such data will allow a better understanding of air-sea flux processes caused by hurricanes, and their broader effect on global climate systems.

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