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Tracking Oil Slicks from the Coal Oil Point Seep Field

Understanding, predicting, and mitigating, petroleum oil slicks from accidental leaks related to oil production and transportation, or subsurface blowouts and leaks is of widespread interest and importance. However, natural marine hydrocarbon seeps also form oil slicks providing an *ideal natural laboratory* for studying the interaction between oil and the marine environment. An example is the Coal Oil Point (COP) seep field that the University of California, Santa Barbara (UCSB) seep group has studied for many years including spatial distribution, emission volumes, methane flux, and seafloor geology. The field covers ~18 sq km and emits ~10^5 m^3 of gas and ~100 bbl oil per day. Here we investigate the chemical evolution of large, perennial oil slicks at Coal Oil Point.

Numerous processes cause oil slicks to change, including dispersion, volatilization, and photochemical and biological degradation. At present, slick models are based on a few lab and field studies, but significant uncertainties remain. An innovative Catamaran Drum (CatDrum) sampler addresses a significant issue, continuous sampling. CatDrums consists of two 2-meter long hulls supporting a motor-driven rotating stainless-steel drum and a collection trough from which sample is pumped into either sample jars or through a fluorometer. CatDrums was tested in a large wind-wave channel and then and field deployed in the COP slicks. The device is designed to either drift or be towed through slicks and is GPS tracked. This ongoing project will develop new advection and dispersion parameterizations that demonstrate the limitations of current slick models.