

## OVERVIEW OF NATURAL OIL SEEPAGE IN THE SANTA BARBARA CHANNEL AND SOUTHERN SANTA MARIA BASIN, SOUTHERN CALIFORNIA

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A five year study of tars and oils in southern California waters and beaches is underway as part of a joint U.S. Geological Survey-Minerals Management Service (USGS/MMS) program to identify natural and anthropogenic sources. Natural sources for these petroleum hydrocarbons include ubiquitous onshore and offshore shallow oil seeps, especially prominent along the southern California coast. Anthropogenic sources include accidental oil spills from vessels and sunken wrecks, from offshore drilling rigs and pipelines, and from ships involved in the processing and transport of oil.

We have collected and analyzed about 650 tars and oils from along the California coast including selected oils from offshore platforms to differentiate them from natural seep oil and tarballs. A chemical fingerprint for each sample was determined by a combination of thirty-two measured parameters. We partitioned the oils into genetic families based on a statistical method using only source related biomarkers. The distributions of samples in each family can be mapped, thus revealing information about their origins and seasonal patterns of tar deposition on local beaches. An extensive area of active seeps has been located by sidescan imagery and sampled by a remotely operated vehicle (ROV) in the area near Point Conception where about 150,000 barrels of tar up to 5-m thick cover the seafloor over an estimated 5 km<sup>2</sup> area. In cooperation with the University of California, Santa Barbara, we sampled six offshore seeps around Coal Oil Point, near Santa Barbara. This seep oil is lighter and geochemically distinct from that near Point Conception and occurs as far west as offshore Gaviota.

Our results demonstrate that tar accumulations on California beaches can be related to natural sources and that there is extensive offshore seepage. Future work will focus on fingerprinting platform-produced oils, monitoring unusual beach tar deposition events, and perhaps making flux measurements of selected seeps.

### Reference :

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