

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications and Economic Benefits (5)

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SOUTHERN CALIFORNIA COASTAL POLLUTION HAZARDS: UTILIZING SATELLITE
SYNTHETIC APERTURE RADAR TO MONITOR STORMWATER PLUMES FOR WATER
RESOURCE APPLICATIONS

Abstract

The Southern California Bight (SCB) coastal region is the site of major urban stormwater runoff pollution, currently the region's most significant pollution hazard. Such pollution has resulted in public health hazards, beach closures, and signals the potential for devastating, long-term effects on the marine ecosystem of the SCB. With the expansion of urban populations such as Los Angeles and the increase in impervious surfaces, the concentrations of stormwater runoff pollutants continue to rise. We use space-borne Synthetic Aperture Radar (SAR), combined with in situ measurements to assess these hazards and determine stormwater plume extent. As SAR is all-weather capable and unaffected by clouds or daylight, it provides a means of assessing the plumes during rainfall events. Dozens of SAR image acquisitions coincident to rainfall events and with detectable plumes have been accumulated over the last 10-15 years. The SAR data was available from the European Space Agency's Envisat and ERS-1/2 sensors and from Radarsat-1 data archived at the Alaska Satellite Facility website, and were assessed with ASTER optical satellite data to detect plume extent. We compared our satellite observations and in situ measurements with actual beach closures, with the goal of demonstrating to local partners the benefits of SAR as an observational tool in response to a significant pollution hazard with potential applications to other urbanized coastal regions. This study focuses on extending Earth science research results to existing local decision-making agencies in order to assist in the monitoring and determining of pollution hazards posed by urban stormwater runoff in the Southern California Bight.