Optical and Radar Satellite Detections of Submerged Turbulence

Carl H. Gibson (UCSD MAE and SIO Departments, La Jolla, CA, USA, cgibson@ucsd.edu)
Valery G. Bondur (Aerocosmos Scientific Center of Aerospace Monitoring, Moscow, Russia)
R. Norris Keefer (Directed Technologies, Arlington, VA, USA)
Pak Tao Leung (Department of Oceanography, Texas A&M University, TX, USA)

Results from the Remote Anthropogenic Sensor Program (RASP) 2002-2004 are presented. Surface manifestations of stratified turbulent plumes from the Hondo Island Marine Control Station observed by both optical and mechanical instruments are compared to horizontal and vertical microstructure sampling. Nearshore spatial frequency band 30-250 m wavelength surface turbulent plumes were detected by the optical in situ at a distance up to 20 km from the Hondo Island Marine Control Station. Anomalous optical plumes were observed by satellite. In situ data were compared to satellite images by linear regression analysis of satellite and in situ data. Results indicate that optical plumes observed by satellite are highly correlated with in situ measurements of turbulence, with the optical plume signal dominating the in situ measurements. This correlation suggests that satellite-based optical plumes provide a valuable tool for monitoring and mapping nearshore turbulent plumes. The results from this study suggest that satellite-based optical plumes provide a valuable tool for monitoring and mapping nearshore turbulent plumes. The results from this study suggest that satellite-based optical plumes provide a valuable tool for monitoring and mapping nearshore turbulent plumes. The results from this study suggest that satellite-based optical plumes provide a valuable tool for monitoring and mapping nearshore turbulent plumes.