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Effects of BP oil spill burning on coastal fine particle concentrations

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Abstract

The BP oil spill in the Gulf of Mexico in 2010 was considered the largest accidental marine oil spill in the history of the petroleum industry. The three basic approaches for removing the oil from the water were: combustion, offshore filtration, and collection for later processing. From April to mid-July 2010, 411 burns were carried out which removed 5% or over 300,000 Barrels of oil; during the same time all the skimming operations removed 3% proving when conditions are right this is a very useful strategy (see www.oilspillsolutions.org/). While many health risk studies are ongoing, it is the purpose of this presentation to qualify and quantify the meteorological and oceanographic (met-ocean) conditions during these oil spill burning operations by analyzing the timeline of fine particle (PM2.5) measurements at Grand Isle, Louisiana. From April 28 thru August 21, 2010, there were 12 days the measurements exceeded the National Ambient Air Quality Standards (NAAQS). Using the daily weather map, on-site meteorological measurements at Grand Isle, and the applied physics of air-sea interaction from a buoy near the BP oil spill burning area, it is found that all high values of PM2.5 as measured at Grand Isle were not caused by the combustion method offshore, i.e., on-water burning to remove some of the BP oil spill. It is concluded that the burning of oil spill at a distance far enough (such as in this case 50 miles or 80 km) offshore and under fair weather conditions (when unstable atmospheric stability prevails or when the sea-surface temperature is higher than the overlying air temperature) is an effective approach to reduce the spill from reaching the shore.

Biography

S. A. Hsu is Professor of Oceanography and Coastal Sciences (Emeritus), Louisiana State University (LSU) since 1969 after he completed his M.S. in Environmental Health Engineering and Ph.D. in Atmospheric Sciences (specializing in the physics of air-sea-land interaction and engineering meteorology), Department of Civil and Environmental Engineering, the University of Texas. He published world-first textbook entitled "*Coastal Meteorology*" by Academic Press in 1988 and over 120 refereed journal articles in the fields of coastal and marine meteorology, air-pollution meteorology, air-sea interaction, and hydro- and engineering meteorology. Dr. Hsu is a Certified Consulting Meteorologist (certified by American Meteorological Society in 1979) for numerous corporations and law firms. Prof. Hsu is also the Co-Editor-in-Chief for "The Open Ocean Engineering Journal"