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Evaluating the capability of an environmental observatory in oil-spill response activities

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In combating an oil spill or other hazardous release, the speed at which effective countermeasures are deployed is a key factor. Effective decision-making regarding the selection and application of countermeasures requires information detailing the release. A protocol such as the Special Monitoring of Applied Research Technologies (SMART) establishes a framework for the collection and handling of data during spill response operations. Recent years have witnessed the rapid development and expansion of various environmental observatory programs designed to produce high-frequency, real-time data. Such observatories, if suitably equipped, could provide decision-makers with useful information prior to response mobilization, as well as during and after the application of countermeasures. An observatory capable of collecting information on the nature and spread of oil plumes has been deployed in Corpus Christi Bay, Texas. This network is comprised of three types of systems: fixed-position autonomous in-situ vertical profilers, high frequency radar stations, and a mobile in-situ undulating towbody system. Together, these systems provide large-scale surface current maps as well as localized information on water current profiles, meteorological conditions, droplet concentration and size distribution at multiple depths, and assorted additional parameters. This observatory was used to track a simulated oil plume (rhodamine dye) both temporally and spatially during an oil-spill mock exercise. This exercise demonstrated the system applicability in spill response activities through providing valuable information {e.g., water current variation over 24-hr period (lateral currents ≤ 80 cm/s, longitudinal currents ≤ 55cm/s); observed rhodamine variation (up to 400 ppb)} which were used in characterizing the plume dynamics.

Biography

Mohammad Shahidul Islam holds a B.S. in civil engineering from Bangladesh University of Engineering and Technology, and his M.S. from the University of Tokyo. He earned his Ph.D. in environmental engineering from Texas A&M University in 2009. He currently serves as a project Manger in the department of civil engineering at Clarkson University. He is also a registered professional engineer in Connecticut. His current research interests include field application of environmental instrumentation, implementation of cyber-infrastructure for real-time data acquisition and dissemination, environmental processes analysis, numerical modeling and economical sensor development for environmental monitoring.

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