



A tracer model nowcast/forecast study of the Tampa Bay, Piney Point effluent plume: Rapid response to an environmental hazard

An emergency discharge of nutrient-rich effluent from the defunct Piney Point fertilizer stack into Tampa Bay at Port Manatee occurred from 30 March – 8 April 2021. This resulted in a pollutant plume that evolved over time and space across the entire bay, including its environmentally sensitive marine preserves, and out onto the adjacent continental shelf. As a rapid response to environmental concerns, the plume evolution was simulated using the high resolution, unstructured grid, Tampa Bay Coastal Ocean Model (TBCOM) nowcast/forecast system, with an embedded tracer module that included realistic point discharge rates. Normalized tracer distributions were automatically updated each day, providing 1-day hindcasts and 3.5-day forecasts. Due to mixing and advection, tracer concentration was quickly reduced by two or more orders of magnitude as the plume spread out. Highest tracer concentrations hugged the southeastern Tampa Bay shoreline during the first week. Lower tracer concentrations were gradually advected to the western side of Tampa Bay, and the tracer was slowly flushed out of the bay to be transported primarily northward along the coast. The modeled plume evolution served as principal guidance for coordinating environmental monitoring by state, local and academic personnel. The model results also provide a basis for future multidisciplinary studies.

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