



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: VT641

Title: Lagrangian Drifters Within Lake Champlain Feasibility Study

Focus Categories: Water Quality, None

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Congressional District: First

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Abstract

An understanding of the hydrodynamics of Lake Champlain is critical to our ability to accurately model and predict the movement and eventual disposition of contaminants within the water column. Although our knowledge of lake circulation has increased dramatically over the past, it is nevertheless based entirely upon Eulerian observations at a few selected sites within the lake. By their very nature, Eulerian measurements (observations made at a fixed location over time) possess intrinsic limitations in their ability to map complicated flow dynamics within large regions. Specifically for Lake Champlain, large oscillatory currents created by the internal seiche mask our ability to define average flow conditions due to low average values bounded by high standard deviations.

Additionally, documenting circulation throughout the entire lake using existing techniques is cost prohibitive. This proposal seeks to test the practicality of using a Lagrangian mapping technique known as RAFOS to define complicated flow trajectories of fluid parcels at different levels within the water column over time. While this technique has been used within the oceans over the past several decades to look at oceanographic problems ranging over a wide spectrum of temporal and spatial scales, it has never been employed, to our knowledge, in any lake environment. This project is a feasibility study using acoustically traced, neutrally buoyant, free-drifting subsurface floats within Lake Champlain. If successful, both Eulerian and Lagrangian measurements could be coupled to produce the next significant level of understanding of circulation dynamics within Lake Champlain.