*Energy Distribution and Dissipation in a Freshwater Plume Flowing into a Highly Stratified Fjord*

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ABSTRACT

Buoyant river inflows are a typical feature of the coastal ocean influencing local and regional stratification and transport of energy and material. Typically such plumes are regarded as steady state processes whereas often the freshwater flux is variable. It is this variability which influences how energy is distributed and transported. In this talk I shall present a research proposal to study this variability and its influences by utilising the Manapouri hydroelectric power station tailrace flow into Doubtful Sound. A highly temporally variable plume, entire seasonal changes of inflow can be mimicked over several days. The small-scale turbulent processes occurring between the tailrace and the highly stratified fjord will be characterised by an overturn length scale analysis: the Thorpe scale examines the length scale of typical turbulent fluctuations, indicative of the extent of vertical mixing. The distribution of turbulent kinetic energy across these scales is represented by an energy spectrum of a range from the largest energy-containing scales down to where the energy is ultimately dissipated as heat. In this talk I will present recent field results and present proposed experiments as part of my PhD research.