

Arrays of PME fast conductivity sensors have just been deployed in a series of investigations carried out by Alan Cuthbertson and Peter Davies (University of Dundee, UK), Janek Laanearu (Tallinn University of Technology, Estonia) and Anna Wählin (University of Gothenburg, Sweden) at the Norwegian University of Science & Technology (NTNU) Coriolis rotating basin facility in Trondheim, Norway. The sensors were used in a laboratory study supported by the EU Hydralab Programme into the behaviour of dense (saline) gravity currents in rotating channel flows, as part of a wider modelling investigation into large-scale dense oceanic outflows from the Northern Seas into the North Atlantic. In the Trondheim experiments, the gravity currents were generated by pumping salt water into a vee-shaped, converging, inclined channel filled with fresh water. The whole system was mounted on a 5 m diameter rotating table to incorporate the effects of Coriolis acceleration and to simulate the role of the background rotation of the Earth in the oceanic counterpart flows. The principal focus of interest was the temporal and spatial development of the density interface between the turbulent saline gravity current and the overlying fresh water and the role played in this development by hydraulic control at the channel convergence section. To this end, 8 fast conductivity sensors were assembled in cross- and along channel array configurations; time series vertical salinity profiles were acquired automatically at prescribed intervals in the experimental runs, enabling the development of the cross- and along-channel slopes of the interface and the turbulent entrainment across the interface to be measured.

PME fast conductivity sensors have been used successfully for over 15 years by Davies' fluid mechanics research group at Dundee to look at a range of buoyancy-driven and stratified flow problems. Right now they are being set up for a new project on turbulent mixing associated with breaking internal solitary waves.



Conductivity probes configured to measure (a) cross-channel and (b) along channel density profiles

