Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

**Direct Numerical Simulation of a Model Estuary** ROLF HENNIGER, LEONHARD KLEISER, ETH Zurich, ECKART MEIBURG, UC Santa Barbara — We investigate mixing and sedimentation processes in laboratory-scale estuaries by means of high-resolution Navier-Stokes simulations. A positively buoyant, sediment-laden freshwater river is considered that enters a notional ocean, upon which particles sediment out at the lower boundary of the current. The computational setup, while employing a simplified geometry, accounts for the most important features of a typical estuary. The flow is studied in a spatially developing framework that allows us to obtain statistically stationary solutions for freshwater/saltwater mixing rates and particulate settling profiles. Details of the particle settling process are investigated both during the initial transient phase, as well as for statistically stationary conditions. We observe qualitatively good agreement of the settling mechanisms with corresponding laboratory experiments. The properties of the particulate plume in the freshwater current are analyzed as a function of the particle Stokes settling velocity.

Eckart Meiburg
UC Santa Barbara

Date submitted: 06 Aug 2009 Electronic form version 1.4