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**Improved Boussinesq models over highly variable topographies**
ANDRE NACHBIN, IMPA/Brazil — Recently a weakly nonlinear, weakly dispersive terrain-following Boussinesq system was formulated [SIAP 2003] in order to study solitary waves over highly variable (random) topographies. The modeling allows for multiply-valued topography profiles. In this presentation we will give an overview of very recent theoretical results performed with this equation. The apparent diffusion [SIAP 2004, Physica D 2004], eddy viscosity [PRL 2004b] and time-reversed waveform inversion [PRL 2004a] are illustrated through computational experiments. Finally we introduce a new, fully dispersive, Boussinesq system [PRL 2004c] that generalizes the terrain-following system mentioned above. The full linear dispersion relation is entirely retained by constructing a Dirichlet-to-Neumann (DtN) map along the top boundary of the highly corrugated strip representing the channel.

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