Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Horizontal convection PIV study STEFANO DISCETTI, TOMMASO ASTARITA, University of Naples Federico II — Horizontal convection has received limited attention, despite of its well recognized implication in geophysical flows of relevant interest. E.g., oceans are often modeled as being cooled and heated in a thin surface layer, which is nearly horizontal, due to solar irradiance forcing differentially in latitude and determining strong stable density stratification. The phenomenology is simulated in a plexiglass box, with a piecewise thermal boundary condition on its bottom surface while all the other boundaries are thermally insulated. A Particle Image Velocimetry (PIV) investigation of the natural convection generated by a differential thermal boundary condition along the same horizontal boundary is proposed. A preliminary investigation of the structure of the circulation cell, generated by the hot water rising up in correspondence of the heat flux input zone, and sinking down nearby the cooled zone, is carried out. A strong convection cell, consisting of a rising intense plume (filling the whole box height) and a slow downward average flow, are observed in all the tested configurations.

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Date submitted: 01 Aug 2011 Electronic form version 1.4