Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Laboratory study of orographic cloud-like flow KANWAR NAIN SINGH, K.R. SREENIVAS, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore — Clouds are one of the major sources of uncertainty in climate prediction, listed in "the most urgent scientific problems requiring attention" IPCC. Also, convective clouds are of utmost importance to study the dynamics of tropical meteorology and therefore, play a key role in understanding monsoons. The present work is to study the dynamics of orographic clouds. Parameterization of these clouds will help in forecasting the precipitation accurately. Also, one could validate laboratory results from our study by actually measuring cloud development along a sloping terrain. In this context a planar buoyant turbulent wall jet is considered as an appropriate low order fluid-dynamical model for studying the turbulence and entrainment in orographic-clouds. Flow is volumetrically heated to mimic the latent heat release due to condensation in an actual cloud. This is the first step in studying the entrainment dynamics of the evolving orographic cloud. We are going to present some results on the cloud development using techniques that allows us to construct a 3-dimensional flow field at each instance and its development over the time. By combining velocity field from PIV and flow volume from PLIF at successive instances, we estimate the entrainment coefficient. Since the life-cycle of a cloud is determined by the entrainment of ambient air, these results could be extremely helpful in understanding the dynamics of the clouds. Detailed results will be presented at the conference.

Kanwar Nain Singh
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

Date submitted: 02 Aug 2013 Electronic form version 1.4