Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Experimental study of *starting plumes* simulating cumulus cloud flows in the atmosphere DUVVURI SUBRAHMANYAM, K.R. SREENIVAS, G.S. BHAT, S.S. DIWAN, RODDAM NARASIMHA — Turbulent jets and plumes subjected to off-source volumetric heating have been studied experimentally and numerically by Narasimha and co-workers and others over the past two decades. The off-source heating attempts to simulate the latent heat release that occurs in cumulus clouds on condensation of water vapour. This heat release plays a crucial role in determining the overall cloud shape among other things. Previous studies investigated steady state jets and plumes that had attained similarity upstream of heat injection. A better understanding and appreciation of the fluid dynamics of cumulus clouds should be possible by study of *starting plumes*. Experiments have been set up at JNCASR (Bangalore) using experimental techniques developed previously but incorporating various improvements. Till date, experiments have been performed on plumes at Re of 1000 and 2250, with three different heating levels in each case. Axial sections of the flow have been studied using standard PLIF techniques. The flow visualization provides us with data on the temporal evolution of the *starting plume*. It is observed that the broad nature of the effect of off-source heating on the *starting plumes* is generally consistent with the results obtained previously on steady state flows. More complete results and a critical discussion will be presented at the upcoming meeting.

Duvvuri Subrahmanyam
Department of Aerospace Engineering,
Indian Institute of Technology Madras

Date submitted: 03 Aug 2009 Electronic form version 1.4