

Evolution, structure and Dynamics of Tropical Cyclone using Doppler Weather Radar and MST Radar

K. N. Uma¹, M. Venkat Ratnam², and S. B. Thampi³

¹. Space Physics Laboratory, VSSC, India

². National Atmospheric Research Laboratory, India

³. India Meteorological Department, India

Two severe cyclonic storms namely “Thane” and “Nilam” occurred over the Indian region during 25-30 December, 2011 and 28-31 October 2012 respectively. During the initial stage, a depression formed over the Bay of Bengal which developed into a deep depression, which further intensified and matured into a cyclonic storm during both the cases. The Indian Mesosphere Stratosphere Troposphere Radar (MST) was operated in a campaign mode during both the cases. The reflectivity from MST radar shows that the overshooting convection reached up to the height of tropopause. Intense turbulence activity is also observed from the spectral width. The vertical velocity shows strong updrafts in the lower troposphere and both updrafts and downdrafts are observed in the upper troposphere. During the above campaign, S-band Doppler weather radar (DWR) operating at a wavelength of 10 cm (2875 MHz) by India Meteorological Department (IMD) is also collected in order to understand the three dimensional distribution of cyclone. DWR reflectivity shows the organization of cloud clusters into a deep convective system with typical rain-bands over the southern peninsular India. High reflectivity (> 35 dBz) is observed when corresponding strong updrafts are observed from the MST radar. The rain-bands also showed high reflectivity. The reflectivity also shows the eye of cyclones which are surrounded by thick wall of clouds. Additional observations from Kalpana, the Indian geostationary satellite and also CloudSAT (A-train constellation of satellites) are also utilized to support the above observations. The details will be presented in the workshop.