



## **Spatio-temporal variation of hail features and associated mix phase microphysical properties as detected by satellite onboard sensors in two different climatic convective regimes**

Sanjay Sharma, Partha Roy, and Rupraj Biswasharma

Kohima Science College, Jotsoma, Kohima, 797002, Nagaland, India (sanjay\_sharma11@hotmail.com)

Hail storms are manifestation of severe and deep layer moist convection in the atmosphere. The microphysical processes in the mix phase region of the atmosphere in convective systems play a critical role in the formation of hails. The convective systems in the subtropical and midlatitude regions are governed by different microphysical and thermodynamical process. The present work investigate the spatio-temporal variation of satellite detected hail features and associated mix phase microphysical properties in the subtropical and midlatitude convective regimes. For this purpose, a region of North East India and its adjoining region ( $20^{\circ}$ – $30^{\circ}$  N;  $80^{\circ}$ – $100^{\circ}$  E) in the subtropics and the Europe region ( $0^{\circ}$ – $35^{\circ}$  E and  $38^{\circ}$  N– $56^{\circ}$  N) in midlatitude are considered. For the present study the Global Precipitation Measurement (GPM) - Ku Radar, and GPM Microwave Imager (GMI) data products are utilized (over both the regions) along with the Tropical Rainfall Measuring Mission TRMM- Precipitation Radar (PR) and TRMM Microwave Imager (TMI) data products (over subtropics region only). The hail features are identified by Polarization Corrected Temperature at 37 GHz Channels ( $PCT_{37GHz(min)}$ ) of GMI/TMI with its value  $< 156$  K. The associated microphysical properties in the mix phase region are analyzed in terms of cloud ice and liquid water content, by using the GPM and TRMM data products. The hail detection from the satellite onboard sensors, are supported by hail reporting data of European Severe Weather Database (ESWD) and India Meteorological Department (IMD) over the respective region. During the hail events, echo top height of 40 dBZ ( $ETH_{40dBZ}$ ) are studied. The properties of  $ETH_{40dBZ}$  are associated with hail size over the Europe. There is significant spatial and temporal variation in the characteristics of hail features and associated mix phase microphysical properties over each region. The results are consistent with the ground hail reports.