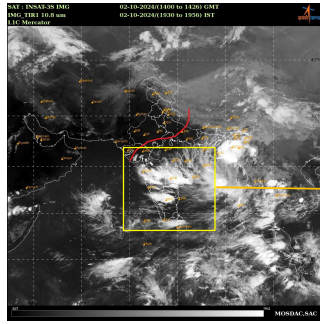
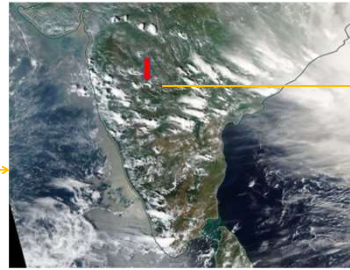


## Enhanced convective activity near the CAIPEEX site due to the cyclonic circulation over northeast Assam

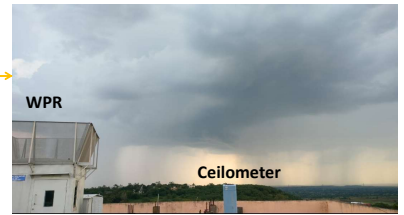
A cyclonic circulation in the lower tropospheric level was observed over the northeast Assam and neighbourhood during the first week of October along with the trough running from the Comorin area to off south coastal Karnataka. While the conditions were favourable for the southwest monsoon withdrawal in the northern part of the country, the isolated heavy rainfall observed near the Cloud Aerosol Interaction and precipitation Enhancement Experiment (CAIPEEX) site on 2<sup>nd</sup> October 2024, under the influence of trough and the cyclonic circulation.



INSAT image downloaded from MOSDAC live

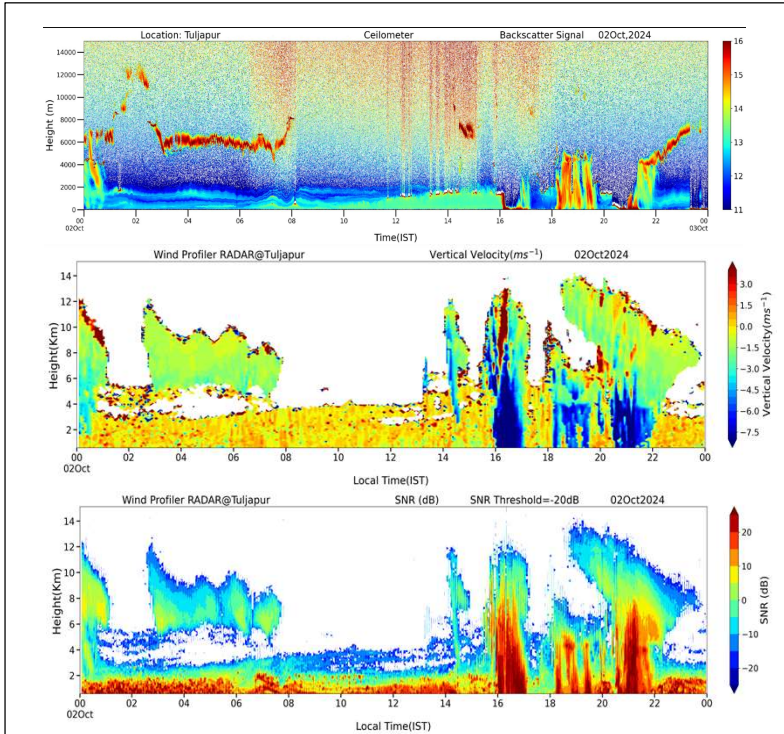


MODIS Aqua satellite image downloaded from WORLDVIEW

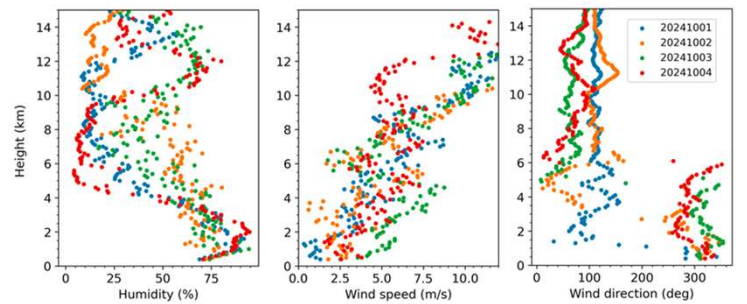


CAIPEEX Tuljapur site equipped with the Wind profiler and Ceilometer instruments installed at Shree Tuljabhavani college of engineering, Tuljapur. Photo was taken on the 1<sup>st</sup> October 2024, featuring the raining clouds near the site.

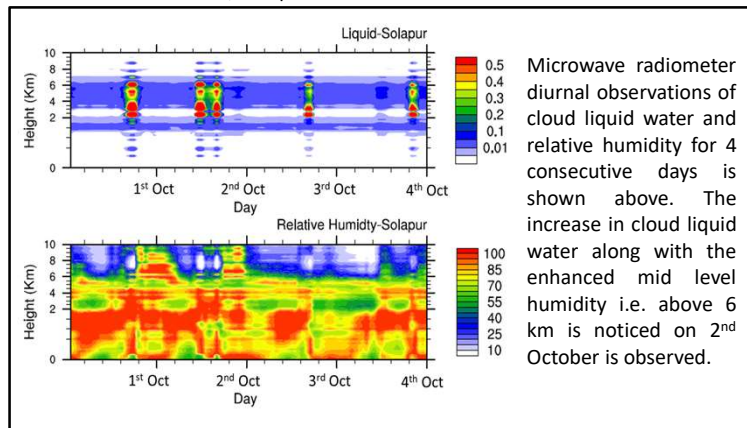
## CAIPEEX Tuljapur observations



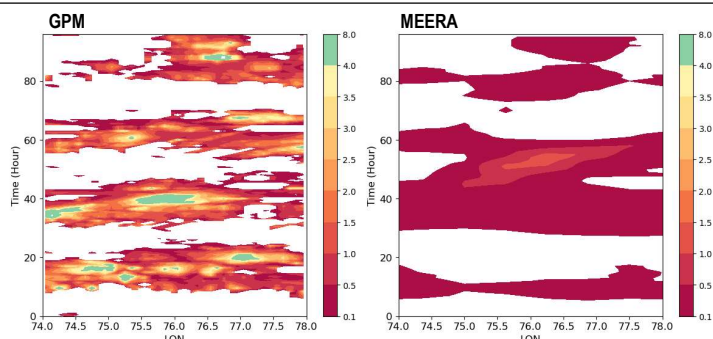
CAIPEEX Tuljapur observations of Ceilometer and Wind profiler observations are shown above on 2<sup>nd</sup> October 2024. Both the instruments shows the heavy rainfall event near the site in the evening hours after i.e. 16 IST. Event shows the stronger updraft within the cloud layer which is going more than 3 m/s. The intense rain shows higher SNR with higher fall velocity



Daily radiosonde observations are conducted at Solapur site, which is nearly 40 km away from the Tuljapur site. A significant dry conditions in the middle level (6 to 10 km) is observed on the 4<sup>th</sup> October 2024, where as on 2<sup>nd</sup> enhanced moist conditions in the middle level is observed, interestingly, change in wind direction from north west to east- south east direction observed above 6 km, except for the 1<sup>st</sup> October 2024



Microwave radiometer diurnal observations of cloud liquid water and relative humidity for 4 consecutive days is shown above. The increase in cloud liquid water along with the enhanced mid level humidity i.e. above 6 km is noticed on 2<sup>nd</sup> October is observed.



Hovmuller analysis of rainfall from 74° E till 78° E, averaged over 16° N to 20° N, is shown here for four consecutive days, starting with 1<sup>st</sup> October 2024, from two different sets of data, GPM and MEERA respectively.

Present study shows the detailed evidence of the heavy rainfall near the CAIPEEX Tuljapur site through the various CAIPEEX remote sensing observations. The important inferences from the presented event are as follows,

- Under the influence of Cyclonic circulation formed near the north east Assam, a long trough extending from Comorin to south coastal Karnataka formed.
- Due to this, an enhanced middle level moisture above 6 to 10 km is observed in both, Radiosonde and Radiometer data.
- Enhanced moisture in the middle level in the morning hours, follows systematic diurnal cycle of precipitation in the evening hours.
- The heavy rainfall under the influence of cyclonic circulation also features the stronger updraft reaching higher altitude
- Delay in the 2<sup>nd</sup> October heavy rainfall event is evident in the MEERA 2 data, which is a WMO Mandatory and Recommended Global Climate Reanalysis Products