The centre has set up a regional facility for advanced research in Atmospheric and Space Science area towards understanding and quantifying the processes leading to regional weather and climate variability, to improve weather forecasting in the region, to support disaster risk reduction activities, to provide weather advisory services, and promotion of space science research.

**MAJOR HIGHLIGHTS**

- Aerosol Physical and Optical Characterization.
- Regional Greenhouse Gas concentration measurements.
- Radiative forcing and Long Range Transport of Aerosol and GHG.
- Boundary Layer Dynamics and its Impact.
- Research to Improve Short and Medium Range Weather Forecast.
- Regional Climate Change and Impact Assessment on Key Sectors.
- Improvement and Augmentation of Surface Observation Network.

**MAJOR BENEFITS**

- Understanding of Drivers of Climate Change over NER.
- Quantification of regional Climate Change Potential.
- Improvements in Regional Weather Forecasting Helps in Flood Forecasting.
- Thunderstorm Nowcasting Initiated.
- Promotion of Space Science.

- Instruments for physical & optical characterization of aerosols. Facility to study surface, columnar, and vertical profile of aerosol. Instrumented vehicle for conducting field based land campaign.
- Instruments for atmospheric boundary layer Physics and dynamics studies. Launching of Pisharoty sonde with Hydrogen filled balloons. Fast response sensors (3D sonic anemometers) on a 32m multi layered tower.
- Online gas analyzers for Ozone, Methane, Carbon-monoxide, Oxides of Sulpher, and Oxides of Nitrogen to study their Chemistry, Transport, and radiative forcing.
- Network of 118 Automatic weather station (AWS) spread across NE states of India. One Doppler Weather Radar at Cherrapunjee.
SPACE & ATMOSPHERIC SCIENCE ACTIVITIES

Operational Products/Services

- Data support to National projects under IGBP.
- High resolution weather forecast for NE region to support flood early warning.
- Thunderstorm nowcasting.
- Agro-meteorological advisory services for Village Resource Centres.
- Operation and Maintenance of surface observation network.

Research Areas

- Assessment of aerosol impact on cloud microphysics and precipitation efficiency.
- Inventory and Transport modeling for GHG.
- Regional Climate Modeling and impact assessment on key sectors.
- Improvement in Parameterization in WRF modeling.
- Regional Atmospheric Boundary Layer dynamics study and simulation.

Aerosol radiative forcing and impact on regional Climate

Aerosol characterization and estimation of aerosol radiative forcing over NE India are being carried out using data from Umiam and two land campaigns. The impact of high aerosol concentration observed over Brahmaputra valley on regional weather and climate are being investigated.

Weather Forecasting using WRF model

Numerical weather prediction (NWP) over NER by customizing the Weather Research and Forecasting (WRF) model and assimilating data from the AWS, satellite derived wind vector, AMSU and INSAT 3D radiance.

Boundary layer dynamics studies

The atmospheric boundary layer (ABL) dynamics are studied using fixed station and campaign data to understand the its dynamics and its impact on cloud generation along the hill slopes in Brahmaputra valley.

Zonal, Meridional, and Vertical wind as measured by SODAR