

CLOUD PHYSICS AND MESOSCALE CONVECTIVE SYSTEMS

- Cloud droplet formation. Kohler curves. Condensation. Maxwell equation
- Rain formation in warm and cold clouds. Development of cloud droplet spectrum distribution and its dependence on droplet's size.
- Ice crystal nucleation and growth in cold clouds. Bergeron Theory.
- Atmospheric conditions for the hail, snow or heavy rain.
- Storm Physics. Single and multi-cell storms.
- Speed and direction of severe storms. Structure and characteristics of the storm front.
- Basic thermodynamic and dynamic atmospheric parameters for storms' prediction.
- Mesoscale Convective Systems (MCS) – Definition – Conditions for development – Types and characteristics
- Structure of vertically developing clouds in terms of circulation patterns within the clouds and in the surrounding atmosphere. Development stages.
- Precipitation estimation in MCS.
- Multispectral satellite based indices for the recognition and tracking of MCSs.
- Extreme weather events – Definition, causes and frequency for development, relation to climate change.
- Satellites and the meteorological radar in support of the study of MCS and severe storms.