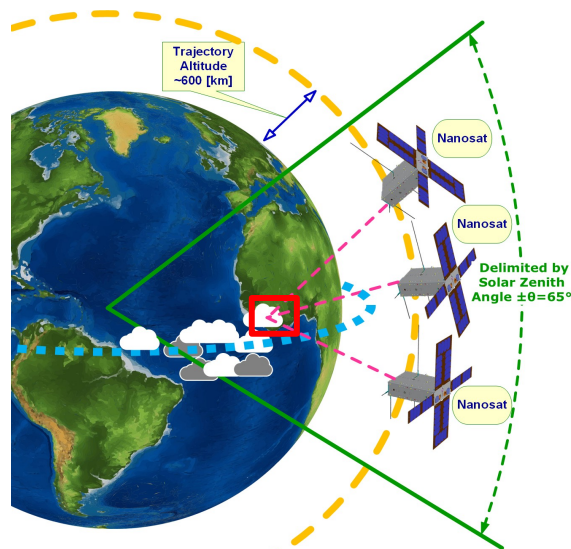# C³IEL: Cluster for Climate and Cloud Imaging of Evolution and Lightning

Daniel Rosenfeld[1], Céline Cornet[2], Shmaryahu Aviad[3], Renaud Binet[5], Philippe Crebassol[5], Paolo Dandini[2], Eric Defer[4], Christine Fallet[5], Vadim Holodovsky[6], Avner Kaidar[6], Colin Price[7], Didier Ricard[8], Yoav Schechner[6], Pierre Tabary[5], Yoav Yair[9]

Scientific objective: documenting the evolution of atmosphere at high temporal and spatial resolution

Trajectory Altitude ~600 [km]

Nanosat

Nanosat

Delimited by Solar Zenith Angle ±θ=65°

Nanosat

2 to 3 simultaneous observations of the same cloud fields of 80 km x 80 km every 20s during 200s

Operation a train of 2 to 3 idendical nano-satellites with multiple views of the same scene trough :

- High resolution (20m) visible imagers (CLOUD) every 20s during 200s
  → 3D cloud top : development velocity, updrafts, divergence

- Water vapor cameras (WV) at 500m resolution every 20s during 200s
  → 3D water vapor distribution around and between the clouds

- Lightning imagers and photometers (ZEUS) measuring continuously during 200s
- **→ flash properties and 3D time-dependent lightning activity**

Sampling strategy:
snapshot of 80 kmx80km every 300s during **2 years at 13:30 LT**

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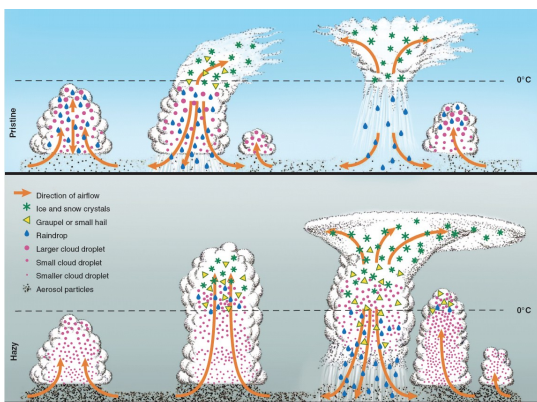
Rosenfeld et al., Science, 2008
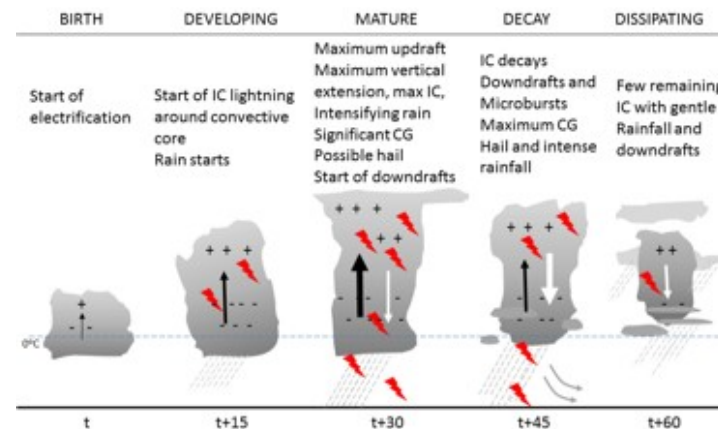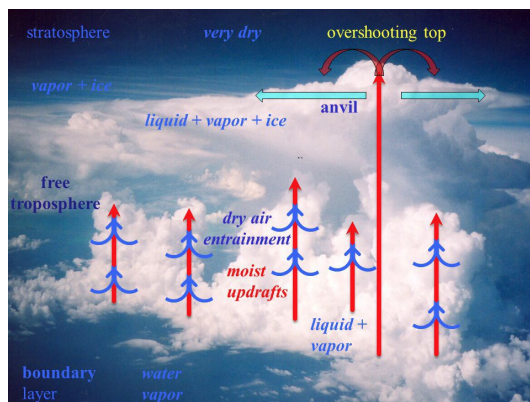
- **Convective cloud repartition, distribution and development including small clouds : updrafts, divergence, mixing ...**
- **With VIIRs/JPSS, cloud- aerosol interactions studies**
- **Water vapor and cloud interactions : entrainment/detrainement, mixing processes**
- **Links between lightning activities and convection characteristics**
- **With Geo-satellites, statistical studies cloud life cycle**