# The New ATTO Site
# The Campina Site
# Convective Processes Measurements

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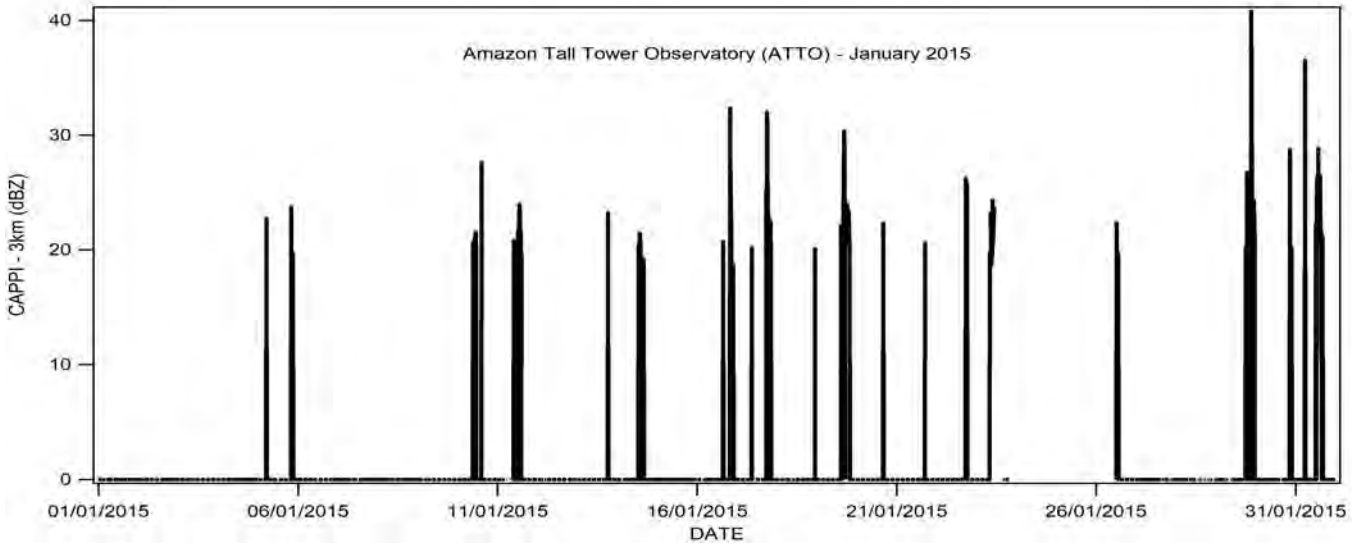
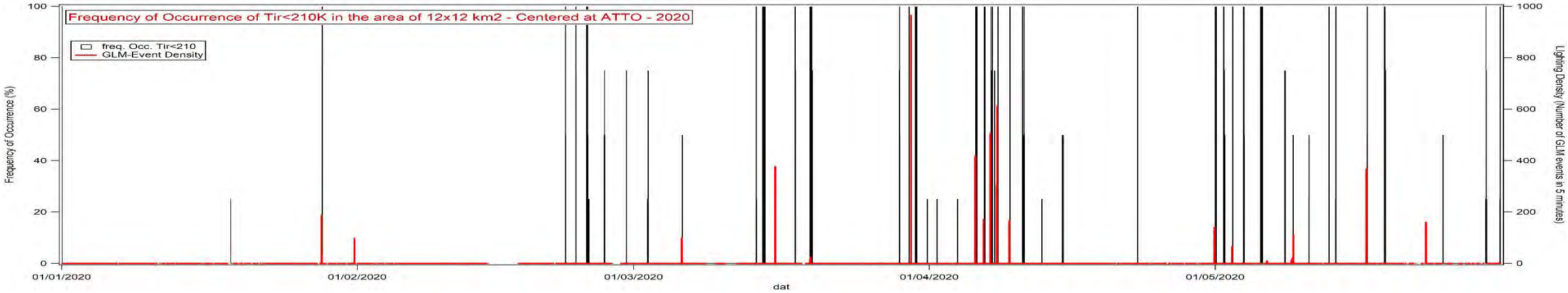
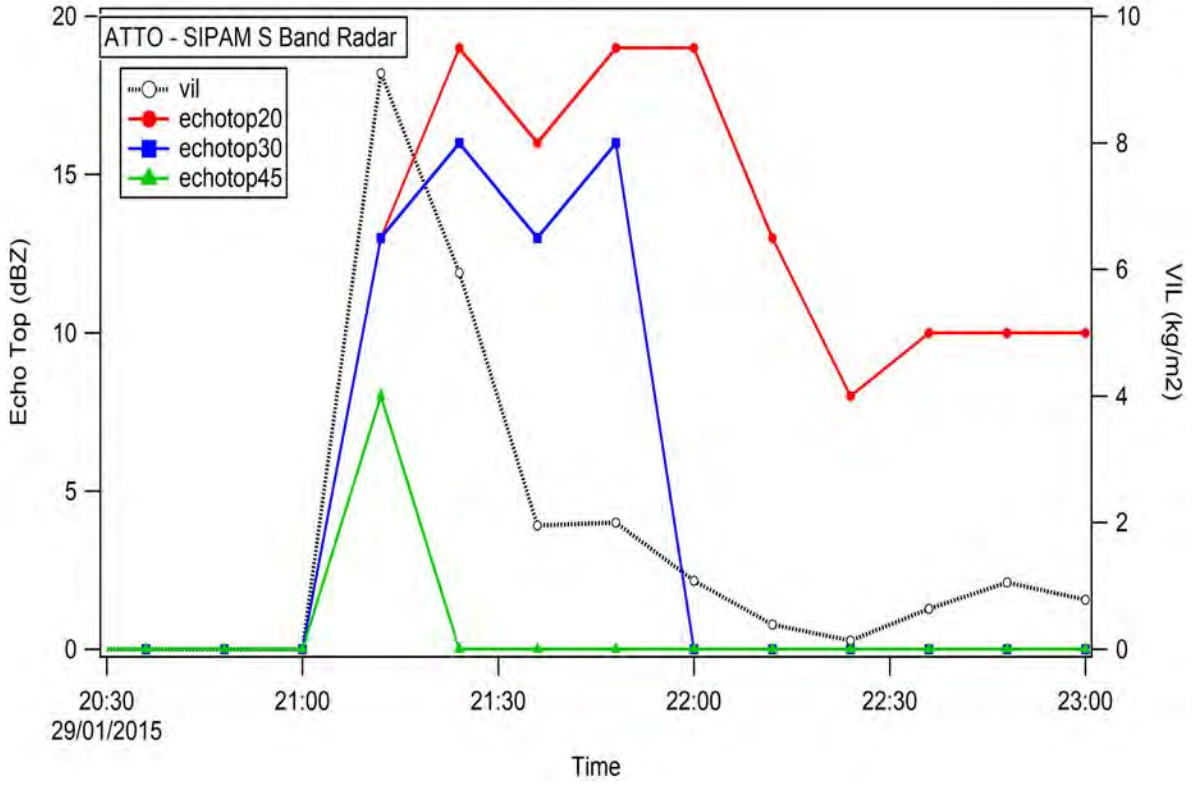
# Why Study Convection on Amazonas:

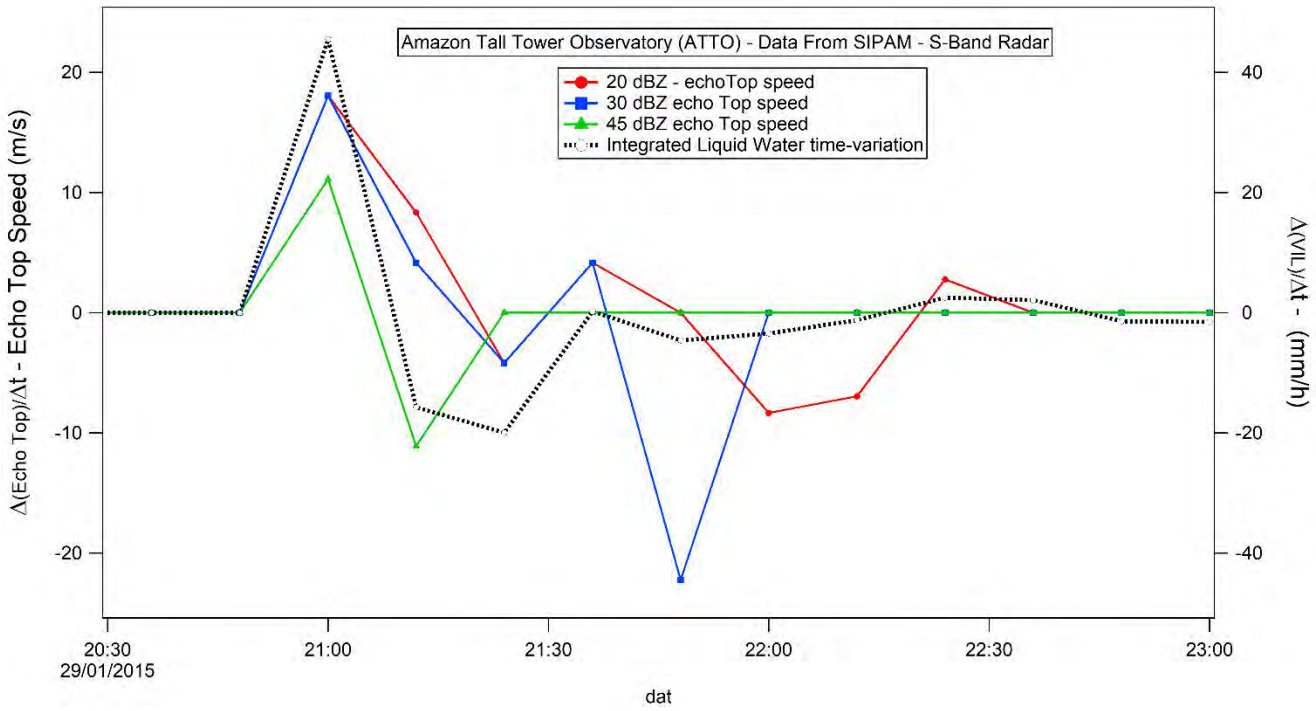
Convective processes are complex due to surface homogeneity and high water vapor amount
Models have lower skill in forecasting convection in the space and time than in middle latitudes
Convection in Amazonas has a strong interaction between meso-large scale (Ocean Air Mass) and local Convection
**The high number of convective events**



# Example of Data Produced for ATTO



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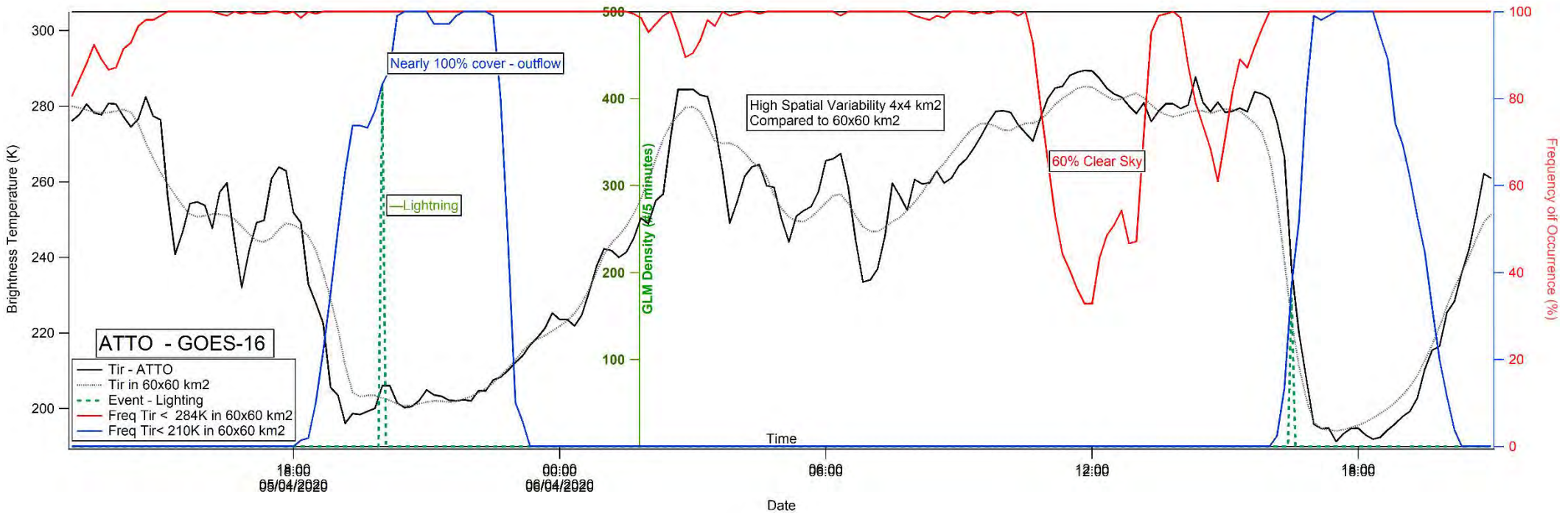
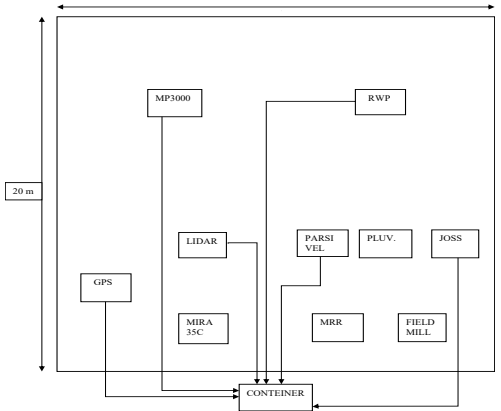


# The Campina Site – Interrupted by COVID-19

| | |
|---|---|
| Parsivel | Disdrometer – rain drop size distribution |
| Joss | Disdrometer – rain drop size distribution |
| Raingauge | Tipping bucked rain gauge |
| Field Mill | Electrical filed between cloud and surface |
| GPS | Integrated water vapor |
| MP3000 | Profile of Temperature, humidity and cloud liquid water |
| TORRE DE FLUXO | CO2, Latent, sensible Flux, soil humidity and temperature – 10 meters tower |
| LIDAR | Cloud base and cloud top and cloud ice properties |
| MRR | Cloud Vertical profiling of drop size distribution, rain rate and liquid water content |
| LAP 3000 | Cloud profile, Horizontal wind speed and direction, wind components u, v and w, standard deviations of wind, backscatter, spectra, moments. (up to 5 km) |
| MIRA-35C | Cloud radar – see profile of cloud and fog liquid water profile - before it contains rain drops |
| UV Raman Lidar | Cloud base, humidity profile, |
| MPLnet | Measure aerosol and cloud vertical structure, and boundary layer heights. |
| Scanning mobility particle sizer (SMPS, SMPS-C GRIMM Aerosol Technik Ainring GmbH & Co. KG, Ainring, Germany) | For size distribution measurements from 0.01 – 1.089 µm; |
| Optical particle counter (OPC, EDM180 179 GRIMM Aerosol Technik Ainring GmbH & Co. KG, Ainring, Germany) f | For size distribution measurements from 0.25 – 32 µm; |




# **A**mazon System Virtual **M**odeling Laboratory and **O**bseRvation (**AMOR**)

- **The general objective is to improve the description and forecast&simulations of the Amazonas System that control the energy, hydrologic and chemistry processes.**
- **Connecting observation to modeling in different scales.**
- **Connect shallow convection to deep convection, isolate clouds to organized clouds**
- **Improve cloud and rainfall description in different space-time scales.**
- **Description of the aerosol life cycle from gases to particles and describe the different cycle and multiphases of the main chemical's components of the atmosphere and soil.**
- **The interaction of chemistry and physics of the atmosphere and their boundaries is the key processes to improve the radiation, water and chemistry cycles.**

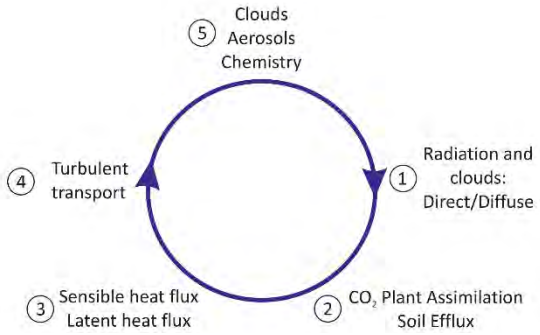
**White paper** - Being prepared - open for contributions and opportunities

# Interactions Between the Amazonian Rainforest and Cumuli Clouds: A Large-Eddy Simulation, High-Resolution ECMWF, and Observational Intercomparison Study

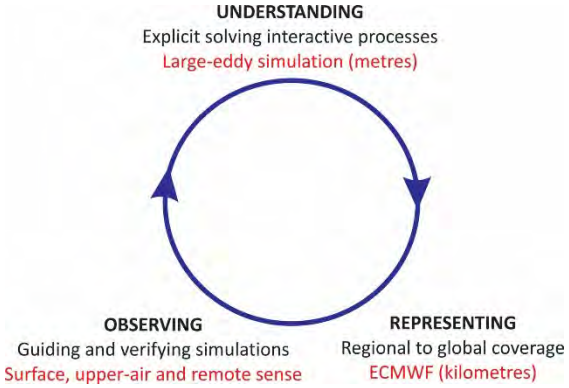
*Jordi Vilà-Guerau de Arellano et al., 2020, James - 10.1029/2019MS001828*

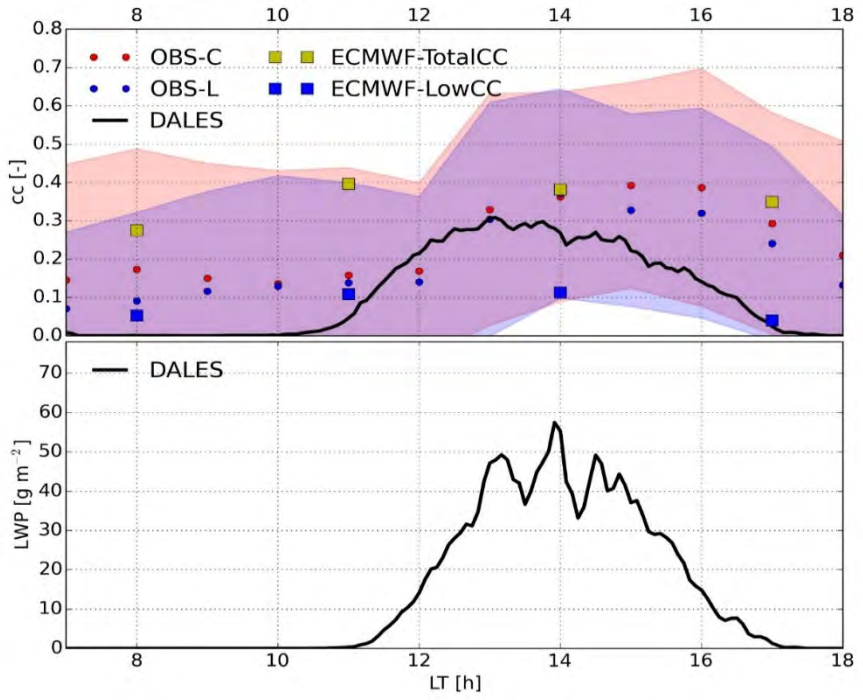
- *Different models performing at different scales*
- *Model Validation*
- *Compare Convection in tropical and Middle Latitudes*

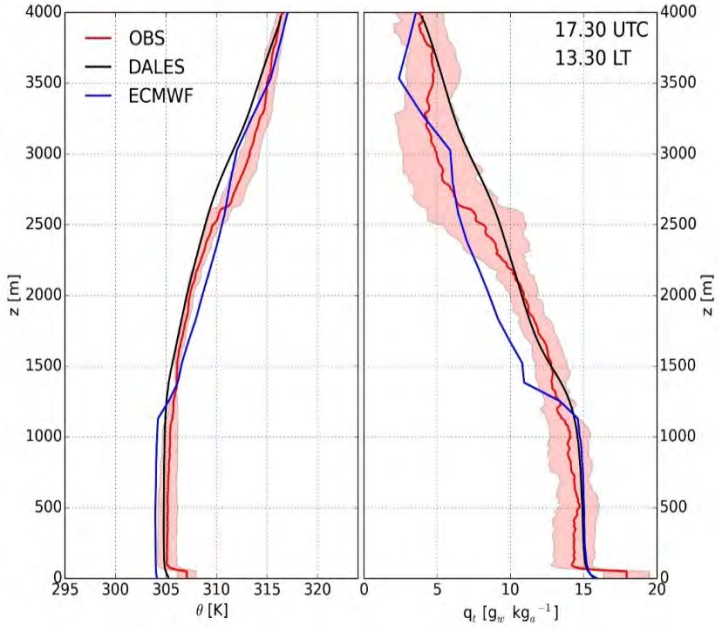
Biophysical processes interconnected to weather




Research strategy: integrating methods




Open challenges with respect to the morning low clouds and the transition from shallow to deep convection

Reduce moistening and destabilization above cloud base by ECMWF-IFS - Impact in triggering deep convection