

Contribution ID: 57

Type: Oral presentation

Assessment of satellite- and ground-based observed total column water vapor variabilities and their relation to convective initiation in Germany

Tuesday, October 6, 2020 11:20 AM (20 minutes)

Highly spatial and temporal variable atmospheric water vapor largely determines whether clouds, and subsequent precipitation, evolve and how they develop differently in certain regions. The spatial variability of atmospheric water vapor fields at very small scales, but for larger regions, is currently only observable from polar-orbiting satellites.

We present our newly developed and evaluated total column water vapor retrievals from measurements of the passive imager OLCI, onboard Sentinel-3 satellites, based on extensive experience with TCWV retrievals for MERIS and MODIS. While precipitation itself is mostly invisible to passive VIS/NIR/TIR radiation, past case studies have shown the potential to identify small-scale convective structures in satellite-based TCWV fields. In the context of improving the characterization of the pre-convective environment using satellite observations of water vapor and clouds to potentially improve Quantitative Precipitation Nowcasting in Germany, an assessment is made in a statistical manner as well.

By combining the high spatial resolution TCWV observations from OLCI (250m) with high temporal resolution (15 min.) TCWV time series from the dense German GPS network and cloud observations from the passive imager SEVIRI on the geostationary satellite MSG, observed measures of spatial and temporal TCWV variabilities are related to various cloudy conditions at later time steps. The match-up of the various observational datasets allows us to mimic at least partly the significantly improved observational capabilities of future MTG, with which the monitoring of the pre-convective environment as well as cloud and precipitation development is expected to improve significantly. To this end, also an algorithm framework was set up to investigate the potential of TCWV retrievals from MSG-SEVIRI observations and, on a test-basis, from future MTG-FCI observations.

Authors: CARBAJAL HENKEN, Cintia (FUB); Dr PREUSKER, Rene (Freie Universität Berlin)

Presenter: CARBAJAL HENKEN, Cintia (FUB)

Session Classification: Quantitative Precipitation Nowcasting (QPN)