

EGU21-13676

<https://doi.org/10.5194/egusphere-egu21-13676>

EGU General Assembly 2021

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## Fingerprinting Precipitation Processes in Remote-Sensing Observations

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The distinctive fingerprints of precipitation processes in multifrequency measurements from GOES-East and GPM sensors are characterized using ground-based observations (rain gauges, disdrometers, spectrometers, radars, etc.) and microphysical-dynamical models. The focus is on low-level warm rain processes, including the life-cycle of hydrometeors from CN activation until they reach the land surface, not resolved by numerical weather prediction models and missed by remote observing systems on the ground or satellites. That is, the Terra Obscura of orographic precipitation. We propose and demonstrate a framework to infer local physical-statistical constraints from satellite measurements to improve quantitative precipitation estimates (QPE) in complex terrain regions globally.