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# Processing of Doppler spectra collected by an airborne cloud radar

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Radar Doppler spectra from vertically-pointing cloud radars have been successfully used to derive physical and microphysical properties of clouds and precipitation, such as air motion, particle fall speed, or cloud-drop and drizzle parameters. The majority of past studies utilized spectral observations of stratiform clouds from ground-based radar systems. Doppler spectra from airborne radars are rarely used because they pose special challenges: Because of the finite beam width of radars, the horizontal wind component, which is dominated by the high speed of an aircraft, causes a broadening of the airborne spectra, even when the radar is pointing exactly vertically.
Using observations from the airborne HIAPER Cloud Radar (HCR), we developed a robust technique to correct Doppler spectra for broadening caused by aircraft motion. From the corrected spectra, we calculate high-quality higher-order moments, such as skewness and kurtosis, and other spectral parameters. The development of this processing method is the first step towards our goal of providing higher-order moments, and other spectral parameters, for all HCR observations on a routine basis. HCR has been deployed in five major field campaigns, reaching from the Southern Ocean to the Central American tropics, sampling a vast variety of cloud types. By making spectral radar products derived from clouds sampled in different climatic regions easily accessible, we aim to increase their use by the scientific community. Better utilization of spectral products in cloud research will improve our understanding of their microphysical and kinematic implications, and enhance their use in retrieval algorithms.

## VAT

## Session

From Classical to Integrated Remote Sensing: New observation strategies for clouds and precipitation (multi-frequency, spectral polarimetry, multi-sensor)

## Preferred Contribution Type

Oral Presentation

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