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The prospects for radars on satellites to provide better observations of warm conveyor belts

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Spaceborne radars have the potential to provide profiles of precipitation, clouds and winds within cloudy systems that are inaccessible from other satellite techniques. The reflectivity profiles from the nadir pointing cloud radar on CloudSat launched in 2006 have provided the first global data sets of cloud ice content within clouds and precipitation rates with 500m vertical and 1km horizontal resolution; this information has been a useful constraint for cloud parameterisation schemes within NWP and climate models. The EarthCARE satellite to be launched in 2022 will have a nadir pointing Doppler radar and high spectral resolution lidar and should to provide much more precise profiles of the microphysical and radiative cloud properties. ESA are studying a conically scanning Doppler cloud radar concept with a revisit time of about 12 hours, that should measure in-cloud winds, using the cloud droplets as tracers, with a resolution of 1km in the vertical and 20km in the horizontal, sufficient to resolve warm conveyor belts.

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