

A spaceborne conically scanning 94GHz radar to provide global observations of winds rain and clouds.

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Building on recent ESA and UK studies we propose a conically scanning spaceborne broad-swath Dopplerised 94GHz radar to provide global measurements of winds, rainfall and cloud ice water content using the radar returns from cloud and precipitation particles. The 94GHz radar will have a very narrow beam so that even with a slant path it can achieve 1km vertical resolution. The observations will have 50km horizontal resolution with several visits every day at European latitudes. Polarisation diversity techniques will be used to achieve a high folding velocity and to reduce the variance in Doppler velocity estimates; ground based and aircraft observations are needed to evaluate the performance of these techniques. Windstorms in Europe have caused many billions of Euro damage over recent years. High losses have also resulted from flooding. The loss of life from tropical cyclones is decreasing due to improved forecasts and better warnings: compare the 138,000 deaths in Myanmar due to cyclone Nargis in 2008 with the 43 deaths from the more powerful Indian super-cyclone in October 2013. Better observations of winds, rain and clouds would lead to more accurate forecasts with improved timing and location so that mitigation activities can be better focussed. The in-cloud winds from this proposed satellite would complement the clear air winds from the ESA explorer ADM/AEOLUS when it is launched in late 2014.