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TITLE: Dual-frequency Spaceborne Doppler Radar: analysis of performances in estimating latent heat fluxes

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ABSTRACT TEXT:

Knowledge of the global distribution of the vertical velocity of precipitation is important in estimating latent heat fluxes, and therefore in the general study of energy transportation in the atmosphere. Such knowledge can only be acquired with the use of spaceborne Doppler precipitation radars. Recent studies have proven that the average vertical velocity can be measured to acceptable accuracy levels by appropriate selection of radar parameters. Furthermore, methods to correct for specific errors arising from Non-Uniform Beam Filling effects and pointing uncertainties have recently been developed.

As demonstrated in the Global Precipitation Mission (GPM) preparatory studies, the use of a dual-frequency precipitation radar allows improved estimation of the main Drop Size Distribution (DSD) parameters. Such parameters, in turn, allow to improve the estimates latent heat fluxes. In this paper we analyze and compare the performances for single- vs. dual- frequency Doppler radar in estimating the latent heat fluxes from the measured rainfall vertical velocity and DSD parameters. The results are generated from a 3D spaceborne Doppler radar simulator applied either to the high resolution airborne Doppler radar rainfall datasets, or to datasets generated through a cloud resolving simulator.

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Keywords: Doppler, Spaceborne Radar, Precipitation