

Using Commercial Microwave Links to Estimate Rainfall Intensity and Variability in Rwanda

Thursday, June 26, 2025 3:15 PM (45 minutes)

This poster presents a first-time application of using commercial microwave links (CML) to predict rainfall intensity and variability in Rwanda, in the framework of a research project (Sensor²) with Ghent University, Rwanda Meteorology Agency, MTN Rwandacell and University of Rwanda. Similar research has shown global success in generating real-time data rainfall monitoring, particularly in areas with limited weather radar coverage. Rwanda, a country of hilly topography, located in a tropical region where weather patterns are complex and fluctuate easily, and with high population density and widespread mobile phone usage, could highly benefit from application of CML for rainfall monitoring. This research will identify the limitations of using CML to predict rainfall in a tropical region like Rwanda, with challenging meteorological conditions and a large variability in applied microwave frequencies. We will present a first analysis of a few case studies of extreme rainfall during the rainy season of 2025. The ultimate aim of the project is to generate calibrated, operational, high-frequency rainfall maps in real-time. To do so, an extensive calibration will be performed using dedicated disdrometers and automatic rain gauges. In addition, we plan to merge the CML-derived rainfall products with the existing automatic rain gauge network and satellite information. We will also investigate alternative approaches for dry-wet period identification using Meteosat Third Generation and optimal spatial interpolation methods. As such, this research will improve the accuracy of rainfall monitoring and early warning systems at the Rwanda Meteorology Agency reducing and mitigating risks associated with extreme weather events and improving Rwanda's disaster preparedness.

Are you an Early Career Scientist ?

Yes

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