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Simultaneaous X-band and K-band study of precipitation to derive localized Z-R relationships

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During the Convective and Orographically-induced Precipitation Study (COPS) campaign, the Laboratoire de Météorologie Physique (LaMP) set up its precipitation measurement instrumentation at the french supersite V around the Bischenberg for continuous operation from June 15 to August 29 2007. These instruments consist of a small high resolution X-band scanning radar used at a fixed elevation, a vertically looking K-band Micro-Rain Radar (MRR), a disdrometer and a raingage. Intercalibration between the two radars has been done over the whole data set of the campaign. Attenuation due to precipitation has been taken into account when possible by the use of the Hitschfeld and Bordan algorithm.

By focusing on the common volume of the two radars, we investigate the high spatial and temporal variability of precipitating systems at scales internal to the system itself. In order to improve rain estimates, we propose to classify rain regimes such that localized Z-R relationships can be applied. The classification schemes are based on the trend of the reflectivity intensity (increasing, decreasing, stagnating) or on its intensity itself (reflectivity classes) while a last method use a statistical approach.

Our preliminary work in the framework of COPS has been assessed. We showed that the statistical approach is the most effective but that it can be applied only on sub-sets of the data for which there is a good stability of the reflectivity signal. Hence, we propose improvement and combination of the different methods to provide an effective estimation of precipitation in all conditions. The study is also completed by data from intense precipitation episodes during May and June 2008 at the LaMP home site in the Massif Central mountains.