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Opportunistic Sensing of Rainfall

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Hydrometeorologists have traditionally relied on dedicated measurement equipment to do their business. Such instruments are typically owned and operated by government agencies and regional or local authorities. Installed and maintained according to (inter)national standards, they offer accurate and reliable information about environmental states and fluxes. Such standard instruments are often further developments of novel measurement techniques which have their origins in the research community and have been tested during dedicated field campaigns. One drawback of the operational measurement networks available to the hydrometeorological community today is that they often lack the required coverage and spatial and/or temporal resolution for high-resolution real-time monitoring or short-term forecasting of rapidly responding systems (e.g. urban areas). Another drawback is that dedicated networks are often costly to install and maintain, which makes it a challenge for nations in the developing world to operate them on a continuous basis, for instance.

Yet, our world is nowadays full of sensors, often related to the rapid development in wireless communication networks we are currently witnessing (including 5G). Let us try to make use of such opportunistic sensors to do our science and operations. They may not be as accurate or reliable as the dedicated measurement equipment we are used to working with, let alone meet official international standards, but they typically come in large numbers and are accessible online. Hence, in combination with smart retrieval algorithms and statistical treatment, opportunistic sensors may provide a valuable complementary source of information regarding the state of our environment.

The presentation will focus on some recent examples of the potential of opportunistic sensing techniques for rainfall monitoring, using microwave links from cellular communication networks (in Europe, South America, Africa and Asia) as well as personal weather stations.

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