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Measuring and modelling high resolution rainfall fields for hydrologic process understanding

Lionel Benoit¹, **Anthony Michelin**¹, Bettina Schaepli^{1,2}, and Grégoire Mariéthoz¹

¹University of Lausanne, Institute of Earth Surface Dynamics, Lausanne, Switzerland

²University of Bern, Institute of Geography, Bern, Switzerland

Observing and modelling rainfall at high spatial and temporal resolution is known to be key for hydrologic applications in urban areas, but little is known about the relevance of high density observations in natural headwater catchments. In this contribution, we present the case of the Vallon de Nant experimental catchment (Switzerland) where high resolution rainfall observations have been carried out with low cost (drop-counting) sensors to develop a new sub-kilometer scale stochastic rainfall model and to investigate the relevance of high resolution rainfall observations to understand the rainfall-runoff response of a small alpine headwater catchment (13.4 km²).

We will give an overview over the experimental set-up (in place for two consecutive summers), the reliability of the used sensors (Driptych Pluvimate) and the potential of such a network to inform high resolution stochastic rainfall field models and hydrologic models. A special focus will be on the developed methodological framework to assess the importance of high resolution observations for hydrological process research. Given the relatively low cost of the deployed rainfall sensors (around 600 USD each), the presented methods are readily transferable to similar hydrologic settings, in natural as well as urban areas.