

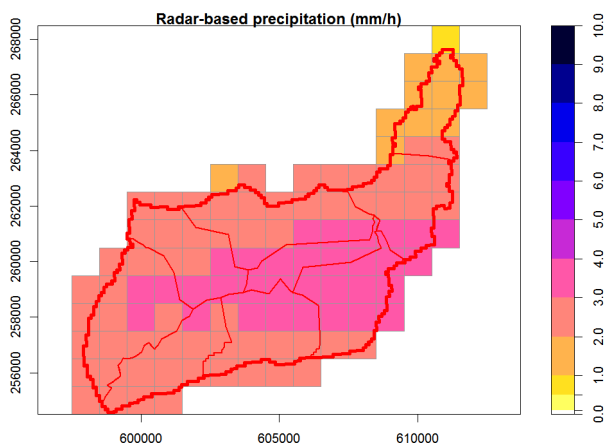
Potentials of radar data for modelling different rainfall floods

Motivation:

Traditionally rainfall has been measured punctually with rain gauges located at the ground. Recently, radar-based rainfall information is gathering more and more attention as a possible source of accurate and spatially distributed rainfall information^{1,2}. One potential application of radar-based data is for flood predictions in small to semi-sized catchments³. However, it remains unclear whether floods resulting from different rainfall types can profit in the same way from the radar-based data⁴.

Content of this Master thesis:

This master thesis should explore the potential of incorporating radar data to model flood events resulting from different types of rainfalls, i.e. convective, stratiform or mixed in a small urban catchment of Birsig (Basel). Different set-ups of a rainfall-runoff model and the catchment can be explored. This thesis aims at covering the following questions:



- Does the performance of hydrologic model depend on the rainfall type (and rainfall information)?
- Which rainfall types (and resulting flood types) profit the most from the radar-based information (and which the least)?
- Does increasing catchment spatial diversity increase model performance?
- Which characteristics of floods can be better predicted with radar-based and which with rain gauge data?

Source: Sikorska-Senoner et al. 2019.

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This master project is a collaboration with MeteoSwiss.

Key references:

¹Germann, U., Galli, G., Boscacci, M., Bolliger, M., 2007. Radar precipitation measurement in a mountainous region. *Quarterly Journal of the Royal Meteorological Society*.

²Sideris, I., Gabella, M., Sassi, M., Germann, U., 2014. The CombiPrecip experience: development and operation of a real-time radar-rain gauge combination scheme in Switzerland. *Proceedings, 2014. International Symposium Weather Radar and Hydrology, Washington DC, USA*.

³Sikorska, A., Seibert, J., 2018. Appropriate temporal resolution of precipitation data for discharge modelling in pre-alpine catchments. *Hydrol. Sci. J.* 61, 1-16. doi:10.1080/02626667.2017.1410279.

⁴Sikorska-Senoner, A.E., Seibert, J., Sideris, I., Barton, Y., Germann, U. (2019) Does radar-based rainfall data improve runoff simulations? – A case study in a small urban Swiss catchment, 11th International Workshop on Precipitation in Urban Areas (UrbanRain18), Pontresina, Switzerland, December 5-7, 2018, pp. 109-110.