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Application of commercial microwave link (CML) derived precipitation data in a hydrology model

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In 2016 very local and extremely intensive convective events caused severe flooding in the Alpine space. Despite the large number of monitoring stations most of the rainfall events were not captured accurately by the existing rain gauge network. As the number of traditional precipitation monitoring sites is in general decreasing, novel rain monitoring techniques are gaining attention. One of the new techniques is the rainfall estimation from signal attenuation in commercial microwave link (CML) networks operated by cellular phone companies.
In this contribution, we use CML-derived rainfall information to improve the streamflow forecast of the distributed hydrology model WaSiM-ETH in hindcasting and nowcasting modes. Our model domain covers the complex terrain of the Ammer catchment located in the German Alps. The hydrology model is operated with a spatial resolution of 100m and with an hourly time step.
We present two alternative methods of rainfall estimation from CMLs and compare the results to data from rain gauges and a weather radar. Finally, we show the impact of the rainfall data sets on the hydrology model initialization and in discharge simulations of the Ammer River for selected episodes in 2015 and 2016. We found that the densification of the observation network by the CML observations leads to a significant improvement of the model performance.