

**Conference:** 34th International Conference on Alpine Meteorology, Reykjavík, Iceland, 18-23 June 2017  
(<http://vedur.org/index.php/icam>)

**Title:** Accuracy of high-resolution gridded precipitation and temperature datasets in the Alps: evaluation by hydrological modelling in the Adige catchment (Italy)

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A good accuracy of gridded climate datasets is of crucial importance to climate studies, for the analysis of past and present climate, as well as for the validation, bias correction and/or statistical downscaling of climate models. Achieving accurate estimates for climate variables is especially challenging in the Alpine region, where spatio-temporal variability is exacerbated by complex topography and peculiar weather phenomena, and surface observations are rather scarce. This work aims to (1) assess the uncertainty of high-resolution precipitation and temperature gridded products available over the Alps and (2) indirectly evaluate their accuracy by means of hydrological modelling. The HYPERstream distributed model (*Piccolroaz et al. 2016*) is calibrated and run for the Alpine catchment of the river Adige (Italy), according to daily meteorological inputs from five datasets, namely E-OBS (*Haylock et al. 2008*), MSWEP (*Beck et al. 2016*), MESAN (*Landelius et al. 2016*), APGD (*Isotta et al. 2014*) and ADIGE (a regional dataset), for the years 1989-2008. The datasets of highest observational density, APGD and ADIGE, show similar spatio-temporal patterns of precipitation and correspond to simulations with high modeling efficiencies and small biases in simulated streamflow, at both large and local scales. On the other hand, despite taking advantage from counterbalancing effects at the basin scale, at smaller scales E-OBS, MESAN and MSWEP are found to be not accurate enough. Thanks to the use of hydrological modelling as an indirect and integrated evaluation tool, the climate datasets compared are thus ranked according to their accuracy. In addition, their suitability for possible hydrological applications in impact studies is also determined.

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*Haylock et al. (2008), A European daily high-resolution gridded dataset of surface temperature and precipitation, J. Geophys. Res., 113, D20119, doi:10.1029/2008JD10201.*

*Isotta et al. (2014), The climate of daily precipitation in the Alps: development and analysis of a high-resolution grid dataset from pan-Alpine rain-gauge data, Int. J. Climatol., 34, 1657–1675, doi:10.1002/joc.3794.*

*Landelius et al. (2016), A high-resolution regional reanalysis for Europe. Part 2: 2D analysis of surface temperature, precipitation and wind, Q.J.R. Meteorol. Soc., doi: 10.1002/qj.2813.*

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