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# Implementation and evaluation of a new high resolution meteorological reanalysis system of surface parameters over France

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The SAFRAN reanalysis system is operationally used at Météo-France for avalanche risk forecasting and water management. It calculates hourly 2m air temperature and specific humidity, liquid and solid precipitation rates, wind speed and solar and infrared radiations over France on a regular grid (8km resolution), and usable to drive land surface models. The aim of the current study is to design a high resolution (kilometric scale) reanalysis system over France to replace SAFRAN. Such a system will be dedicated to near-real time and past reanalysis. The MESCAN analysis system based on optimum interpolation (OI), which makes the best unbiased linear combination between observations and a background, will be used to analyse 2m temperature and relative humidity as well as daily precipitation.

The focus will be put on the precipitation analysis with the statistical method based on semi-variograms used to determine daily observation and background errors. At first, this statistical method was applied using the French observational network and a background from the operational AROME model at a 1.3km resolution over the November 2015 - May 2018 period. A comparison over the same time period is then performed to assess the variability of the observation and background standard deviations using another background information as input of the OI such as the global ERA5, or regional UERRA reanalysis.

The MESCAN precipitation analysis will then be evaluated against independent observations, by employing various metric such as the Heidke Skill Score, bias or the root-mean square error, and compared to the UERRA-MESCAN-SURFEX production.