seNorge_2018 observational gridded datasets over Norway

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seNorge_2018 is the newest member of the seNorge family of observational datasets that have been produced on a daily basis at the Norwegian Meteorological Institute (MET Norway) since 2002. The dataset includes: daily total precipitation; daily mean, minimum and maximum temperature for the Norwegian mainland covering the time period from 1957 to the present day. The fields are presented on a regular grid with 1 km of grid spacing. seNorge data are used for several applications in climatology, hydrology and meteorology and this version is the first to provide minimum and maximum daily temperatures.

seNorge_2018 is based on in-situ observations from the MET Norway's climate archive and the ECA&D dataset. The data are quality controlled both through automatic checks and by MET Norway staff. The gauge observations are adjusted for wind-induced undercatch, which is quite important in Norway.

This presentation focuses on the spatial interpolation methods for both temperature and precipitation. The two methods follow a similar approach, where the fields are first estimated over larger scales, subsequently we move to local scales. At the end, we aim at delivering the best (i.e. highest effective resolution) product for each day given its data density.

For temperature, the larger scales are represented through the blending of several local vertical temperature profiles. Then, an Optimal Interpolation (OI) scheme adjust for the local scales. The previous seNorge version was similar, though seNorge_2018 features minor modifications (e.g., land-area fraction is in the spatial structure function) and an improved parameter optimization procedure. The results show significant differences from the previous version, especially along the coastline and in data-sparse regions. Minimum daily temperature is the most challenging temperature variable to represent.

For precipitation, a successive correction algorithm has been implemented, which iterates OI over a sequence of decreasing spatial scales. With respect to previous versions, the innovative parts are: (i) the interpolation is performed over transformed data so as to better comply with the assumption of normality; (ii) a gridded adjustment factor is added to improve the interpolation performances in data-sparse regions. This factor is derived by processing a decade of precipitation data from a high-resolution numerical model.

seNorge_2018 performances are evaluated through cross-validation and also by comparing it with other datasets.

The dataset is available for public download at:
http://thredds.met.no/thredds/catalog/senorge/seNorge_2018/catalog.html