

Version: March 2019

CS1 Winter tourism centers in Northern Finland

RUKA needs

- Winter: Both short (daily/monthly/seasonal) and long term (5 year intervals) are interesting, but especially long term. If exact data is not available, even patterns and estimates can help. Temperature, wind, humidity, cloudiness, snow fall amounts, changes in winter season length and when winter starts/ends.
- Summer: Temperature, rainfall, sunshine, humidity, how the changes in weather/climate affect nature in general.
- Scale: Ideally a 'micro-forecast', i.e. focusing on the ski resort and immediate area.
- Global trends: El Nino/La Nina and how they affect the weather and climate conditions in their area.

The first workshop with RUKA was held in Spring 2017: The results of this workshop are highlighted in the Deliverable D5.1 "CS1 End User Needs Report" and its contents won't be reported in here. From the initial list of end-user knowledge needs, the co-design process has continued as learning cycles during more a case study meeting and workshop in RUKA in Winter 2018. While in the earliest stages of the case study co-design process, RUKA staff was not entirely sure of the usefulness of for instance hindcasts,

Variables to be looked at:

- Temperature
- Humidity
- Wind speed.

RUKA location is 66°09'N 29°09E.

Data source Nr. 1

Provider: UHAM/DWD

What has been provided:

- Hindcast data have been made available in early 2019 from GCF52, together with a manual related to the models to run the first tests.
- Temperature profiles include information about surface temperature and at 2 meters. At a later stage, the AC UoL will access vertical profiles of the temperatures, but at a regional scale, not global.
- Pressure files.
- Hindcast simulations are available starting every May/Nov between 1982 - 2016 for 6 months with 30 ensemble members each, in netCDF format. As a reference data set, the Univ. Hamburg uses the ERAinterim reanalysis for the meteorological data.
- Forecasts: 10 Ensemble members from the October 2019 forecast. Length of 6 months.
- Spatial resolution: please cut out approximately Northern Europe.



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- Contents of the first test file: data of one member of the October 2018 forecast for Northern Europe (55°N - 75°N, 0° - 40°E) for surface temperature, 2m temperature, u and v wind component a few surface variables. This file was prepared for the CS to get a first impression of DWD data, e.g. about the spatial resolution.
- Second test file was provided with the following: 2m temperature, surface temperature, u and v wind component, 1000hPa humidity, 10 ensemble members, Map section of Finland (22.5° to 35.6°E and 59.4° to 72.5°N), January 2019 forecast and January hindcasts of 2010, 2012 and 2014.

The Univ. Hamburg teams suggested starting working with hindcasts for one season with relatively high temporal resolution, with daily time series 2-6 months runs.

As for long-term data, the UHAM model system is based on MPI-ESM-MR, which is a CMIP5 model, and all the MPI-ESM-MR contributions to the CMIP5 archives are consistent with the initialized simulations. As for the CMIP5 data, a summary can be found here: http://cmip-pcmdi.llnl.gov/cmip5/data_getting_started.html

Data source Nr. 2

Provider: Meteorological services in Finland

What has been provided: More data related to **real temperature** have been provided by the Finnish Meteorological Institute. Data from two stations located in Northern Finland have been collected: temperature, pressure, moisture, wind. The data provided by the Finnish Meteorological Institute correspond to the interval 04.11.93 - 23.05.2017, from the stations Kuusamo Rukatunturi and Kuusamo Ruka Talvijärvi. FMI actual measurement from the nearer lake to RUKA.

Data storage

- AC UoL has some access to the CSC storage in Finland
- Additional storage will be negotiated with Zenodo www.zenodo.org

Additional comments

In the future, for this case study, it is envisioned that more data will be obtained from the Norwegian Meteorological services