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FPCUP SnowLoads

Estimation of snow load data using Copernicus and in-situ data

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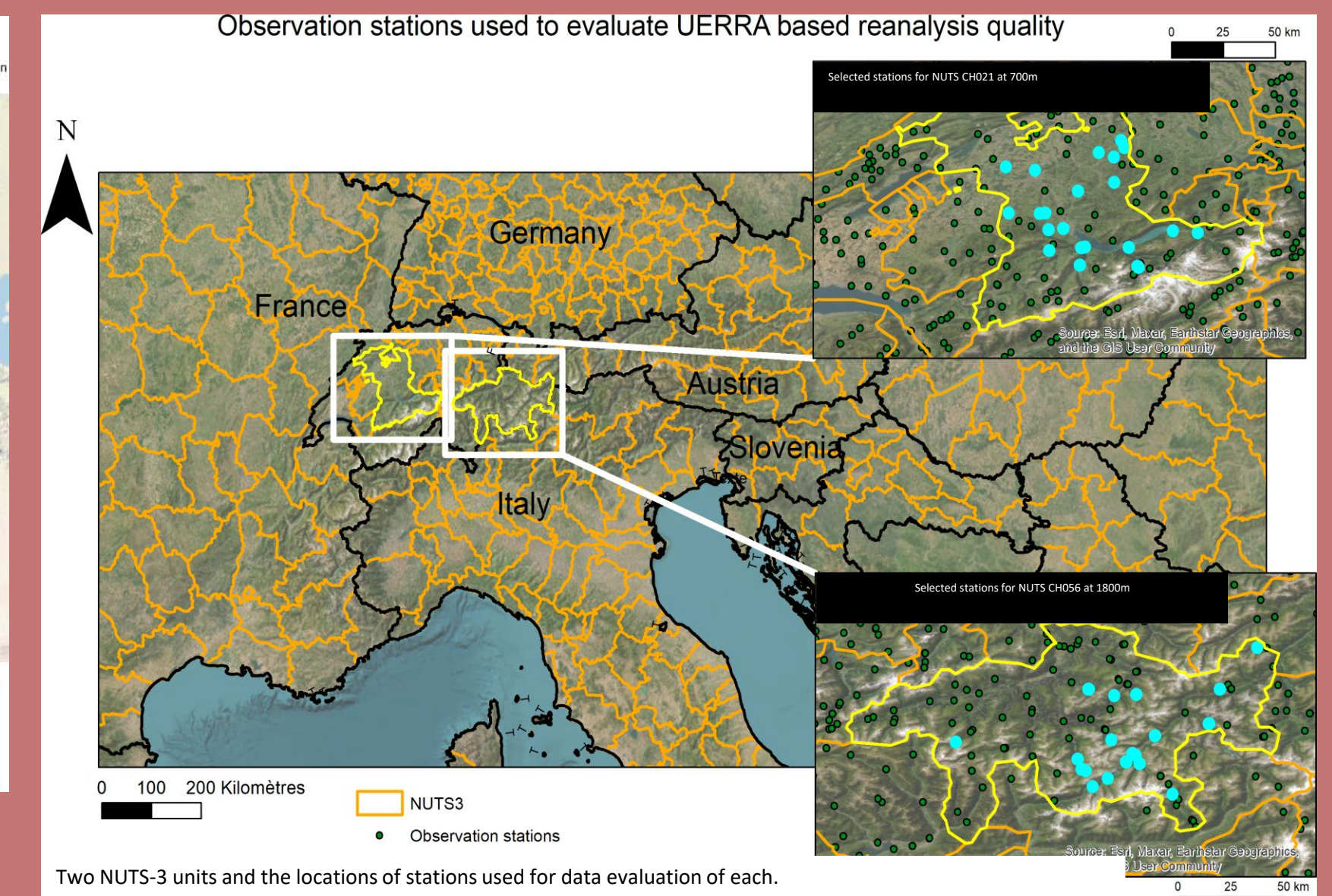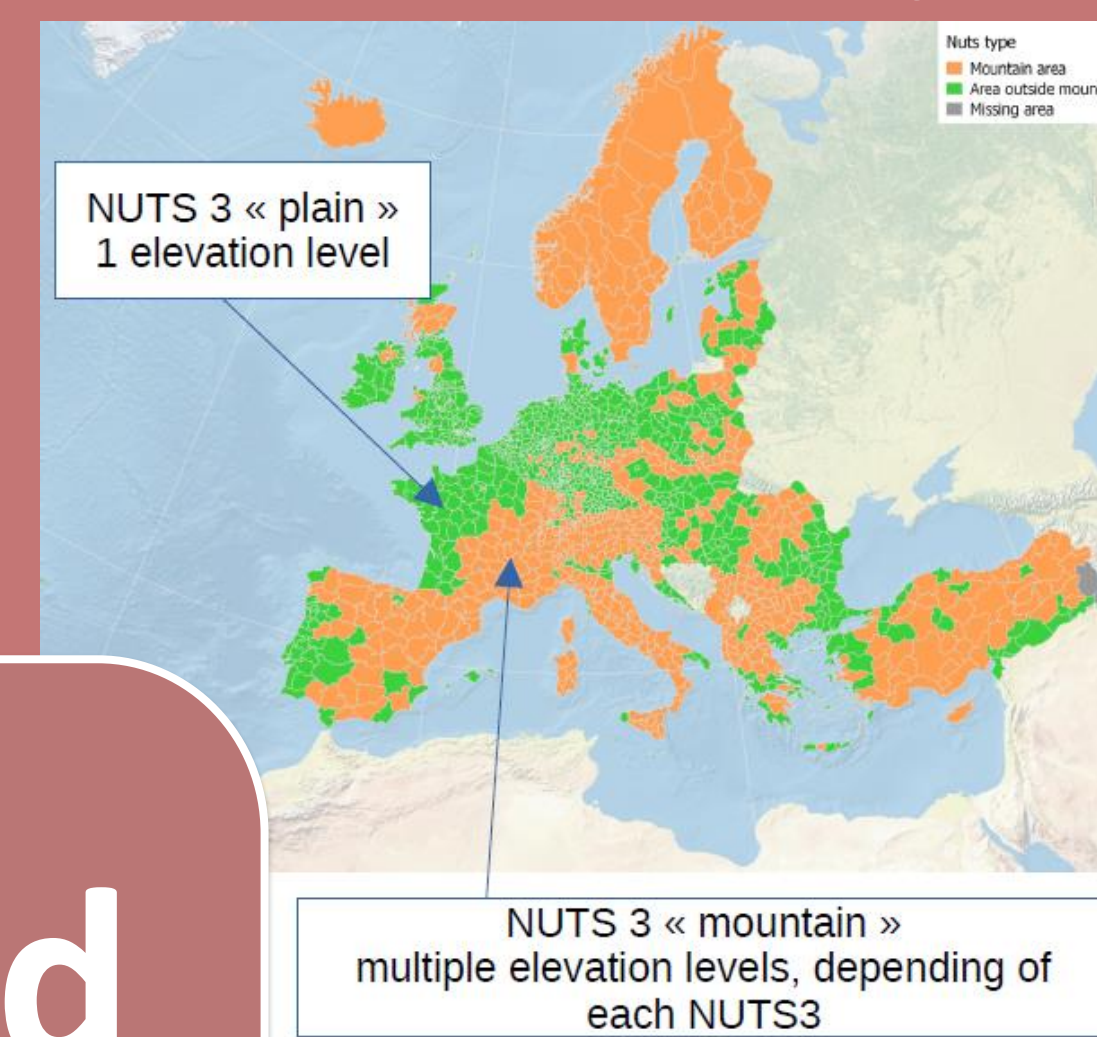[1] Météo-France – CNRS, CNRM; [2] Univ. Grenoble Alpes, INRAE, CNRS, IGE [3] FMI [4] DWD [5] POLIMI

Goals of FPCUP SnowLoads

- Development of a **C3S App** for a Europe-wide provision of snow load climatological information for civil engineering as well as hazard and damage prevention purposes

- **Pilot downstream services** will use the C3S App as basis and will enrich them with current snow load information in the pilot regions.

- **User Workshops** with experience/ feedback; **User advice document** on how to use the C3S App

FPCUP SNOWLOAD

Based on the UERRA reanalysis (1960-2015)

- Yearly snow statistics (Maximum snowfall/SWE, beginning/end of season) from 1960 to 2015.

- At NUTS-3 level (Nomenclature des Unités Territoriales Statistiques) – based on the Mountain Tourism.

- Meteorological and Snow Indicators dataset.

- Along with data quality scores based on comparison with in-situ observations (work in progress).

NUTS 3 « plain »
1 elevation level

NUTS 3 « mountain »
multiple elevation levels, depending of each NUTS3

Observation stations used to evaluate UERRA based reanalysis quality

Two NUTS-3 units and the locations of stations used for data evaluation of each.

Snowload C3S App

Pilot downstream services for pilot regions

Bavaria (Germany), Uusimaa (Finland), Lombardia (Italy)

Goal:

Inform about the **current snowload situation** in pilot regions; design and provided variables depend on user requirements

User requirements:

With this **online survey**, we are currently collecting data on user requirements :

Survey snowload

Relevant snowload indicators for civil engineering in future climate

- 50 year snow return level: snowfall event likely to happen once in 50 years.

- Use of "Generalized Extreme Value" theorem, approximation of the cumulative distributions of snow maxima with a three parameters exponential function (equ. 1). ξ, μ and σ respectively represent the shape, location, and scale of the curve. Adequate parameter estimation is key.

$$G(z) = \exp\left\{-\left[1 + \xi\left(\frac{z-\mu}{\sigma}\right)\right]^{-1/\xi}\right\} \quad (1)$$

- As climate changes, parameters are estimated as nonstationary – the choice of function type for the extreme value statistics still remains challenging.

- Next steps:
(i) finalize the scientific content of the data underpinning the C3S App, and
(ii) implement the App if quality control and sustainability criteria are met.