Documentation – High resolution static data for WRF over Switzerland

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Abstract

Static input data (topography, landuse and soiltype) for the WRF preprocessing system WPS is provided for Switzerland and its neighboring countries between 45-49 N and 4-12 E. The data is provided at a resolution of 1 s. Topography is based on the Aster dataset, while landuse is extracted from the Corine landuse dataset. Soil type is set to *silty clay loam* for the entire domain. This static input data is valid for WRF and CRYOWRF.

1   Introduction

Here, we provide static input data for the preprocessing system WPS used to prepare data for the Weather Research and Forecasting model (WRF, Skamarock et al., 2008). This static data can be used for WRF simulations in general but also for the recently released version of WRF called CRYOWRF, which includes a land surface model with a detailed snow cover model (SNOWPACK, e.g., Lehning et al., 1999) and an additional option for blowing snow (Sharma, 2021). The motivation of this dataset is to provide input data for WRF and CRYOWRF simulations at very high resolution over the region of Switzerland. While the highest spatial resolution of standard WRF static input is available at a resolution of 30 s, this input dataset has a resolution of 1 s. The preparation of the data is following the guide provided in Gerber and Sharma (2018) unless specified otherwise.

> **Note**
>
> This document provides input data to run simulations with the Weather Research and Forecasting Model (WRF) and describes the process, how these files were produced. It does not claim to be complete. No responsibility will be taken in case of damage or loss of any kind.

2   Input data and processing

2.1   Aster topography

Topography data is based on the Aster Global Digital Elevation Model v003 (https://lpdaac.usgs.gov/products/astgtmv003/, accessed: 2021-06-28, NASA/METI/AIST/Japan Spacesystems and U.S./Japan ASTER Science Team, 2019). The data has been processed as described in Gerber and Sharma (2018), except that there was no transitional topography generated at the boundaries of the domain. Data has been processed for the domain between 45-49 N and 4-12 E. This results in a dataset with 28801x14401 grid cells. The data is provided in WGS84 coordinates.

2.2   Corine landuse

Land use data is based on the Coordination of Information on the Environment (Corine) dataset provided on (https://www.eea.europa.eu/data-and-maps/data/clc-2006-raster, downloaded: 2016-06-15, accessed: 2021-06-28, new version available, European Environmental Agency, 2006), and is reclassified to USGS landuse categories

(Pineda et al., 2004). Categories are defined between 1-24 instead of 101-124. The data was processed in the same way as in Gerber and Sharma (2018). The domain extracted is equivalent to the domain described in Section 2.1.

2.3   Soil type

As described in Gerber and Sharma (2018) the soil type is limited to one soil type (*silty clay loam*) for the entire domain. WRF input data for `soiltype_top` and `soiltype_bot` was prepared for the domain described in Section 2.1 following the procedure in Gerber and Sharma (2018).

3   Static data for WPS

The data described in Section 2 is provided as binary WPS input files (`00001-28801.00001-14401`) with the corresponding index file (`index`) for the four static data categories topography, landuse, soiltype bottom and top. The data is available in the folders `topo_1s`, `landuse_1s`, `soiltype_bot_1s` and `soiltype_top_1s`, respectively. The grid cell resolution of the dataset is 1 s, with an extent between 45-49 N and 4-12 E on WGS84 coordinates. To use this dataset an adapted GEOGRID.TBL (provided as GEOGRID.TBL-aster-121_1) and an example `namelist .wps` are provided together with the binary WPS input tiles. Using GEOGRID.TBL-aster-121_1 the new static 1 s data is set as default but can also be chosen in the namelist by setting `geog_data_res = '1s'`, for all chosen domains. GEOGRID.TBL-aster-121-1 includes one smoothing cycle with the WRF smooting option 1-2-1. The number of smoothing cycles needs to be adapted based on the simulation setup.

Acknowledgements

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