Time invariant input parameter processing for applications in the COSMO-CLM Model

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Introduction

Topography, soil characteristics, land use and land cover as well as associated vegetation parameters are key information in Soil-Vegetation-Atmosphere-Transfer (SVAT) schemes widely applied in atmospheric models in parameterization of surface exchange processes. With exception of seasonal changes in the leaf area index (LAI), vegetation fraction or roughness length, the geodata input is usually kept constant in a simulation and can therefore be considered as a time-invariant parameter. Within COSMO-CLM the data processing is performed with the PEP preprocessor.

Preprocessor PEP

• Data base of topography, land use and vegetation parameters
  • Soil characteristics, lake characteristics and others
  • Interface to the data and suite of processing programs:
    • EXPAR preprocessor of the COSMO model
    • GUI and WEB Service for easy data access
  • Several operational and experimental options:

Recent data base extensions

• Monthly LAI values
• Monthly vegetation fraction
• Monthly values for roughness length
• JRC Soil Map (Europe)
• Soil data from Harmonized World Soil Database (1) (2 layers):

The quality of the time invariant data can have a substantial effects on the model results. The Figures below show the influence of the newly introduced subgridscale orography (SSO) parameters required for the SSO parameterization.

With recent data base extensions the data quality has been considerably improved (see section “Recent data base extensions”).

The data processing can have an significant influence on the data quality (see section “Data Processing”)

References