COSMO Priority Project

# COLOBOC

## Consolidation of Lower Boundary Conditions

## Data sources for external parameters – First Review

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# Kolobok

Wikipedia:

Kolobok (Russian: circle side) is the main character of an East Slavic national fairy tale with the same name, represented as a small yellow spherical being. He is accidentally created by an old man and his wife, as a bread dish, when he suddenly becomes animated and escapes from their home. The fairy tale's plot describes Kolobok's repetitive meetings with various animals (rabbit, wolf, and bear) who intend to eat it, but Kolobok cunningly escapes. With each animal Kolobok sings a song in which he explains his escape inductively: "I got away from Grandmother, I got away from Grandfather, and I will certainly get away from you". The fox manages to catch and eat Kolobok through distracting him by praising his singing.

# Land-Surface Processes

Figure: Complex topography and vegetation – Tenerife

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- Fluxes of energy and water at the surface
- Exchange of heat, moisture, and momentum between the surface and atmosphere
- Impact on near surface weather parameters (temperature, dewpoint wind)
- Possible feedback mechanisms on atmospheric processes (e.g., boundary layer, cloudiness)

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- Validation - comprehensive validation with observations are necessary

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# External Parameters

- Type of surface (land, water) `FR_LAND`
- Type and amount of vegetation (albedo, evapotranspiration characteristics, amount of live vegetation, climatology) `ROOT,PLCOV,LAI,FOR_D,FOR_E`
- Type of soil (porosity and thermal properties) `SOILTYP`
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- Type of soil (porosity and thermal properties) SOILTYP, T_2M_CL
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# Data Sources - Orography

GLOBE (National Geophysical Data Center): Land-surface orography with 30 arcsec resolution
Source: `http://www.ngdc.noaa.gov/mgg/topo/globe.html`

- Land-surface altitude `HSURF`
- Geopotential `FI`
- Standard deviation of sub-grid scale orographic height `SSO_STDH`
- Mean slope of sub-grid scale orography `SSO_SIGMA`
- Angle between principal axis of orography and East `SSO_THETA`
- Anisotropy of topography `SSO_GAMMA`
- Roughness length over land (contributions from orography) `Z0`

# Data Sources - Land use

GLC2000 (Global Landcover 2000 Database) from JRC:
Global data set with a resolution of 1 km (exception of Antarctica) geographical latitude/longitude projection based on the evaluation of NDVI-measurements of the SPOT4-satellite for the period 01 January to 31 December, 2000. Plant characteristics are calculated from dominant land cover by look-up tables.
Source: `http://www-gvm.jrc.it/glc2000`

- Land fraction `FR_LAND` also calculated from other data sources
- Roughness length over land (contributions from land use) `Z0`
- Land coverage with plants `PLCOV_MN,PLCOV_MX`
- Land coverage with deciduous forest `FOR_D`
- Land coverage with coniferous forest `FOR_E`
- Leaf area index `LAI_MN, LAI_MX`
- Root depth `ROOTDP`
- Stomatal resistance `PLANT_RES`
- Land-surface emissivity `EMISS_RAD`

# Data Sources - Soil

DSMW (Digital Soil Map of the World) from FAO: Data set with a resolution of 5 arc minutes in a geographic projection.
Textural classes reflect the relative proportions of clay, silt, and sand.
Soil characteristics classification in 9 categories.
Source: `http://www.fao.org/ag/agl/agll/dsmw.HTM`

- Soil type `SOILTYPE`

# Data Sources -Deep Soil Temp.

CRU (Climate Reasearch Unit) University of East Anglia: Global dataset of mean monthly surface climate over global land areas, excluding Antarctica. Interpolated from station data to 0.5 degree lat/lon for a range of variables (e.g., mean temperature).
Source: `http://www.cru.uea.ac.uk/cru/data/hrg.htm`

- Deep soil temperature from GME based on CRU and ERA-40 using `int_2_lm`
- Deep soil temperature as external parameter `T_2M_CL`

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- ECOCLIMAP global database on land surface parameters 1 km resolution

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- External Parameters (Review, Tools, Enhancement)
- Revision of the Land-Surface Model
- Focus on TERRA due to constraints
  - Adequate and well tested for many applications (e.g. NWP)
  - Available in standard COSMO code
  - Well defined and tested interfaces to ACM
  - Studies with isolated stand-alone TERRA are possible (Task 1)
  - External parameters and look-up tables available and well tested
  - Initialisation is well tested in NWP mode (SMA)
  - Validation at increasing number of observational sites (WG 3)

# Discussion

Comments,

Questions,

Advice,

References