

# Soil Moisture Simulation at country level Case study of Bulgaria

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## Purpose

- Prevention and management with the floods, forest fires and water scarcity is possible only by available timely environmental information. The key element of that information is the soil moisture data.
- So monitoring of soil moisture status is of crucial importance and has to be prepared for our country.
- Soil moisture can be measured by in-situ methods or by means of remote sensing. It is an expensive and timely consuming investigations.
- Soil moisture data can be collected by application of good modeling tools.
- Soil moisture simulations for our country are done by application of the Land Surface scheme – Community Land Model, CLM3.0 (USA).

## Objectives

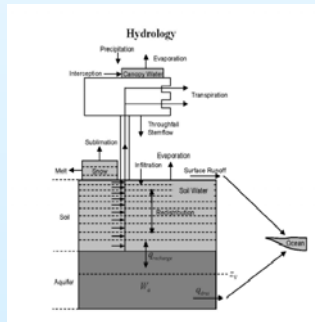
- Monitoring of the soil moisture at national level;
- Application of the spatio-temporal model, CLM3.0 – Community Land Model (USA).

## Application of the CLM model for Bulgaria

- Selected window: longitudes, 22° - 29° ; latitudes, 41° - 45° ;

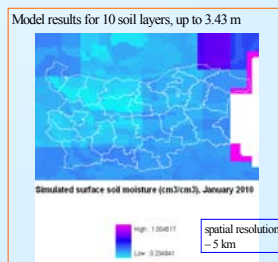
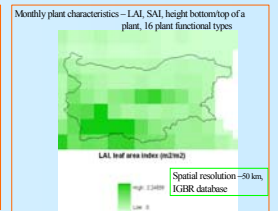
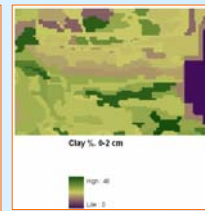
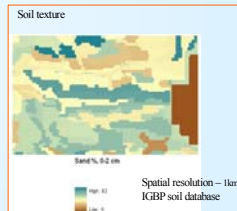
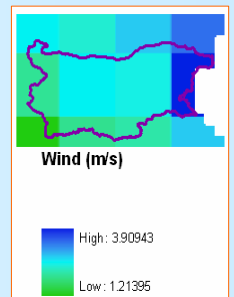
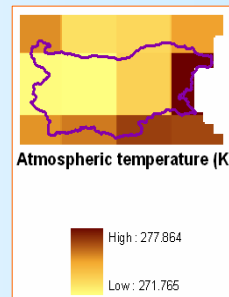
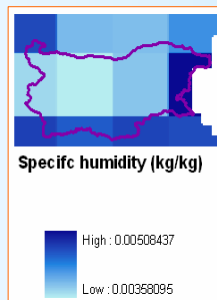
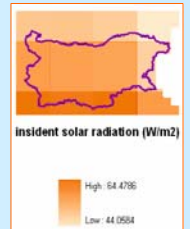
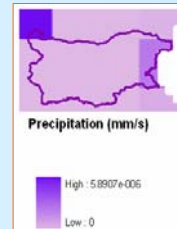
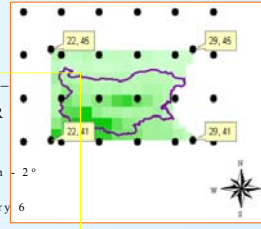
Grid cell resolution – 5 km

CLM model, soil physics – Richard' equation (capillary raise), 10 soil layers up to 3.43 m



Climate data –  
NCEP-NCAR  
database

- Spatial resolution – 2° x 2°
- NASA, satellite observations, every 6 hours



## Conclusions

- The driest upper soil layer has the districts (nuts) – Montana, Vratsa and Lovech;
- The wettest upper soil layer has the district(nut) – Smolyan;
- These are the first model simulations for Bulgaria, the model should be calibrated and validated for regional application;
- The simulated soil moisture information could be used for a monitoring.