

PW2.3: Modelling of continental surfaces

I. Braud (Cemagref), M. Borga (Univ. Padova), A. Montanari (Univ. Bologna)

**4th HyMeX Workshop
Bologna, Italy, June 8-10 2010**

Tasks Team for modelling

- **TTM2a: Whole Mediterranean basin hydro-meteorological modelling**
- **TTM2b: Distributed hydrological modelling over medium to large basins**
- **TTM2c: Groundwater modelling**

Objectives of TTM2-a: Whole Mediterranean basin hydro-meteorological modelling

- Develop a coupled hydrometeorological modelling system (Mediterranean Land Data Assimilation System -MELDAS) describing the main components of the water budget (Météo-France)
- Target area: the **whole Mediterranean** continental areas at **high spatial** resolution (10 km²)
- Target temporal scale: HyMeX **LOP** and **hourly** time scale
- Use of Surfex + river routing scheme + data assimilation of up to date existing products: satellite radiation, albedo, LAI, etc..
- Use of pilot sites data and regional hydrological modelling for validation

Objectives of TTM2-b: Distributed hydrological modelling over medium to large basins

- Improve and develop **distributed** hydrological models over the Mediterranean area (**regional** scale and **ungauged** catchments)
- Two target temporal scales
 - Flash floods
 - The whole water balance over long time periods
- Focus on **pilot sites and super-sites** (for distributed models, need of a large number of data for model assessment, larger than operational networks)
- Focus on EOP period, but longer time series (LOP) of rainfall, discharge, etc, are useful for model improvement and evaluation

TTM2b: Modelling of hydrological processes

- **Detailed models of the water cycle focused on densely instrumented super-sites for process understanding**
- **Examples of addressed scientific questions**
 - Impact of topography on initial soil moisture and evapotranspiration (super-sites)
 - Better knowledge of mediterranean vegetation evapotranspiration (fluxes network)
- **Particular case of flash floods: they are likely to occur outside instrumented sites. Need to develop models applicable on ungauged catchments at the regional scale to exploit post-flood field surveys**

TTM2b: Regional hydrological modelling

- Focus on **pilot-sites** (100-1000 km² catchments)
- Integration of progress on small scale processes into larger scale models and improvement of those models for the long term water balance (WG2) and flash floods (WG3)
- Some challenges (can be tackled on pilot sites with enhanced data acquisition)
 - Integration of **anthropogenic influence** in the modelling (WG2)
 - **Coupling surface and groundwater** (WG2)
 - **Change of scale problem** and transfer to other catchments. Needs to develop classification/typology metrics (for catchments, for events..) (WG2, WG3)
- A platform to organise and drive model intercomparison
- Reference results for Regional Climate Modelling developed in TTM3

Proposed modeling tools in TTM2b

- **Water balance studies**

- Safran-Isba-Modcou chain (Météo-France)
- LIQUID platform (LTHE, Cemagref, France)
- Coupled surface-groundwater modelling (EMMAH, France)
- **New contributions welcome...**

- **Flash floods**

- Surfex-Topmodel (Météo-France)
- LIQUID platform (LTHE, Cemagref, France)
- MARINE model (IMFT, France)
- ATHYS platform (HSM, France)
- GSS model (Padova)
- FFG-MoB (Padova)
- **New contributions welcome...**

Objectives of TTM2-c: Groundwater modelling

- **Develop, improve and assess spatially distributed hydrogeological modelling considering the major types of Mediterranean aquifers (detritic sedimentary, karstic) over the Mediterranean area**
- **Target area: pilot sites and super sites in various countries**
- **Two kinds of modelling according to the scale**
 - Modelling of hydrogeological processes in pilot sites: intercomparison of various modelling approaches, focus on karstic areas
 - Regional scale hydrogeological modelling for upscaling (typology of aquifers) and intercomparison of modelling tools
- **Leaders to be found (French contributions, also some proposals from Israel)**

Discussion/missing points

- **New contributions expected** from on-going activity (register on the HyMeX site and send your contributions to the mailing list)
- Increase the involvement of **hydrogeologists** and find leaders for groundwater modelling
- Framework of an **intercomparison** should still be defined. Focus on pilot sites to have additional data for the assessment of models
 - Flash floods (objectives, catchments, models?)
 - Water balance studies (objectives, catchments, models?)
- **Request of TTM3: choose a catchment and make multi-model simulations for Regional Climate Models validation. The catchment should be large enough to represent a RCM grid point (10000 km²). Objectives and request need to be better discussed**