

5th SURFEX SG Meeting

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SURFEX SG Meeting, March 19, 2014



Current Uses and Ongoing Developments

GMME

- 1) Hydrological Processes (SIM, ISBA-TOP)**
- 2) Soil-Vegetation processes (ISBA)**
- 3) Lakes (FLAKE)**
- 4) Urban processes (TEB)**
- 5) Meso NH**
- 6) Benchmarking and offline surface analysis**



1) Hydrological Processes

Hydrological application **SIM** over France

- New SIM Chain (ISBA-DIF, STRM 90m, Stomatal resistance using Jarvis or Aqs) has been transferred to the Direction de la Climatologie: Climate Directorate. Currently under evaluation.

Hydrology for flash flood prediction : **TOPODYN** (ISBA-TOPmodel approach)

SURFEX v8 : TOPODYN approach for lateral distribution of soil water uses ISBA-DIF

Prospectives

- Regional version of ISBA-TOP : split larger regional scale bassins into sub-basins (for improved lateral/spatial distribution of soil moisture)
- Introduce a variable river flow velocity (collab. With Eram Artinian, Meteo. service-Bulgaria)

2) Soil-Vegetation Processes

Test of ISBA-DIF in coupled mode in the Meso-NH model

- Grid nesting functionality of Meso-NH can now be used with SURFEX with ISBA-DF : Ongoing scientific validation work in 2015

Improved vegetation radiative transfer

- Vegetation canopy radiative transfer option (TR_ML in OPTIONS.nam : Carrer et al. 2013) in SURFEX v8
- Used by DEFAULT *only* with CPHOTO /= DEF (i.e. with Ags options...photosynthesis & Carbon)
- 2 spectral bands considered (NIR, VIS), thus up to 6 input albedos (ground, vegetation and snow if using CSNOW=3-L or =CRO)

2) Soil-Vegetation Processes

GMME

Development of the Multi-Energy-Balance (MEB) ISBA option (with SMHI within HIRLAM)

- MEB now implemented within v8 (collab. With SMHI, CNRM/GMGEC)
- Uses **TR_ML** by DEFAULT (removed original SW scheme) irrespective of CPHOTO
- MEB is Valid for Forest Patches
- Uses CISBA=ISBA-DIF or 3-L (request from HIRLAM), and CSNOW=3-L (explicit snow scheme)
- Can use CPHOTO=AST (baseline Ags photosynthesis)...or Jarvis (CHOTO=DEF)

Perspectives:

- Adapt code for low vegetation/crops (2015) (non-forest vegetated patches)..test/evaluate !
- Progressively add additional Ags options (CPHOTO)...2015
- New explicit understory litter layer (ongoing, Napoly, Boone, Samuelsson) to be merged into official MEB in 2015 (OPTIONAL but recommended)
- Add CROCUS (2015..2016?)
- Offline 0-D mode at CNRM, SMHI (snow), CESBIO/Univ. Cadi Ayyad (ongoing) and within SIM (2015)
- Siberian snow cover (Brun et al., 2013) , and it will be tested within the GSWP3 project (2D offline), impact on global hydrology, fluxes, snowpack...baseline tests in ARPEGE (2015, 2016?)



3.) Lakes (Flake) and 4.) Urban (TEB)

GMME

Work on Flake (with GMGEC) :

- Flake : separation of rivers and lakes in ECOCLIMAP, model changes to allow consistency with other SURFEX schemes

Prospectives

- Couple with ISBA-ES
- Add lake hydrology (water storage changes)

TEB

- Addition of solar panels & Irrigation for Urban vegetated/green areas
- Urban weather generator (develop a heat island above the urban canopy from forcing data)

Prospectives

- Urban hydrology, with soils below roads and buildings
- Radiative balance and phasing with MEB for vegetation within the « urban canyon »



5) Meso NH (Non-Hydrostatic research model)

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The **Meso-NH** community is currently working on :

- the parallelization of PREP in case of nested models in Meso-NH
- the coupling between the atmosphere and an ocean model

The next Meso-NH version (5.2) is scheduled for the 3rd quarter of 2015. It is hoped to include SURFEX V8.



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6) Offline Benchmarking & Sfc re-analysis

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Surface Offline Re-Analysis

- VARASSIM (EKF) has been implemented in SURFEX v8
- LDAS-France is being recoded in preparation for use in LDAS-Monde (Global LDAS).

Fine scale runs (5.5 km) over Europe

- The follow on project UERRA (CNRM contribution) will start in Sept. 2015 - produce 50 years of data at the same resolution (as in EURO4M)

Global Offline

- ISBA (SUREFEX v8) will participate in the GEWEX-supported Global Soil Wetness Project 3 (GSWP3) in 2015-2016. Forcings at 0.5 degree & 3h
- SAME config as for CMIP6 (within the LS3MIP CMIP6 sub-project)
- Exp1: Long term retrospective runs: 1901-2008.
- Exp3: Super Ensemble: 1979-present
- Exp2: Multiple GCMs and Scenarios (2000-2100)
- ISBA-DIF, TRIP, ISBA-ES, Tiles...also test MEB

