SURFEX SC5 – GMAP contribution (30 March 2015)

Atmospheric cycles with SURFEX

- Operational systems in April 2015 : CY40_op2 with SURFEX V7.2+
  Main features regarding the surface : use of ECOCLIMAP-1 and GMTED2010 at 250 m (AROME 1.3 km), new vertical discretization in AROME allows the screen-level variables to be estimated without CANOPY, the surface outputs in FA files are compacted with less fields but stored over the whole forecast range)
- Next operational systems (end 2015) : CY41T1 with SURFEX V7.3+
- Plans for 2016 (end of the year) : CY42T1 with SURFEX V8

Developments on PREP/PGD

Requirement : efficient PREP (FA SURFEX fields on native grid -> FA SURFEX fields on target grid) for PEAROME (and AROME-Airport), ALADIN in dynamical adaptation (using ARPEGE/SURFEX).

Philippe Marguinaud has developed the sofware « PREP/FULLPOS » in order to make efficient geometry changes of SURFEX surface fields compatible with operational requirements. The horizontal interpolations are done by « FULLPOS » (2 levels of parallelisation) and the physical vertical interpolations are done by « PREP ».
Remaining issues :

- The use of « halos » when searching for a grid point with same properties.
- Difficulties when the physiographic databases are different between the native and the target grid.

The recent improvements in computational efficiency (parallelisation) of the version «PREP OFFLINE » are such that the gains brought by « PREP/FULLPOS » are no large, and this interpolation tool is more general. This has been tested by ARPEGE at truncation T2000. On can now run an ARPEGE/SURFEX forecast from initial conditions given by an ARPEGE/ISBA analysis. Studies are undertaken on CY41T1 and part of the developments are already included in SURFEX V8. Additional ones should be provided later.

The creation of a PGD file of physiographic fields takes about 8 min for ARPEGE at T2000.

Need for additional comparisons between PREP/OFFLINE and PREP/SURFEX (collaboration with ALADIN partners).

Need for a tool in order to couple the « ALADIN/ISBA » LAMs with a global model « ARPEGE/SURFEX ».

The convergence of FA files between GMAP and GMGEC has started at the level of common variable namings.

Ongoing and planned activities

- 4D-Var ARPEGE with SURFEX by the end of 2015 (in a research environment). Operational implementation is foreseen for the end of 2016

- Evaluation of SODA to replace OI_CONTROL for surface assimilation in NWP models when SURFEX V8 is available in an atmospheric cycle (second half of 2015). The schedule for the convergence within SODA of activities undertaken by ALADIN/HIRLAM partners (EKF for Flake, STAEKF, …) could be discussed during the SC.

- Inclusion of slope effects on the surface energy balance (collaboration with HIRLAM and Clemens Wastl - ZAMG). This activity has been undertaken within SURFEX V7.3. New parameters are required within the PGD files. These developments will be included in after SURFEX V8 is released for the next version (SURFEX V8.1)