

## Surfex in ALADIN partner countries

Surface/Surfex workshop discussions (December 11-13<sup>th</sup> 2007)

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Where we are now:

- Implementation of the Arpège/Aladin-Fr operational snow scheme (A. Bogatchev, A. Dziedzic)
- 1D tests, first 3D trials (one year post-doctoral position at CNRM: L. Kraljevic)
- 3D plug-in in Arpège and Aladin (G. Hello, Y. Seity, R. El Khatib, K. Yessad, F. Bouyssel, J.-D. Gril, R. Zaaboul and Moroccan colleagues)
- further 3D validation of Surfex: compare with the “old ISBA” behaviour, keeping the old climatological data
- no concrete steps towards data assimilation
- differences with the Arome implementation:
  - implicit coupling with vertical diffusion
  - operational climatological data
  - extra surface fields are needed to run the operational Arp/Ald physics (these are taken from the atmospheric model dataflow)
  - gravity wave drag requires extra fields, which have been added in the inquiry mode output (called by setup)
  - 2 differing file formats so far (FA and LFI): efforts are being done in order to retain one single FA file (Surfex surface written directly into the atmospheric FA file). The discussions have shown that 2 different formats are not suitable for operations, but if more tractable, 2 different files with the same (FA) format may be a good compromise. This latter solution may also be of interest for a simpler file handling in surface assimilation mode, and for telecom considerations (where the constraint lies more on the total timing for transmitting one file, rather than on the total number of files). An open issue remains whether surface fields should be separated in the files between the purely diagnostic, post-processing oriented fields, and the prognostic ones. This latter idea would induce a separation between initial condition files and coupling and post-processing ones.
  - Antifibrillation (AF): the “beta” coefficients of the AF scheme, for the last model level, require surface fields. So far, the tests use a simple shortcut solution (level N-1 coefficients are copied to level N); a more refined solution will probably be defined within the specifications from WG2 (physics consistency and atmosphere/surface communications) in order to compute again level N coefficients.
- Surfex plug-in is available in CY32, but the situation is still varying from one model version to another:
  - Explicit coupling mode for Arome
  - Implicit coupling mode for Arp/Ald
  - Explicit mode for Alaro, but this will change in early 2007 (planned work)
  - Coupling with Hirlam physics needs to be checked at the time when Hirlam phases its present code with CY32 (scheduled also for beginning of 2007)

A question was raised during the meeting about the level of development for configuration ee927 (LAM to LAM change of geometry), especially whether ee927 works with different physiographic datasets (typically old/new). The answer definitely is “yes”: one can run ee927 with oper => ECOCLIMAP-type (+extra fields for Arp/Ald physics) for instance. What has not been tested is the reverse way.

#### Plans for 2007

- about 2 Aladin visits in Toulouse to continue the validation in prognostic mode (Aladin-France)
- last technical adaptations: Arpège geometry into Surfex, implicit coupling with atmospheric models (of all kind), write surface files through the FA interface
- E-suite in Aladin-France (production): *very open* ... the issue was raised whether the mixture of old operational-style climatological data and the new ECOCLIMAP-type data would not produce shocks and inconsistencies. The answer to that question has been left open. In data assimilation mode (for surface), the surface conditions remain controlled by the local database characteristics (through the first guess background), so that no shocks are expected. For spin-up models, the tests within Aladin-FR should tell us more. Would that mean that any partner should run surface (Canari) analysis ? this solution probably is not tractable technically for some partners in the short/mid- term. The issue would become relevant if Arpège production switches to ECOCLIMAP/Surfex (strictly talking also for the coupling Ald-FR => Ald-BE).

#### Mid-term plans

- Tests in Arpège
- Adaptation to data assimilation
- Progressively implement new features offered by Surfex at mesoscale: ECOCLIMAP database, etc.

#### Questions for the collaboration:

- Perform remote installation and testing of Surfex in 0D, (forced) 1D modes. 1D tests on specific research datasets are still valuable.
- First Centers to try 3D (in production, not “assim” mode) ? only early 2008 ? : this can be envisaged after a CY32T1 export becomes available.
- Test combined Surfex/Alaro physics: *ibid*.

To conclude: some further evaluation and discussions are required.

PS: not discussed at the meeting, the e923 configuration also should be made more ECOCLIMAP consistent. So far, Méso-NH’s prep\_pgd tool is used, but elements of this should ideally enter the e923 code and environment.