



ACCORD Surface plans

Patrick Samuelsson, 2021-04-13, All Staff Workshop video conference

Surface side meeting agenda

14:35- ACCORD Surface plans (Patrick Samuelsson, SMHI Sweden)

14:55- Discussion, thoughts and ideas related to ACCORD surface activities

You are all welcome to add written suggestions at 2nd page of this document:

<https://docs.google.com/document/d/15tOO2O365a0WMtD6VYPqrTFA774Rc8ELjIZU192Pog/edit?usp=sharing>

15:15- Status of the SURFEX implementation work in ALARO CSC (Bogdan Bochenek, IMGW-PIB Poland)

15:35- ACCORD snow plans (Ekaterina Kurzeneva, FMI Finland)

15:55- Long term atmosphere-surface coupling strategy (Roel Stappers, Met Norway)

16:15-16:35: Recent results about Ecoclimap-SG and DIF in AROME (Yann Seity, Adrien Napoly, Camille Birman, Météo-France)

Additional presentations if time allows:

SEKF issues in the Alps (Helga Toth, OMSZ Hungary)



ACCORD Surface Area Leader role in announcement

The AL will define a long term scientific and architectural vision for the modernisation of the Surface code

- **Specifically for the model the AL will (for SU3, SU4):**
coordinate, in concertation with the **ALARO** CSC Leader, the switch to **SURFEX**
explore and develop **more advanced options** (with emphasis on soil, snow, urban)
streamline the code for **phasing and coupling** with other parts of the NWP system
- **Specifically for the physiography the AL will (for SU5):**
continue to update **physiographic** databases as the model **resolution** is increasing
assess the **forecast impact** of the new databases and perform the required **tuning** of surface modules
- **Specifically for Surface Data Assimilation the AL will (for SU1, SU2):**
work on the assimilation of **satellite and crowd-sourced** surface data
work on the interoperability and modernization of the code for the **spatialization** and the adaptation to the **OOPS framework**
progressively move to a coupled surface-atmosphere data assimilation system
- **NEW: Specifically for coupling to sea and waves the AL will (for SU6):**
coordinate communication between the active groups

At the same time...

There are already well developed ongoing work and plans at LACE level, coordinated by Bogdan Bochenek and Benedikt Strajnar, at HIRLAM level, coordinated by HIRLAM Surface Project leader, and in former ALADIN countries.

So, we need to find a good balance between these coordinating levels.

The main principal for now is that ACCORD level should focus on long term investments and CSCs coordinating activities and that already well established coordination should continue with short- and medium term activities and plans.

The idea in the end is of course that we should all benefit from each other as much as possible.

ACCORD strategy for Surface

Based on the strategy for 2021-2025 approved by General Assembly and Council 26 June 2020:

- **For the surface model**
- **For physiography**
- **For surface data assimilation**

Strategic goals: For the surface model

The goal is that we all gather around SURFEX and that we all refer to common version control of SURFEX. Then we can more efficiently share development between developers within the consortia and utilize each other's experience. Technically it might mean that we share a NWP branch in the SURFEX repository instead of “sharing” via the traditional cycle phasing...

The strive towards more advanced surface physics is probably shared although the priority and possibility this is given differs now between the CSCs. This means going from Force-restore and slab snow (D95) towards multi-layer diffusion soil, multi-layer explicit snow, Multi-Energy Balance and more patches...

Ideally all experience and development can be shared between CSCs. However, this is not the situation now. For example

- In Hungary much experience and development have been built up over the years around SEKF assimilation for SURFEX fields but the development cannot be easily utilized in another CSC.
- More advanced surface physics is already running in HARMONIE-AROME but Météo-France starts the same exercise in AROME without being able to build directly upon the development in HARMONIE-AROME.

Strategic goals: For physiography

Improved physiography (resolution and cover) is needed and does in general contribute to improved potential for the model system. But, it seldom comes without costs; adjustments in details and tuning are usually needed, exercises that are time consuming. Thus, therefore, also here, coordination and ability to benefit from each other is important.

The strive towards improved physiography...

e.g. implementation of 300 m resolution ECOCLIMAP Second Generation (based on ESA-CCI land cover)

...is probably shared although the priority and possibility this is given differs now between the CSCs.

E.g. ECOSG cannot be examined before SURFEXv8.1 which enters cy48t.

Again, this situation between CSCs may be fine as long as one CSC can utilize the experience and development from another CSC when it is time. However, this is not the situation now, or at least the sharing process is delayed, since we refer to different repositories and SURFEX versions.

Quite exciting activities are happening now with physiography in combination with satellite data and machine learning. A promising potential for going to even higher resolution and better quality.

Also, in SRNWP-C there is a new ESA-CCI land cover position as Balazs mentioned.

Strategic goals: For surface data assimilation

Now most operational setups with DA are based on CANARI-OI (using SYNOP only) for spatialisation and OI (SODA or OI_MAIN) for the soil assimilation.

The common long-term goal is towards strongly coupled atmosphere-surface assimilation system.
Probably independent of today's components like CANARI and SODA...

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What happens in between in the different CSCs and institutes depend on

- current history (research investments in e.g. EKF, EnKF,...)
- current or near-future operational environments (e.g. ensemble systems or not)
- near-time priorities (new advanced physics, satellite based observations, crowd-sourced observations,...)

The common long-term goal is towards strongly coupled atmosphere-surface assimilation system. Probably independent of today's components like CANARI and SODA...

Strategic goals: For surface data assimilation

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Short-medium term solutions differ depending on circumstances...

Ensemble NWP system:
OI for soil with EPS-coeff.

Ensemble NWP system:
EnKF-based solution

Deterministic NWP system:
(S)EKF-based solution

Crowd-sourced focus:
TITAN/gridPP spatialisation

Nowcasting: Less weakly coupled atm-surface assimilation

... but together we can hopefully gather around a limited number of solutions.

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How should satellite observations be handled? Probably we need observation operators for the observation space developed outside the framework of SODA/CANARI/gridPP which will lead us gradually towards the coupled system...

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Organisation of our work

The ACCORD Rolling Work Plan for Surface

- SU1 Algorithms for surface assimilation**
- SU2 Use of observations in surface assimilation**
- SU3 SURFEX: validation of existing options for NWP**
- SU4 SURFEX: development of model components**
- SU5 Assess/improve quality of surface characterization**
- SU6 Coupling with sea surface/ocean**

A complement to this could be thematic groups, e.g. dedicated to

- **Snow and assimilation of snow aspects (SU 1-3 & 5) (see Katya's presentation later)**
- **Stand-alone / open-source (e.g. python) environment for satellite pre-processing handling for surface assimilation. Together with upper-air data assimilation.**
- **Advanced surface physics (SU 1-3)**
- ...

Surface activities in ACCORD

Working weeks and training

We will have working weeks and/or training arranged. Mix of virtual and physical meetings. Subjects, when where...? Please give any ideas and thoughts!

- **A NWP-focused SURFEX/SODA training is already being discussed.**

Scientific visits

Each year the Local Team Managers (LTMs, your boss at home probably) have the duty to request and offer scientific visits for the coming year between researchers in ACCORD. Visits of roughly 2-4 weeks.

Idea: Monthly seminars or Journal club

Virtual seminar with own material or review of a scientific paper

Also, please share opportunities to join locally arranged virtual seminars with surface touch.

ACCORD

The word 'ACCORD' is written in a large, white, bubbly font with a black drop shadow. Below the letters, a blue musical staff with five lines is shown. Various musical symbols are scattered around the staff, including a treble clef, a checkmark, a squiggle, a double bar line, a wavy line, a curved arrow, and a treble clef with a star and a '2' below it.

Thanks and wish for good work together!