Physics meeting on Tuesday April 9 2014, ASM Bucarest

During the ASM it became clear that some kind of coordination/exchange/convergence is necessary between all the developments on the physic, particularly on the area of cloud and turbulence scheme. Therefore, Eric Bazile and Wim de Rooij agreed to initiate this informal meeting.

Problem: Because everybody uses its own version and combination of model settings (e.g. version 36h1 versus 38t1 and edkf versus edmfm, etc. etc.) it is difficult to do a clean comparison and to judge if the modification/verification is useful for your own system. Moreover, this makes it difficult:

1. to have some convergence of the physics developments in "the" operational AROME/Harmonie system. Convergence not necessary in terms of ideas but at least for comparison and evaluation.
2. code maintenance related to the options number, their compatibilities and the work around the cleaning of the physics monitor and the interface.

Recent relevant physics developments that need exchange/convergence

Cloud scheme/Microphysics

-Karl-Ivar : changes cloud scheme and microphysics to get less ice clouds and more mixed phase clouds
-Balasz and MF: too fast fog dissipation (Budapest study) microphysics modification
-Daniel: PDF change using the ARMcu case
-Clemens: Experiments with height dependent pre-factor of extra variance term

Turbulence

-Wim: Increase PBL top entrainment ASTEX/fog cases using Racmo turbulence (mixing length and tke)
-work around the EFB closure:
-Eric: EFB (energy flux budget closure) in ARPEGE with the same L but with EFB anisotropy
-Carl, Valery, Eric : EFB in AROME with prognostic equation for L

In more detail we discussed:

EFB Closure :

- Exchange between Carl and Eric check if their results are consistent EFB in ARPEGE-TKE vs EFB in AROME-TKE. Try to determine which component is really important in the EFB closure and how to continue the evaluation : transition, ??
-Also, could this EFB closure be included in the RACMO turbulence scheme (and is it a good idea ? => Wim will discuss this with Geert Lenderink)
Is it possible and suitable (in terms of maintenance ?) for HARMONIE to have 3 TKE scheme with 3 EFB or pseudo EFB closure ?

-ARM results (Daniel):
Much more ql at cloud base than in MF results with EDKF. After the meeting Wim realized this is most likely not due to convection scheme but due to difference in the applied cloud scheme option (STAT with edmfm and DIRE with EDKF). With option STAT, the mass flux at cloud base leads to larger variance and consequently higher ql values.

Ideas/actions how to proceed

MUSC:
-There was a general agreement that we urgently need a MUSC version that is automatically updated including SURFEX coupling and that is able to run different cases in a simple way. These cases should cover different regimes, at least:

> Dry convective (wangara?), shallow cumulus (ARM / RICO), stable condition (GABLS), stratocumulus (astex), ice and mixed phase cloud case.…?

Idea of Eric: create MUSC committee (like SURFEX) → A person from the surfex group should be involved in a MUSC working group and a MUSC representative in the SURFEX committee → **lobbying from MUSC user ???**

-a good vehicle to simplify clean comparison and enhance cooperation is the KNMI Parameterization Testbed (KPT) system. In this system many different 1D model versions can be run daily and compared to advanced Cabauw observations and LES in a user-friendly browser environment. Wim and Cisco are working to get MUSC cycle 37 (maybe it would be better to go to cy38?). When ready, we suggest that if people like to use this system we provide them with our basis MUSC version and that they include their modifications. Subsequently we can run this version daily or for a certain period (e.g. mixed phase cloud periods). We are planning to reforecast for 2012 different MUSC physics versions. For this year we have daily LES runs for Cabauw. Note that we also present extracted "Cabauw" columns from 3D runs in the Testbed environment. → **Wim, Eric, Laura** (?), **Alaro ? After starting up, a testbed working "week" might be organized.**

Additionally, it is a good idea to include a "Cabauw" column extraction from a 3D modelrun in the testbed. For Harmonie this is already done in the past but also for MF this is interesting, also to verify how much the MUSC1D forecast differs from the 3D model with the same physics. Also the operational ARPEGE forecast might be included (we save the 36h hour forecast profile with all the fluxes for several site like Cabauw, Lindenberg (visible on the FMI web site)) → **Eric and Wim**

Other than MUSC:
-In the end, all physics modifications should be included in the new dynamics-physics interface from Daan. With this it should in principle be easier to investigate modifications for different models/versions. → **all**

-Evaluate Karl-Ivar's modification in the fog case in Hungarian ? At MF ? Combine with the micro physics modification done by Balasz, Eric, Yann (Balaton stay) → **Balasz ?**