**Notes Steering Committee TM5**

**November 6, 2015**

**Present**: Maria (Maria), Wouter (WP), Maarten (MK), Philippe (PLS), Sander (SH), Twan (TvN), Peter Bergamaschi (PB), Arjo Segers (AS, development team).

**Absent**: Folkert (FB), Andy

**1. Status action items:**

* 1.2 Impact of CB05 on CO budget: Jason showed some results. Closed.
* 1.3 TM4 CO budget: Maria will report on this in a mail.
* 1.4 HO2 uptake recommendation: Still open, Maria will follow up
* 1.5 REAS emissions: Closed, not really relevant.
* 1.9 Wet deposition: Twan presented status that showed already big improvements. Marco will transfer fields from ECEARTH to test impact precipitation formation. Cooperation with Twan, Maarten, Twan.
* 1.10 Use of archived Kz-values for BL: Not yet done, but relevant (action for Peter Bergamaschi). We suggest to compare two runs: one with the TM5-derived diffusion, the other with the ERA-Interim values First PLS will check if there is enough meteo (one year), and create it if needed. Remains open.
* 1.14: Done
* 2.2 Done and results presented.
* 2.3 KPP. Maria looked into it. Takes much more time to run with a more “accurate” solver. Philippe mentions that a true comparison would need more work: first make a benchmark, then try solvers with the constraint that the deviations must remain within a certain allowance error. This discussion has been on for some time, and we need a list with pro’s and con’s of using KPP. Philippe will try to make this list, while Maria will look closer to KPP use in TM4.
* 2.4 Next release. See new action point 4.6.
* 3.1 – 3.3 Done. Although there is still a technical issue with UDUNITS.

**2. General discussion**

We discussed the future of TM5. TM5-MP is now coupled to C-IFS and to EC-Earth. The TM5-4DVAR code is used in many projects. How to maintain this success?

An issue with 4DVAR is the scalability on computers. It would be good to move to TM5-MP, but the adjoint is not trivial.

An issue is also the time resolution of the input meteo, and the time it takes to read and distribute the meteo files (see presentation Philippe). JRC showed clear issues with BL dynamics, which are probably at least partly related to the temporal resolution of the meteo (see presentation PB).

One way forward discussed is **Open-IFS**. This could be used to generate high-resolution meteo input (in time and space) without the need to write out large files. Open-IFS (or EC-Earth, as mentioned by Twan), can then be nudged to Era-interim meteo: we have the files. We could then also switch to the reduced Gaussian grid, although ECMWF will move to a different grid in the future.

Another problem that would be solved is the mass-conservation, because we would transfer the meteo output from IFS into mass-conserving fluxes (as now done in the meteo pre-processing). Also, issue with “ownership” of meteo files are solved in this way. A final advantage is the possible use as ensemble meteo generator (e.g. in Carbontracker).

A downside is the need of “nudging” and how this can be done. There is ample experience here, though.

Another down-side would be the use in TM5-MP-4DVAR (see next point), where we still would need to write out the meteo in the forward run, to be used in the adjoint. This would generate still slow code (clever ways might be possible, e.g. write per processor small binary files). Nevertheless, we created an action point to look into this (action **4.1**).

Philippe plans to phase out .hdf meteo files after 1-1-2016 (action **4.2**)

Next we discussed the **adjoint of TM5-MP.** Sander talked to people from the Dutch E-Science center. If you have important applications, this center can finance a programmer to work on the code. A “large” project would also provide some money for TM5-developers, like Arjo and Philippe. Deadline, spring 2016. Sander will start writing in Jan-Feb 2016, and ask for input (action **4.3**).

Twan mentions that a bug was found in the BL scheme. Corrected in the chemistry version. He will report to Peter Bergamaschi and to Arjo, to also fix this in the 4DVAR version (action **4.5**).

Finally, Jason has presented updates to the CB05 code (without M7). Folkert is co-authoring a paper, and this is a good time to tag, and benchmark the new TM5-MP version (including horizontal split presented by Philippe). New benchmark goes with the paper, and might serve as a start for the 4DVAR-TM5-MP version (action **4.6**).

**4. Next ITM5 meeting**

Maarten will set up a doodle for the next ITM5 meeting end June 2016 (action 4.4). Suggested location is JRC Ispra (to be confirmed by PB).

**5. Steering Committee**

PB will leave the steering committee and suggested Arjo Segers as successor. This proposal was accepted by Arjo and the other steering committee members.

**5. Open action items summary**

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| Action # | Title | Responsible |
| 1.3 | TM4 CO budget  | Maria + MK |
| 1.4 | HO2 uptake recommendation  | Maria |
| 1.9 | Wet Deposition (Marco will look at IFS fields) | TvN, MK |
| 1.10 | Kz for (diffus files on 1x1). | PB + AS |
| 2.3 | KPPMake lists with pros/cons | Maria, PLS |
| 4.1 | Open-IFS plans | WP/MK |
| 4.2 | Stop .hdf files per of 1-1-2016 after NOAA check | PLS / Done |
| 4.3 | Proposal TM5-MP-4DVAR  | SH |
| 4.4 | Doodle new meeting / confirm JRC Ispra as meeting location | MK / PB |
| 4.5 | Bug diffusion: info to TM5-4DVAR (🡪AS, PB) | TvN |
| 4.6 | Jason’s chemistry changes: benchmarked?Then tag the version | FB + PLS |