**Notes TM5 Steering Committee meeting 28/06/2016**

Present: Maarten Krol (MK), Maria Kanakidou (MKa), Andy Jacobson (AJ), Twan van Noije (TvN), Wouter Peters (WP), Peter Bergamaschi (PB), Philippe Le Sager (PLS)

**Agenda and Notes:**

*(1) TM5-IFS-EC-Earth*

**MK**: Two websites currently, KNMI and SourceForge. Does that work okay?

**PLS**: WiKi is really on TM5-zoom, and kind of frozen/static. New documentation for TM5-MP goes into the doc directory in the repository itself. Show PDF of the current documentation and ask people what they think, get feedback. Especially recent users. **[AI PLS]**

**MK**: The current KNMI site can only be edited by a few of us. But for now, we do not move yet the WiKI for SourceForge.

**PLS**: For TM5-MP, there is a PDF file with instructions. Philippe will send it to Maarten to be placed on the website. **[AI PLS]**

**MK**: Chemistry development, what is the status of the IFS code and do we integrate TM5-MP and TM5-zoom with it?

**PLS**: It is totally independent, they have their own repository. IFS now uses KPP for automatic generation of a code based on CB05 tropospheric and BASCOE stratospheric chemistry. PLS and VH have made a list of pros and cons for KPP. Their recommendation is to also use the KPP code by VH&JW in TM5-Chem. List of pros/cons can be sent around **[AI PLS]**. Speed loss is limited, and depends on settings for tolerance. Perhaps MSc student could make a first try in TM5-MP and compare?

**MK**: Additional cons are also in coupling to aerosols, M7, and also deposition code.

**WP**: Missed details on discussion on TropOMI and TM5-MP.

**MKa**: Their attempts with the KPP code/solver using a simpler MOGUNTIA chemistry was 3-4x slower when tested in TM4.

**MK+PLS:** replacing the EBI scheme with a better solver would be nice, and even testing the mostly “uncharacterized” numerics of the current EBI scheme would be a good start. To continue discussion and actions. **[AI MK]**

**WP**: New developments for online TM5 meteo are going fast (existing new nudging of IFS, and coupling to TM5 through OASIS). Good time to start investigating further **[AI WP and TvN]**

**PLS**: For clarification: OpenIFS will come to EC-Earth, but at a much later stage (v4.0, 2 years from now). Nudging is already available now. OpenIFS version soon to decide for future implementation. C-IFS not likely to be included in OpenIFS in the near future.

*(2) NetCDF meteo*

Andy Jacobson wants to make 4 points:

1. NOAA uses nearly up-to-date ECMWF meteorology. Very nice for OCO-2 effort. Thanks KNMI and stresses its value for the community.
2. He tested compressed meteo inside netcdf4. Compressed NetCDF is fastest on NOAA systems (20%), while uncompressed NetCDF is 2x slower (!). Has anyone tested this? First tests from Arjo in 2009 suggested uncompressed NetCDF4 was fastest, but we can have another small test **[AI PLS]**
3. Conversion of HDF to NetCDF4 is done locally at NOAA. It works well, but not always. At some point in time the conversion no longer gives the same results as the files from Philippe. **PLS**: At a certain moment, I stopped converting HDF to NetCDF, and started direct production of NetCDF4. That might correspond to the time when the match breaks down, to check? **[AI PLS]**
4. NOAA still plans to host the TM5 meteo on a simple FTP site and is in advanced stages of preparing this service.

*(3) XIOS*

**MK:** What is this?

**PLS**: A dedicated server runs by itself on one core, and only handles I/O for the model. The implementation is though software libraries that can easily use XML tags for all metadata for each output field. The software also handles averaging and regrinding etc. This then does not slow done the model anymore. This works now for NEMO on 3000 cores and separation of I/O speeds up the code. Next step is to also do this for IFS.

**MK**: John Donners from SARA suggested that dedicated cores could take care of I/O, sounds like the same idea.

**AJ**: I tried to make a system that would prepare the meteo data ahead of time on a RAM disk, but the timing of IO looked to be difficult.

**PLS**: John Donners also suggested to read all data from a file at once, and then close it right away. Keep the data in memory and quick to distribute.

**PLS**: Will go to a meeting for EC-Earth and ask about possibilities. Report back **[AI PLS]**

**TvN**: New postdoc Tommi Bergman is interested in XIOS for use in AerChemMIP, and can look at it. Let’s see what his experience will be. **[AI TvN]**

*(4) Existing/New Projects*

**AJ**: Much resources focus on CT-NRT because of needs of OCO-2 community. Also other groups involved that use CT-NRT for boundary conditions. Semi-lagrangian inversions with several meteo products so far done only for CFC’s (see Lei Hu publications). Footprints are quite different between products. Vertical mixing also in these models very uncertain.

**TvN**: New PostDoc Tommi Bergman started two months ago on CRESCENDO project, a H2020 project aiming to improve and apply Earth system models. Interests of KNMI include coupling of nitrogen deposition to ocean biogeochemistry in EC-Earth (with SMHI). Also interested in coupling TM5 to the fire module of LPJ-GUESS. Meanwhile, KNMI is preparing for AeRChemMIP as part of CMIP6. Current work focused on input and diagnostics, and Philippe is trying to improve computational performance. Will be based on CBM5 and TM5-mp. Action item on SOA together with U. Helsinki to get their scheme in.

**WP**: TM5-MP for CT is still on the to-do list. Two new students starting on TM5 + isotopes. One of these could start TM5-online vs offline tests for CO₂ and SF6 relatively soon.

**MK**: New student starting in September to work on methyl chloroform, will work with TM5 and adjoint version for optimizing OH. Target period is 1979-2016. ITN in H2020 on methane+isotopes was approved, but no TM5 involved.

**SH**: Will contribute to CAMS, together with TNO

**PB**: Inverting GoSAT data for ESA project.

**Mka**: Stelios will come to Wageningen and [to complete]

*(5) Action items last meeting*

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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** | KPP  Make 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 |

1.3: Closed

1.4: Should be easy to also put it in TM5, Vincent has worked on it, probably in. Twan does not know details. New action item: IFS and TM5 chemistry **[AI MK and Stelios]**

1.9: Closed

1.10: Open

2.3: Done, to send around and publish. Close.

4.1: Closed

4.2: Closed

4.3: Done

4.4: Done

4.5: Has the bug fix been fixed in TM5-zoom? TM5-MP was updated. Arjo should do it. To check. Andy does not see the change in the trunk of the base. **[AI Arjo]**

4.6: Paper was submitted. Status unknown. Leave open.

*(6) New action items list*

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| Action # | Title | Responsible |
| **1.4** | HO2 uptake recommendation. To continue under new action item for IFS+TM5 chemistry development | MK + Stelios |
| **1.10** | Kz for (diffus files on 1x1). | PB + AS |
| **4.5** | Bug diffusion: info to TM5-4DVAR. Has also TM5-MP and TM5-zoom been updated?? | AS |
| **4.6** | Jason’s chemistry changes: benchmarked?  Then tag the version | FB +  PLS |
| **5.1** | Distribute PDF file with TM5-MP documentation to some new users and get feedback | PLS |
| **5.2** | Send this PDF file to Maarten and place online at sourceforge website | PLS+MK |
| **5.3** | Distribute list of pros/cons for KPP to Maarten and other users, start exploring possibilities for an inter comparison with current EBI solver | PLS+MK |
| **5.4** | Take initiative to start using and testing the TM5-online (IFS+TM5+OASIS within EC-Earth with nudging) system | WP+TvN |
| **5.5** | Make a small test with uncompressed and compressed reading times of NetCDF4 meteo | PLS |
| **5.6** | Check date when meteo production went straight to NetCDF4, resolve possible differences with conversion of HDF5 that was done before that time | PLS |
| **5.7** | Report back on possibilities for XIOS server in TM5 after recent EC-Earth meeting, gain first experience and report back | TB and PLS |
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