**Minutes TM5 Steering Committee meeting 21 November 2017**

Final version, 1 December 2017

Participants: Maarten Krol (MK), Maria Kanakidou (MKa), Andy Jacobson (AJ), Twan van Noije (TvN), Wouter Peters (WP), Arjo Segers (AS), Sander Houweling (SH), Stelios M.

**Agenda:**

1. Action items last time
2. Discussion points
3. Updated list of action items
4. New Projects
5. Next meeting

**1) Action items last time**

|  |  |  |
| --- | --- | --- |
| Action # | Title | Responsible |
| 1.4 | HO2 uptake recommendation | Stelios |
| 1.10 | Kz for (diffus files on 1x1). | PLS+SB+SH |
| 4.5 | Bug diffusion: correct TM5-zoom | AS |
| 5.1 | Lars Killaars will play guinea pig on TMmp documentation – feedback to PLS | PLS+WP+LK |
| 5.2 | Send (again) documentation PDF to Maarten and place online at sourceforge website | PLS+MK |
| 5.7 | Explore possibilities for XIOS server in TM5  | TB+PLS |
| 6.1 | NETCDF / HDF meteo inconsistency: try to figure out what causes this + implications for (re)processing.  | PLS |
| 6.2 | Switch the processing of new meteo to netcdf-classic compression level 1 | PLS |
| 6.3 | Introduce/test KPP for automating gas phase and aqueous phase chemistry development in TM5  | Stelios |

1.4: This is still an issue. Stelios’ multi-phase chemistry code may provide guidance. Stelios is asked to recommend uptake values to use in the current standard chemistry scheme.

1.10: Done. Philippe has processed the data and provided the files to Sourish and Sander.

4.5: Done

5.1: This is an ongoing process. Philippe sends the document to every new user now. Can be closed.

5.2: Done

5.7: Philippe has communicated with Sander and Arjo about that. XIOS can also be used for input. His experience with EC-Earth is that it works very well for NEMO output: you can increase the output 10 fold and the model is not slowing down a bit (unlike the serial IO of IFS). We did not have the time to implement it for TM5 output in EC-Earth. Implementation of XIOS is part of Sander’s new project with SURFsara, which will start next year. This is a new development and not a SC issue. The issue can be closed.

6.1: Unfortunately Philippe did not have time to investigate that issue further. We leave the issue open, but with a low priority.

6.2: Done

6.3: Done and presented by Stelios.

**3) Discussion points**

**ERA5**

Production of ERA-Interim will be phased out during 2018 and replaced by the new ERA5 reanalysis. ERA-Interim will remain available at least six months after Q2 2018, when ERA5 1979-2010 is expected to be complete and continuous NRT updating of ERA5 is running. This means that in a year from now ERA-Interim may stop. Currently, ERA5 is already available for 2010-2016, and will be produced for 1950-NRT (within 3 months after real time). ERA5 will produce hourly data at T639 spectral resolution (N320), corresponding to 31 km or 0.28125 degree. Besides the resolution and improvements in the model and assimilation system, there are some other differences between ERA-Interim and ERA-5. ECMWF stresses that "the accumulations in the short forecasts (from 06 and 18 UTC) of ERA5 are treated differently compared with those in ERA-Interim (where they are from the beginning of the forecast to the forecast step). In the short forecasts of ERA5 the accumulations are since the previous post processing (archiving)".

Andy noted that standalone chemistry transport modelling will still be around for a while, at least for another decade or so. We therefore need a strategy to switch to ERA5. There was agreement that we should be able to run TM5 at a global resolution of 1x1 degree, but the possibility to go to higher resolutions was also discussed.

This has implications for the spatial and temporal resolution at which the ERA5 data should be stored in the TM5 meteo archive. We have to find a compromise there, because the data volume at native resolution will just be too large to store, except perhaps for specific periods of limited duration. For the longer data set, the options to consider for the 3-D fields are 0.5 to 1 degree, 60 to 137 levels, and hourly to 3-hourly. For the surface fields, the data volume is not critical and there was general consensus that these should be stored at the highest available spatial and temporal resolution. This will be important for the description of surface and boundary layer processes, and will allow a more accurate calculation of (wind speed dependent) natural aerosol sources like sea salt, DMS and dust.

Wouter proposes the alternative option to use the nudged TM5-IFS coupled system from EC-Earth to produce driving fields for TM5. This will require storing only a limited number of fields needed for the nudging. The disadvantage of such a method is that it will not be the same as ERA5, which was considered undesirable. Wouter also raised the question if we could make the ERA5 nudging data in parallel to the ERA5 fields to drive the standalone model.

About the processing of ERA5 itself, Arjo has already tested it for a short period. He used Philippe’s set up, and that worked almost out of the box. He only had to set the experiment id to the ERA5 stream and correct spatial/vertical/temporal resolution keywords.

**KPP and MOGUNTIA/ECPL**

Stelios presented results on the implementation of KPP for both CB05 and MOGUNTIA/ECPL. It was agreed that his code should be merged into TM5-mp trunk, but keep EBI as an option. EBI will still be used for the long-term integrations planned in AerChemMIP, as it is about 14% faster.

**Marco’s code** should be put into EC-Earth repository. However, it will not be possible to use this more complete description in the standalone model, even after switching to ERA5. Large-scale precipitation is only available as a 2-D fields, and precipitation formation or evaporation are not available either. ERA5 does have extra fields to describe rain water and snow water content at model levels, which can be used to improve the model.

A list of available parameters can be found in the tables on this page:

https://software.ecmwf.int/wiki/display/CKB/ERA5+data+documentation

For complete overview of model level output in ERA5 see Tabled 11 and 12 on: [https://software.ecmwf.int/wiki/display/CKB/ERA5+data+documentation#ERA5datadocumentation-Parameterlistings](https://software.ecmwf.int/wiki/display/CKB/ERA5%2Bdata%2Bdocumentation#ERA5datadocumentation-Parameterlistings)

**Convection**

A new set of data is available based on a bug-fixed and cleaned-up version of the current Tiedtke scheme used to produce the “sub” files. This might give us a hint why the difference between using “sub” and “convec” files seems significant in some experiments. Arjo asked for people to get involved in testing. Sander (CO2) and Andy (SF6) both volunteered.

**MSA**

When using a single tracer for MSA, it should be treated as aerosol. Should be checked in TM5-mp code.

**Mailing list**

It is becoming more and more cumbersome to add new user or change the email address of an existing one. A user cannot remove himself from the list, and now we are charged $$ each time we request an action from our IT support (Campus). Philippe proposes to go with google groups like we did for EC-Earth. We need to design administrators (and may be moderators if we want to approve post before publication). Agreed.

**3) Updated list of action items**

|  |  |  |
| --- | --- | --- |
| Action # | Title | Responsible |
| 1.4 | HO2 uptake recommendation | Stelios |
| 6.1 | NETCDF / HDF meteo inconsistency: try to figure out what causes this + implications for (re)processing.  | PLS |
| 7.1 | Prepare short note for SC on requirements and feasibility of ERA5 archive | PLS + AS |
| 7.2 | Merge Stelios KPP-CB05 and KPP-MOGUNTIA/ECPL code into TM5-mp trunk | Stelios + PLS |
| 7.3 | Run KNMI benchmark on both new KPP chemistry versions | PLS |
| 7.3 | Commit Marco’s code on cloud/rain processing to EC-Earth repository | Marco |
| 7.4 | Check description of MSA | Stelios + TvN |
| 7.5 | Move TM5 mailing list to Google groups | PLS |

**4) New projects**

SRON: Sander has a new project with SURFSARA, which will start in 2018. Arjo will work on merging the TM5-mp code into the 4D-Var system. Moreover, the aim is to include XIOS into the code. Other projects: CHE, WRF aerosol; H2020, scarbo: preparation sentinel 7. Aircraft with CO2 and aerosol remote sensing; STW Gales: TROMPOMI methane (more WRF-chem);

GO-proposal, joint NO2 & CO; CAMS (with Arjo); ESA-GhG CCI.

KNMI: Internal proposal to integrate C-IFS chemistry and TM5-M7 aerosols into OpenIFS has been granted and will run for three years (2018-2020). KNMI is also involved in a new H2020 proposal FORCeS on aerosol-climate modelling, to start in spring 2019. Now only in the first stage of the proposal phase.

TNO: Methane inversion (CAMS), TM5-MP adjoint (VU + TNO).

Crete: FORCeS

JRC: VERIFY and CHE. CHE will look at CO2 assimilation with the online system.

NOAA: Next release of CarbonTracker underway

Wouter: VERIFY and CHE. New person will start in the Carbon Portal.

Maarten: NWO open round proposal Climpepsi on SO2 mass independent fractionation in the stratosphere was granted. Recruitment for this project has started. An ERC project on OCS was also granted, which will involve two to three PhD students and/or one postdoc. Another project on OH, using 4DVAR optimization.

Stelios submitted a proposal called AD-HOC (Atmospheric Deposition cHanges the Ocean Carbon cycle) to the Greek Foundation for Research and Innovation.

**5) Next meeting**

SRON, 28-29 June 2018