1ˢᵗ ESMValTool Coding Workshop
"Documentation and Visualization"
Workshop summary

Convener: Axel Lauer, Veronika Eyring, Alexander Löw, and Benjamin Müller

Workshop Participants, from left to right: Daniel Senftleben (DLR, Germany), Jeremy Walton (Met Office, UK), Veronika Eyring (DLR, Germany), Thomas Schartner (FU Berlin, Germany), Ricarda Rettinger (DLR, Germany), Björn Brötz (DLR, Germany), Axel Lauer (DLR, Germany), Bettina Gier (DLR, Germany), Alexander Löw (LMU, Germany), and Benjamin Müller (LMU, Germany)

Venue: the 1ˢᵗ coding workshop on documentation and visualization of the Earth System Model Evaluation Tool (ESMValTool) was held at the Ludwig-Maximilians-Universität Munich (LMU) in the Department of Geography from 8-12 May 2017.

Workshop Goals: The workshop invitations were restricted to a subgroup of the ESMValTool Development Team that works on improving the documentation of the tool, visualization and provenance of the results. The goals of the coding workshop were to (1) convert the existing user's and developer's guide into a format suitable for an automated creation of the documentation using the software Sphinx, (2) include the available in-code documentation from the individual diagnostics and library functions into the new user's guide, (3) add tags to available namelists and diagnostics that will be used for reporting and visualization, and (4) define an interface between the ESMValTool and FREVA for the visualization of the CMIP6 ESMValTool evaluation results.

Achievements:

- The complete user's and developer's guide has been converted into restructured text format (.rst) including all tables and figures. The user's and developer's guide can now be created using Sphinx.

- The Python script written for the ESMValTool to extract the in-code documentation from NCL source code files has been extended and can now handle all NCL files in diag_scripts, diag_scripts/lib/ncl, and plot_scripts/ncl. The Python diagnostics in diag_scripts have been modified so that Sphinx can be used directly to extract the in-code documentation. The documentation of the functions and procedures in the source code files has been added to the user's and developer's guide as a new annex.

- A structure for tagging namelists and diagnostics to be used for reporting and visualization has been setup. Current namelist tags include global tags such as "main reference" and "project" as well as diagnostic specific tags for each individual diagnostic block such as "theme" and "realm". Tags to be included in the individual diagnostics ("diagnostic tags") currently include "domain", "plot type" and "statistics". All available tags are defined in doc/MASTER_authors-refs-acknow.txt:
  - D_xxxx (reference),
  - P_xxxx (project),
  - R_xxxx (CMIP6 realm),
  - T_xxxx (theme),
  - DM_xxxx (domain),
  - PT_xxxx (plot type),
  - ST_xxxx (statistics).

- The namelist tags have been added to all available namelists, the work of adding the tags to the individual diagnostics is still in progress.

- In addition to the namelist and diagnostic tags, also the name of the actual namelist, variable name(s), model name(s) and tracking IDs of the input files) are collected as meta-data to be written into the EXIF header of all figure files (.png) in order to improve provenance and allow for sorting / filtering figures included in the reporting. In addition, the ESMValTool log-file will provide general meta-data.

- An interface between the ESMValTool and FREVA for the visualization of the CMIP6 ESMValTool evaluation results has been discussed and agreed. The ESMValTool will provide png-files and xml-files with meta-data and the above mentioned classes of tags. FREVA will then allow sorting the figures by ESMValTool namelist and the above tags. The goal is to implement such a visualization system with tags via a SQL database for the ESMValTool results by end of June 2017 at http://cmip-eval.dkrz.de.