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Web-based post-processing workflow composition for CMIP6

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CMIP6 defines a data standard as well as a data request (DReq) in order to facilitate analysis across results from different climate models. For most model output, post-processing is required to make it CMIP6 compliant. The German Federal Ministry of Education and Research (BMBF) is funding a project [1] providing services which help with the production of quality-assured CMIP6 compliant data according to the DReq.

In that project, a web-based GUI [2] has been developed which guides the modelers through the different steps of the data post-processing workflow, allowing to orchestrate the aggregation, diagnostic and standardizing of the model data in a modular manner. Therefor the website provides several functionalities:
1. A DReq generator, based on Martin Juckes' DreqPy API [3], can be used to tailor the DReq according to the envisaged experiments and supported MIPs. Moreover, the expected data volume can be calculated.

2. The mapping between variables of the DReq and of the raw model output can be specified. These specifications (model variable names, units, etc.) may include diagnostic algorithms and are stored in a database.

3. The variable mapping information can be retrieved as a mapping table (MT). Additionally, this information can be used to create post-processing script fragments. One of the script fragments contains processing commands based on the diagnostic algorithms entered into the mapping GUI, whereas the other rewrites the (diagnosed) data in a CMIP6 compliant format. Both script fragments use the CDO tool kit [4] developed at the Max Planck Institute for Meteorology, namely the CDO expr and cmor [5] operators. The latter makes use of the CMOR3 library [6] and parses the MT. The script fragments are meant to be integrated into CMIP6 data workflows or scripts. A template for such a script, that allows for a modular and flexible process control of the single workflow steps, will be included when downloading the script fragments.

4. User specific metadata can be generated, which supply the CDO cmor operator with the required and correct metadata as specified in the CMIP6 controlled vocabulary (CV).

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