Project: **1122**

Project title: **Quality Assurance for the Climate Data Store C3S_512, Copernicus Climate Change Service**

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Report period: **2019-07-01 to 2020-06-30**

WP1: Framework for assessment of the quality of the Global Climate Projection Data from the CMIP5 stored in the Climate Data Store (CDS).

According to the project, the quality assessment of the climate data in the Climate Data Store should be performed on the ECMWF servers. For this purpose, a cluster of dedicated virtual machines was set up there, providing the resources for the main workload. In order to avoid overload, for performing some specific tasks and providing some buffering computational resources we planned to use some facilities provided by the DKRZ. The operational work on DKRZ, for the reported period, had two targets:

1. Installing, adopting and running the data checker qa-dkrz developed at DKRZ and ceda-cc developed at CEDA. The focus was set on establishing a functioning workflow, based on the qa-dkrz checker. This has two reasons. First, the qa-dkrz checker provides larger amount of functions in comparison with the ceda-cc checker. Second, the qa-dkrz checker has been developed on the DKRZ platform and is known to work there, allowing the use of the experience gathered during the years of operation and personal contact with the developers. The main result from the reporting period is that we managed to migrate the qa-dkrz framework to our computational facilities. This included intensive work on configuration, compilation and testing. The current stage is a fully operational system. At present, samples of climate projection data were downloaded from the CDS and checked for consistency with the CF convention and for the CMIP5 standard. The results are directly used as complementary source for filling up the missing information, which could not be provided by the ceda-cc checker running at the C3S systems
2. Analysis of the climate data relevant to and required by the quality assessment documents/reports. This included in-depth diagnostics for the global projection data with the following metrics: the mean field, annual anomalies, bias, trend, standard deviation and annual cycle. The reference for the comparison is EAR5 and the ESMValTool (Eyring et al. 2016) has been used for the analysis. An example of annual anomalies of the global climate model data spatially averaged over the global domain is shown in Fig. 1.

As a short summary, during the 1122 project period, we managed to develop, establish and run a DKRZ based data checking platform, providing a valuable and flexible resource for balanced use of our main computational resources and quality assurance.

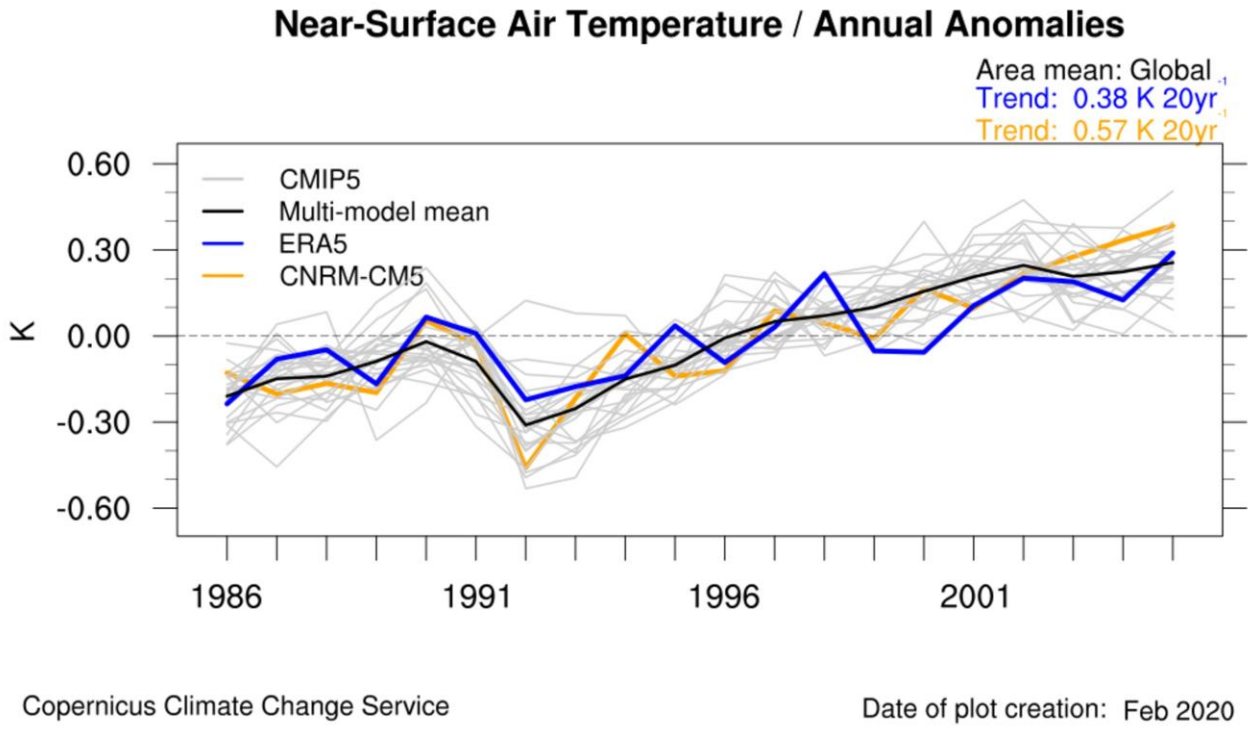

Fig. 1 Annual anomalies of the global climate model data spatially averaged over the domain. The base period ranges from 1986 to 2005. Blue) ERA5 reanalysis data averaged over the same area, Orange) the global climate model assessed, Grey) other global climate models participated in the CMIP5 experiment and Black) Average of the runs is displayed in grey. The spatially averaged trends for the global climate model and ERA5 are given at the top right corner using the same colour codes.