Project: **802**

Project title: **COSMO-CLM simulations with 2-way nesting**

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Report period: **1.1.2021 - 31.12.2021**

The current status of the project

In 2019 a new two-way coupling between coarse and fine grid COSMO-CLM was developed. Hereto the OASIS3-MCT interface was extended and an interpolation between the z-grids was implemented. This development was finalized in 2020. At HZG in 2019/20 the coupling cclm+HD (HD: Hydrological Discharge Model) was developed. These developments are part of a strategy of the CLM-Community to develop a Regional Climate System Model for convection permitting scales.

An important feature of CCLM+CCLM is an increase of vertical resolution in each nest. Hereby a bias of approximately 1Pa is achieved. This feature is not available with ICON+ICON 2-way coupling.

Development of a regional earth system model for convection resolving scales is a strategic goal of the CLM-Community. A unified OASIS interface for multiple couplings has been developed for the COSMO Climate System Limited area Model (CCSLM) encompassing several couplings. This unified OASIS interface is being further developed in such a way that it can be easily implemented in ICON. One coupling is the CCLM+HD (Hydrological Discharge model of HZG). Another is the CCLM+CCLM coupling.

The further development and application of ESM+CCLM could not be continued due to lack of personal resources. The further development of CCLM+CCLM coupling has been continued. In 9-12 2021 it is planned to investigate the CCLM+CCLM coupling for non-dissipative dynamics (not available for the ICON grid) using the ME5 and NOG domains for CCLM. This configuration is planned to be investigated and applied in 2022.

The unified OASIS interface for COSMO_6 is still not finalized, mainly due to restrictions in cooperation during the Corona pandemic. The development is planned to be finalised in 2021 together with the necessary evalution.