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Modular AWI-CM: An Earth System Model (ESM) prototype using the esm-interface library for a modular ESM coupling approach

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Earth System Models (ESMs) are composed of different components, including submodels as well as whole domain models. Within such an ESM, these model components need to exchange information to account for the interactions between the different compartments. This exchange of data is the purpose of a “model coupler”.

Within the Advanced Earth System Modelling Capacity (ESM) project, a goal is to develop a modular framework that allows for a flexible ESM configuration. One approach is to implement purpose build model couplers in a more modular way.

For this purpose, we developed the esm-interface library, in consideration of the following objectives: (i) To obtain a more modular ESM, that allows model components and model couplers to be exchangeable; and (ii) to account for a more flexible coupling configuration of an ESM setup.

As a first application of the esm-interface library, we implemented it into the AWI Climate Model (AWI-CM) [Sidorenko et al., 2015] as an interface between the model components and the model coupler (OASIS3-MCT; Valcke [2013]). In a second step, we extended the esm-interface library for a second coupler (YAC; Hanke et al. [2016]).

In this presentation, we will discuss the general idea of the esm-interface library, it’s implementation in an ESM setup and show first results from the first modular prototype of AWI-CM.