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The INGV-CMCC Earth System Model: Configuration and technical results

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The understanding of past and current climate and the assessment of future climate change needs a deep knowledge of the different components of the climate system and their interactions. Reliable future climate projections requires to take in to account the carbon dioxide budget of the climate system. The INGV-CMCC Earth System Model represent our ongoing effort in the development of an Earth System Model suitable to study past, present and future climate with the aim of closing the global carbon cycle. The physical core of the ESM, initially developed as part of the PRISM project, is based on the ECHAM5 atmospheric general circulation model developed at the MPI and on the OPA8.2 ocean general circulation model developed at the LODYC and including the LIM interactive dynamic-thermodynamic sea-ice model (hereafter EOL Model). The configuration of full ESM consists of the physical core integrated with the SILVA land surface and vegetation model and the PELAGOS marine biogeochemistry model. The EOL model components are coupled through the OASIS3 coupler without any flux adjustment. Here we illustrate the physical interface of the EOL model and its implementation in selected simulations. We examine two aspects of the coupling: The impact of a change in the vertical and horizontal resolutions of the atmospheric component on the EOL model and in the coupling frequency between the atmosphere and the ocean components.