



OASIS4: An Efficient Parallel Code Coupler for Earth System Modelling

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As a new development step of the OASIS coupler family, we present OASIS4 in its latest version. OASIS4 is a software allowing synchronized exchanges of coupling information between numerical codes representing different components of the climate system. The concepts of portability, flexibility, parallelism and efficiency are the main drivers for the OASIS4 development with which we target the needs of Earth system modelling in its full complexity. The development and maintenance of OASIS4 has been supported by EU and institutional funding within the PRISM Support Initiative for the past seven years.

Here we present the latest version of the OASIS4 coupling software which now includes the commonly known point based 2d and 3d interpolation schemes (bilinear, trilinear, bicubic, nearest neighbour), and 2D conservative remapping. Furthermore, the new version of the software now provides a complete parallel search taking into account specific requirements at process boundaries in order to provide identical search results independently of the domain partitioning. The parallel “multi-grid” search ensures low CPU cost to perform the task of the neighbourhood search and at the same time showing a good scalability when applied to grid partitioned domains.

OASIS4 is currently used in few climate applications such as in the FP6 European GEMS project for the 3D coupling between atmosphere and atmosphere chemistry, by the Swedish Meteorological and Hydrological Institute (SMHI) for regional models covering the Arctic Sea or the Baltic area, and by the Calcul Intensif pour le CLimat et l'Environnement (CICLE) project funded by the French “Agence Nationale de la Recherche”.