# Grid as an Enabling Technology for High Performance Computing in Climate Research

W. Hiller and B. Fritzsch

Alfred Wegener Institute for Polar and Marine Research, Computing Center, Bremerhaven, Germany
(Bernadette.Fritzsch@awi.de)

An increasing gap can be observed worldwide between the capabilities of today's large scale Supercomputing facilities and the way an individual researcher can benefit from it. This is on one side due to the fact that the algorithmic basis in Climate research needs more efficient and flexible schemes for coupled problems and multiscale phenomena suited to present massively parallel and hybrid high performance computers, on the other side all aspects of the workflow including data handling and visualisation have to be optimised.

The amount of data in climate and earth system science increased dramatically in the last few years. Data resulting from observations or modelling studies are distributed over many archives and databases. They are highly heterogeneous with respect to access mechanisms as well as in their corresponding descriptions (metadata) in schema and extent. Therefore researchers' data retrievals and thus their workflows are extremely complicated and tedious.

Grid technology can help to overcome these problems. One example is the C3Grid (Collaborative Climate Community Data- and Processing Grid – C3Grid) which aims at building up a grid infrastructure for a seamless and fast access to the traditional data resources of German data archives. The general architecture and use cases are presented. They show how C3Grid can interact with HPC Systems used for simulation in Climate Research. The grid provides tools for effective data discovery and data transfer and enable scientists to combine various data sources. Diagnostic workflows implemented in C3Grid can be used for analysis of data.