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Considerations for implementing NWP dynamical cores on next generation computers.

O. Fuhrer (1), T. Gysi (2), X. Lapillonne (3), and T. Schulthess (4)

(1) Swiss Federal Office of Meteorology and Climatology MeteoSwiss, Zurich, Switzerland, (2) Supercomputing Systems AG, Zuerich, Switzerland, (3) Center for Climate Systems Modeling, ETH, Zurich, Switzerland, (4) Institute for Theoretical Physics, ETH, Zurich, Switzerland

The available computer power is the most important constraint limiting the horizontal resolution, the complexity of the model system, and the number of ensemble members of numerical weather prediction and regional climate models. In order to leverage future supercomputers, which will tend to have an increasing number of compute cores with reduced memory access speed per core, current climate and weather prediction codes will have to be adapted. In this presentation we will discuss general characteristics of codes using finite difference or finite volume methods on structured grids and their implications on the efficiency of the algorithms on emerging computing hardware. Using the concrete example of the dynamical core of the COSMO (Consortium for Small Scale Modeling) model, an effort to systematically rewrite the code in a performance portable way will be discussed.