

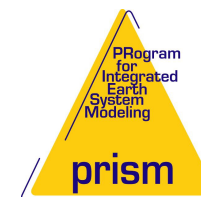
The OASIS4 Multigrid Search for Data Interpolation

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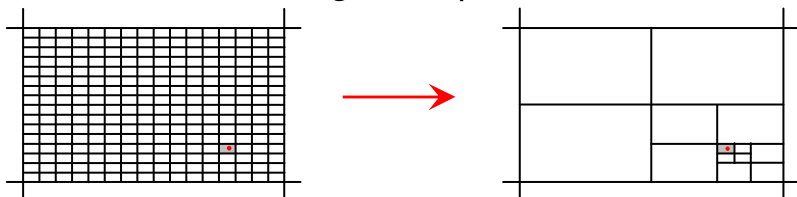
Summary

- The neighbourhood search for large grids requires **efficient algorithms**.
- **Good scalability** with the number of grid points is achieved with multigrid search.
- Our **parallel implementation** makes use of all available application processes.
- The time needed for search is typically in the **order of seconds**.

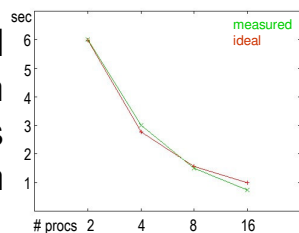


Description

- The search is based on the geographical information provided by the physical models.
- A preliminary search excludes exterior domains that are not relevant for coupling.
- A multigrid hierarchy is established on the donor side and neighbour points are identified.



- Minimum CPU time required
- Reasonable scalability with the number of processes
- Potential for optimisation



Pseudo Model Test: Interpolation from etopo to ORCA

- The CPU time needed for the search primarily depends on the number of target grid points.
- Support for special grids saves additional CPU time.

Ratio of grid sizes: ORCA05/ORCA2: **13.6** etopo5/etopo120: **576.0**

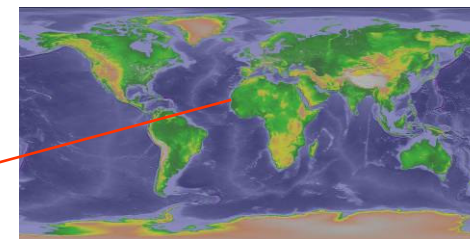
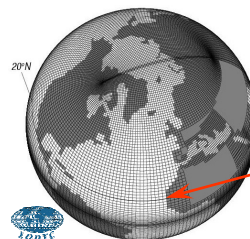
Ratios of CPU time needed for the search: $\frac{\text{etopo5} \rightarrow \text{ORCA05}}{\text{etopo5} \rightarrow \text{ORCA2}} = 7.1$ $\frac{\text{etopo5} \rightarrow \text{ORCA2}}{\text{etopo120} \rightarrow \text{ORCA2}} = 2.7$

$\frac{\text{etopo120} \rightarrow \text{ORCA05}}{\text{etopo120} \rightarrow \text{ORCA2}} = 13.8$ $\frac{\text{etopo5} \rightarrow \text{ORCA05}}{\text{etopo120} \rightarrow \text{ORCA05}} = 1.4$

CPU time in seconds for search (1 process/grid)

	etopo120	etopo60	etopo40	etopo20	etopo5
ORCA2	0.14	0.15	0.18	0.21	0.38
ORCA05	1.92	2.04	2.19	2.47	2.76

file-to-file transfer with OASIS4



Contact

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