The Met Office, Exeter, UK
IFREMER, Brest, France
IPSL, Paris, France
ETH, Zürich, Switzerland
SMHI, Norrköping, Sweden
A. Wegener Inst., Bremerhaven, Germany
Brandenburgische Tech. U., Cottbus, Germany
U. Bonn, Germany
OASIS Dedicated User Support

Description

- Design new interfaces in models
- Improve performances of existing configurations

Diagram:

1. Initialize
2. Define grid/partition
3. Read forcing
4. Get coupling
5. Write diagnostic
6. Put coupling
7. Terminate

OASIS world
Coupling interface design

OASIS3.3 coupling between global atmosphere and 2 different ocean grids:
- Global
- Regional AGRIF zoom over Atlantic Ocean (ERNA configuration)

Main results
- Interpolation mask designed to avoid artificial gradients at child/parent grids limit
- Evaluation of what can be done by OASIS, what must be defined by the user

Location
IFREMER, Brest, Breizh

Models
ARPEGE (global atmosphere)
NEMO (global ocean) + zoom North Atlantic

Resolution
400 to 50Km stretched grid
1/2 degree +
1/8 degrees zoom

Computing
o(10) cores
IBM Power 6, IDRIS, CNRS
Coupling interface design

OASIS3.3 coupling between two regional grid
- At each time step
- On different grids with different extensions
- Through CPL7 (between CLM and DATM) and OASIS (DATM and COSMO)

Main results
- Efficiency (same performances than initial per-subroutine call to native TERRA land model)
- Modularity: COSMO interface with NEMO ocean implemented by DWD/Frankfurt U., with Parflow hydrology by TR32/Bonn U.

Location
ETH, Zürich, Switzerland

Models
- COSMO (regional atmosphere)
- CESM-CLM (land)

Resolution
40Km

Computing
- o(10) cores
- CRAY XT5, CSCS
OASIS3-MCT coupling between global & regional grid
• with 6 47-levels 3D fields (2 way nesting)
• at each ECHAM time step
• includes ECHAM-MPI-OM (ocean) coupling

Main results
• Efficiency: few % coupling overcost (t.b.i.)
• Modularity: can be coupled with Zürich configuration (COSMO-CLM community)
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Improve performances

How to measure relative performances of each component when they are running in parallel?

- Development of a specific tool ("lucia") to evaluate load balancing between models
- Measure of OASIS performances at the same time (interpolation/communications)
- Tests on almost all coupling interfaces already set up
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Improve performances

OASIS3-MCT performances on Met Office high resolution model

- Check coupled model reproducibility (UM and NEMO and OASIS3-MCT)
- Coupling cost 6 times less than OASIS3.3
- Load balancing improved thanks to “lucia” tool (adapted to OASIS3-MCT)

Location
Met Office, Exeter, Devon

Models
Unified Model (global atmosphere)
NEMO (global ocean)

Resolution
25Km
25Km

Computing
o(1000) cores
IBM Power 7, Met Office

![Graph showing OASIS coupled model compared performances. Green boxes represent time spent for coupling exchange or time spent to wait the slowest model. Red boxes: time independent of coupling (model) + interpretation time (Cassiopeia).]
And now?

- OASIS Dedicated User Support still possible (ex: ETHZ 2013)
- Applicants must involve CERFACS in national/international projects
- Mutual agreement with CERFACS possible
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Questions ?