



OASIS3-MCT latest news S.Valcke, CERFACS

IS-ENES3 1st General Assembly 25-27th March 2020 Toulouse, France

- OASIS3-MCT timeline
- Current users and coupled applications
- Dedicated User Support
- Latest developments
- SCRIP quality analysis
- Future developments







The IS-ENES3 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824084





OASIS3-MCT current users 2019 survey

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67 climate modelling groups around the world use OASIS3-MCT

. .



to assemble more than 80 coupled applications !!

OASIS3-MCT is used in 5 of the 7 European ESMs participating to CMIP6

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ODUS 2019 (3 pms IS-ENES3):

Dasis

- ETH Zürich: support of single precision components
- UK MetOffice: concurrent coupling of NEMO and SI3
- GEOMAR Kiel : ocean-atmosphere with zoom in ocean
 - > significant performance improvement obtained in all 3 cases

ODUS 2020 (2 pms ESiWACE2, 3 pms IS-ENES3) (postponed ?)

- NERSC, Bergen: coupling of adaptive mesh sea-ice NeXtSIM & NEMO
- BTU, Cottbus: unified OASIS3-MCT interface in COSMO
- GEOMAR Kiel: locally conservative remapping for runoff
- NERSC, Bergen: coupling new component HYCOM







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Main developments

- Fractional masks for the global conservation operation CONSERV (ESiWACE2)
- New options in global CONSERV to conserve fields with positive and negative values with average value close to zero (ESiWACE2)
- « True » area normalisation in conservative remapping
- Addition of "additional nearest-neighbour" option in SCRIP CONSERV/DESTAREA (DESTNNEI, DESTNNTR)
- Possibility to desactivate the "additional nearest-neighbour" option (BILINEARNF, BICUBICNF, DISTWGTNF, and GAUSWGTNF)
- Bugfix for local distance calculation in GAUSWGT interpolation
- More systematic test of NetCDF returned error code





OASIS3-MCT latest developments

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ORCA025 (1442x1050) - T359 (181724)

number of OpenMP tasks Scalability of the parallel SCRIP library

weight calculation time

Detailled analysis of the quality of the SCRIP library recently parallelised with mixted MPI/OpenMP:

- 4 grid types : Ion-lat, logically-rectangular, icosahedral, Gaussian-reduced
- Two normalisation options : FRACAREA (target cell intersected area) and DESTAREA (full target cell area)
- Impact of Lambert equivalent azimuthal projection

Conclusion for lon-lat, logically-rectangular, icosahedral grids:

- FRACAREA OK for all grids with and without Lambert projection
- DESTAREA OK for all grids but
 - in some cases, only if Lambert projection is activated (log.rect <-> lon-lat)
 - in some cases, only if Lambert projection is not activated (icos -> log.rect)
 - in some case, Lambert projection does not change the results (log.rect -> icos)

All details in Cerfacs tech reports Jonville & Valcke 2019, Valcke & Piacentini 2019





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match the corners of a neighbour cell

Detailled analysis of the SCRIP remapping quality for the Gaussian-reduced grid



Conclusion for Gaussian-reduced grids:

- FRACAREA OK without Lambert projection (4-corner and 7-corner grid)
- DESTAREA not OK: significant error with & without Lambert projection (4-corner and 7-corner grid)

All details in Cerfacs tech reports Jonville & Valcke 2019, Valcke & Piacentini 2019





OASIS3-MCT future developments

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- API for coupling python codes (STFC)
- Additional and improved diagnostics
- Additional pre- and post-processing transformation
- Analysis of remapping quality for ESMF, XIOS, YAC, ATLAS
- Possible replacement of SCRIP with one of the above
 - > OASIS3-MCT_5.0, 12/2021
- Dynamic re calculation of remapping weights for dynamic grids









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