

Yet Another Coupler

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History

- OASIS1/2/3 (* 1991)
 - Serial online weight generation
 - Remapping via single coupler process
- OASIS4 (* 2003; † 2011-07)
 - Parallel online weight generation
 - Parallel remapping
- OASIS3-MCT (* 2012-08)
 - Parallel remapping using MCT
- YAC (* 2014-07)
 - Parallel online weight generation
 - Parallel remapping

YAC overview

- Coupling library (not a framework)
- C, Fortran, and Python interface
- Supports
 - Coupling of 2D fields on the sphere
 - All commonly used global and regional grids
 - Arbitrary decompositions

YAC overview (cont.)

- Interpolation

- Conservative (1st and 2nd order), N-Nearest-Neighbour, Linear, Bernstein-Bézier polynomial, RBF, Creep fill, Run-off-mapping, ...

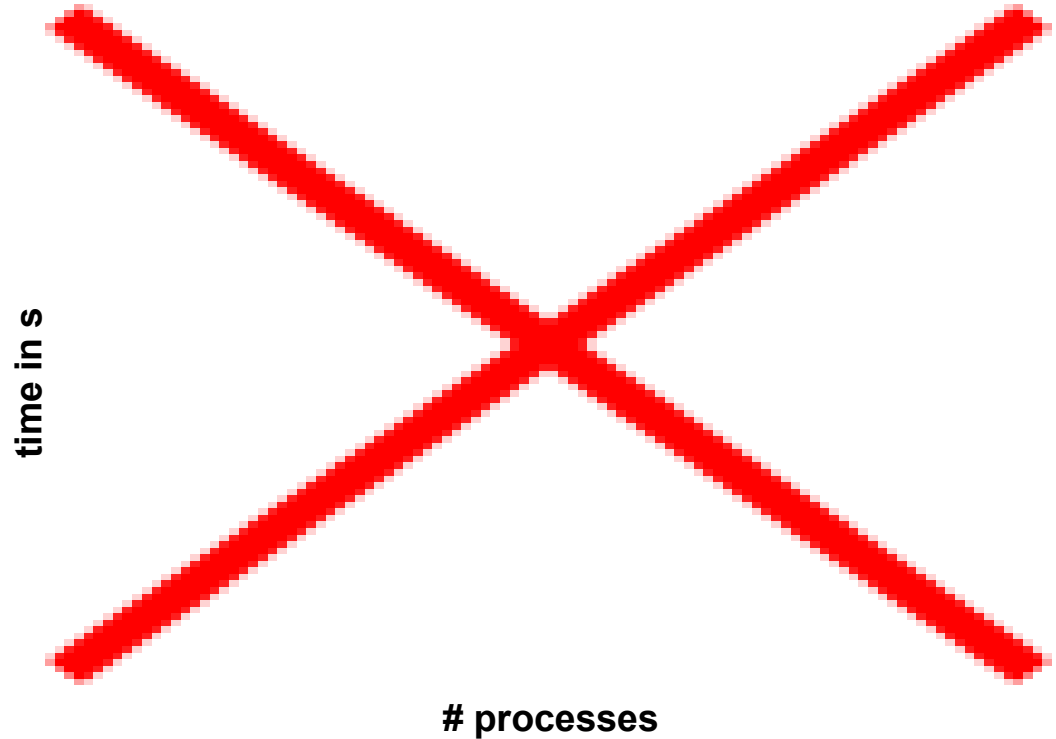
- Interpolation stack concept allows flexible configuration of fallback methods

- “may [...] be unique in being able to accurately construct grid cell shapes and areas for most grids used in climate models” [1]

[1]: Taylor, K. E.: Truly conserving with conservative remapping methods, Geosci. Model Dev., 17, 415–430, <https://doi.org/10.5194/gmd-17-415-2024>, 2024.

Performance of online weight computation

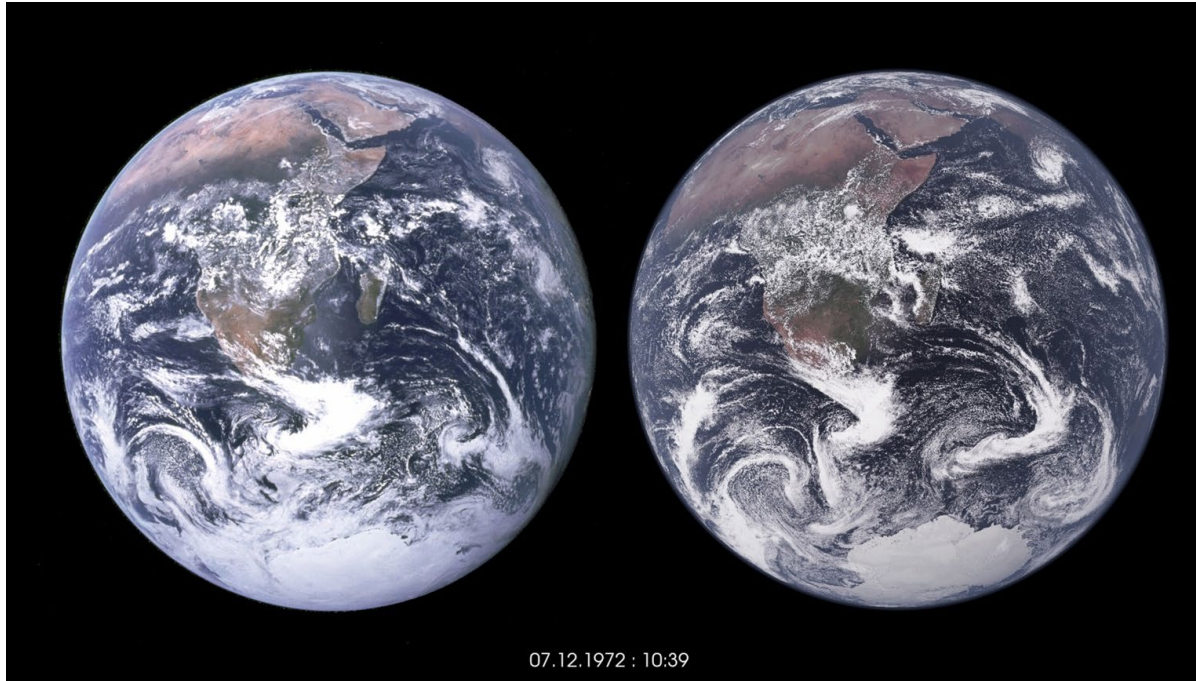
- Initialisation time (incl. weight computation)
- ICON-R02B11 → Cubed-sphere C3600



Use-cases

- Coupling of:
 - Weather/Climate components
(atmosphere, ocean, wave, hydrology, ...)
 - Input components
(e.g. ECMWF Reanalysis v5 reader)
 - Output components
(e.g. HEALPix writer)
- Optional online weight computation in
OASIS3-MCT 6.0

“Blue Marble”



Bockelmann, H., German Climate Computing Center (Deutsches Klimarechenzentrum, DKRZ), Röber, N., NVIDIA, Stevens, B., & Max Planck Institute for Meteorology. (n.d.). Revisiting the Blue Marble: ICON simulating the coupled climate system at 1 km. Max Planck Institute for Meteorology. <https://mpimet.mpg.de/en/communication/news/neuer-blick-auf-das-blue-marble-foto-icon-simuliert-das-gekoppelte-klimasystem-mit-1-km-aufloesung>