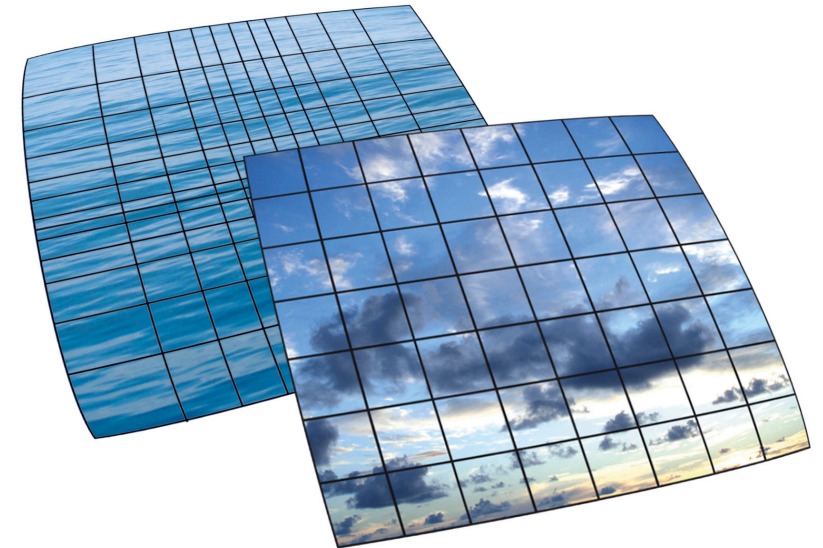
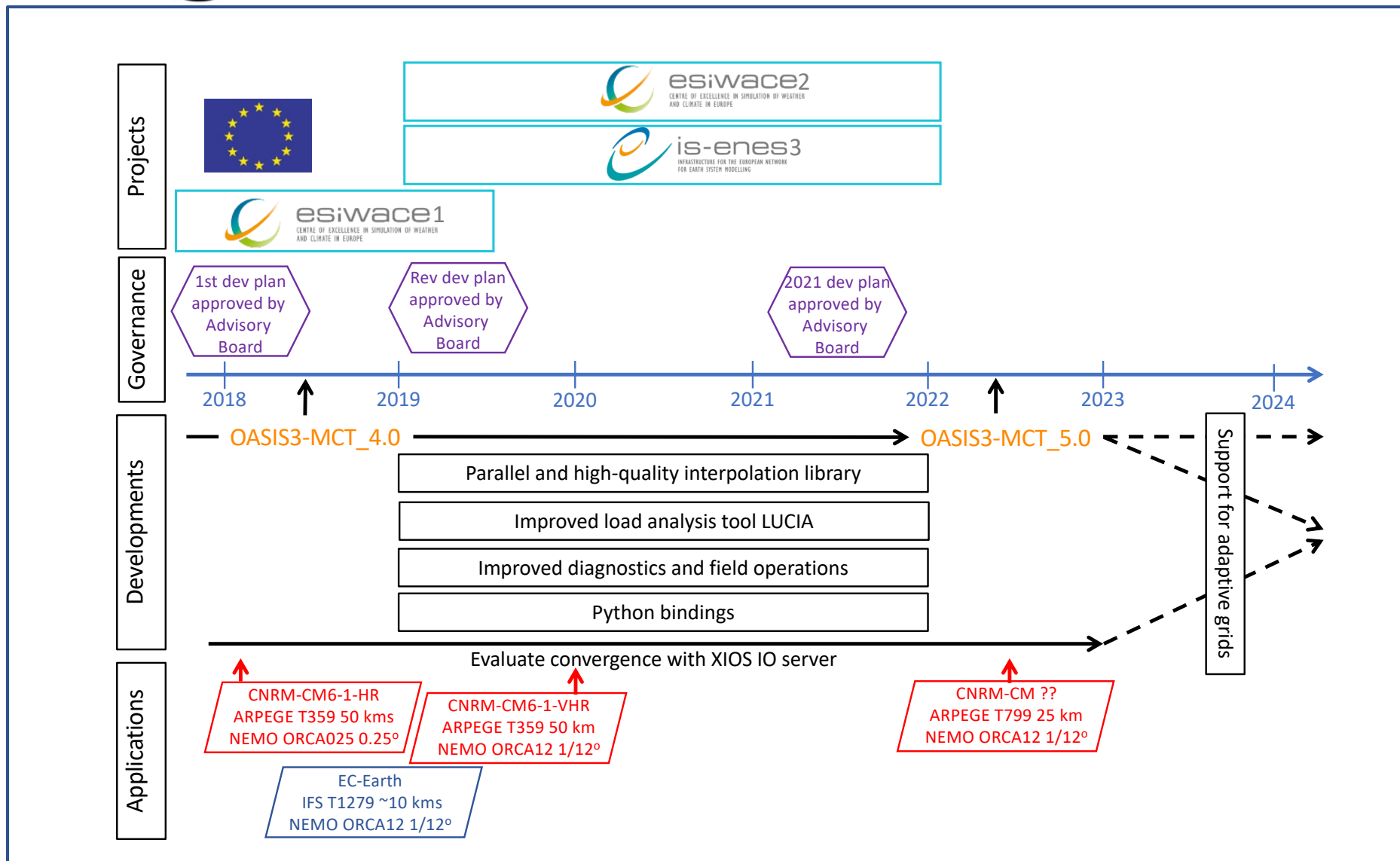


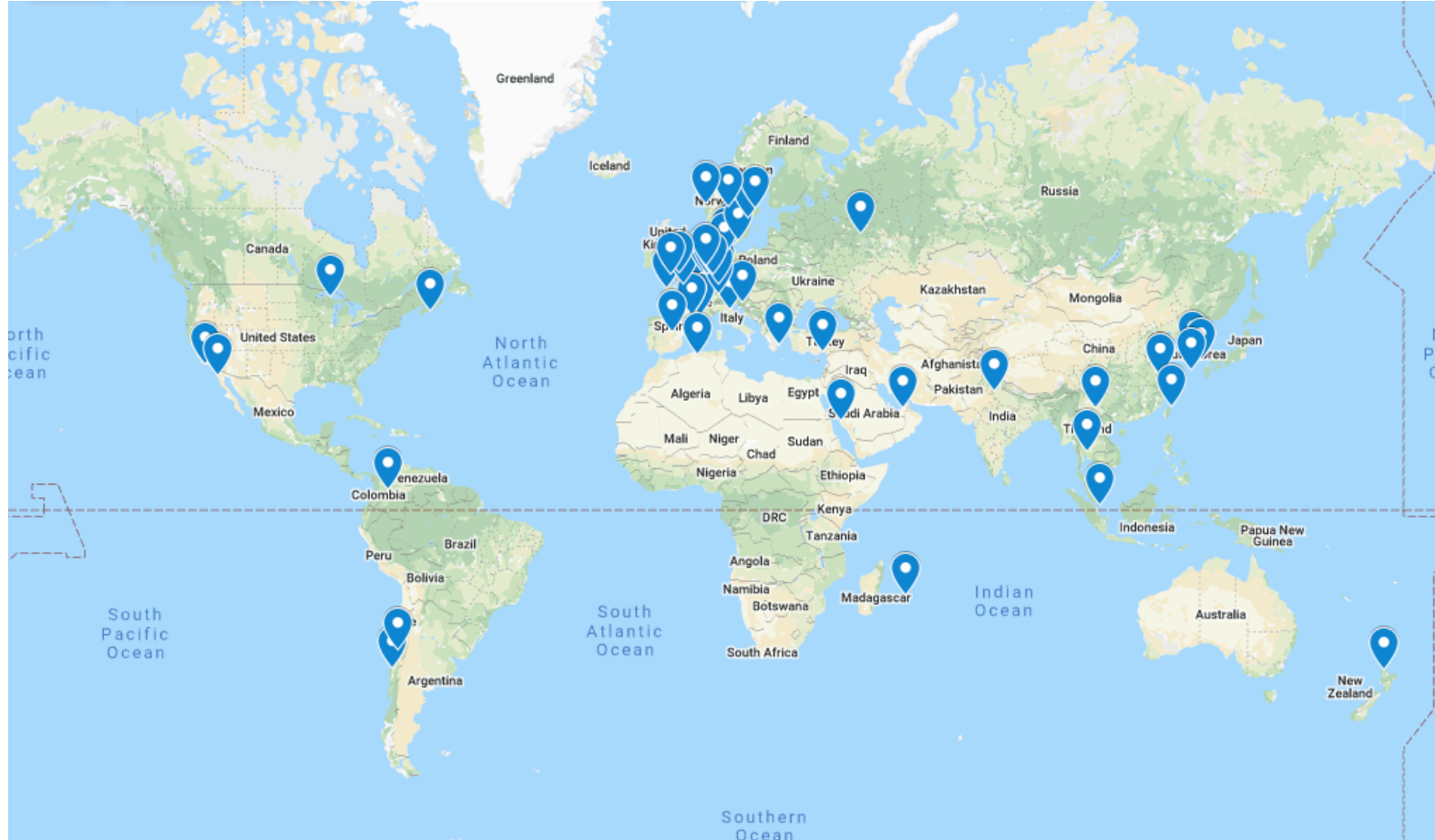
- OASIS3-MCT timeline
- Current users and coupled applications
- Dedicated User Support
- Latest developments
- SCRIP quality analysis
- Future developments





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

## ODUS 2019 (3 pms IS-ENES3):

- 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

## Main developments

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

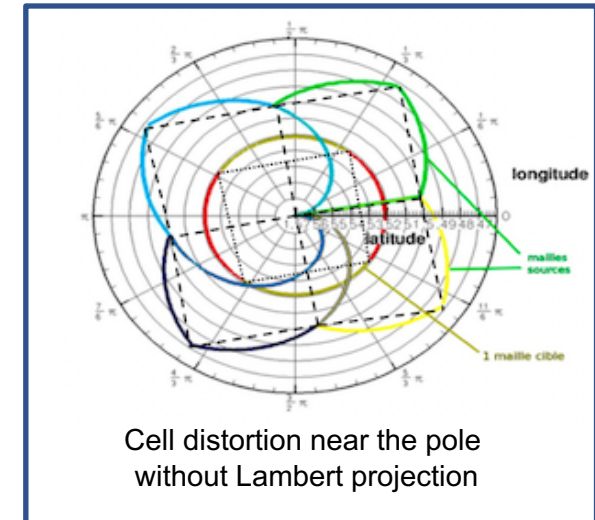
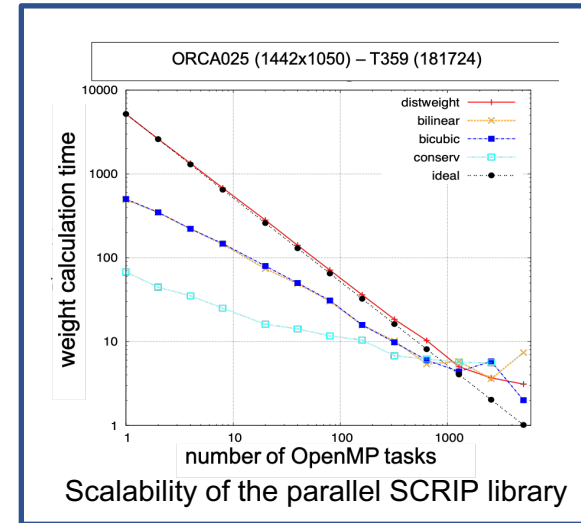
## Detailed analysis of the quality of the SCRIP library recently parallelised with mixed MPI/OpenMP:

- 4 grid types : lon-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

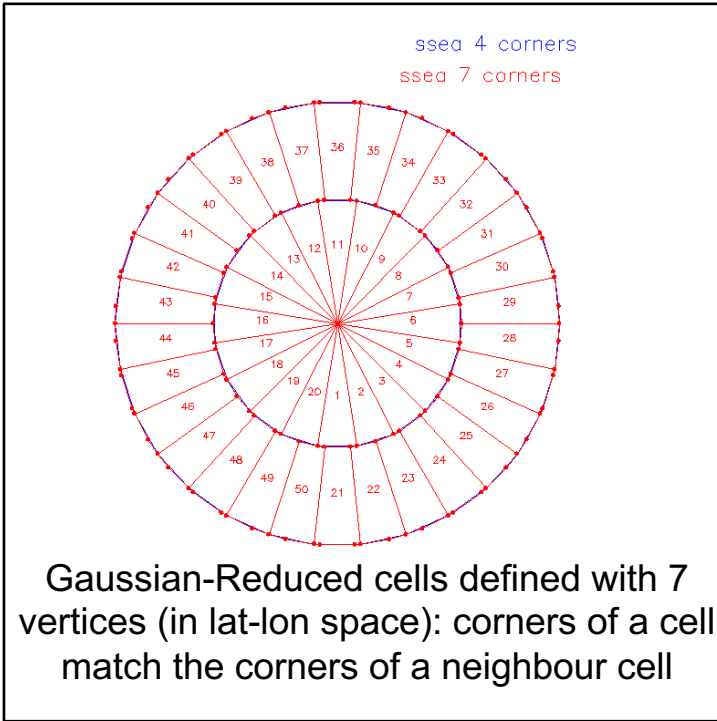
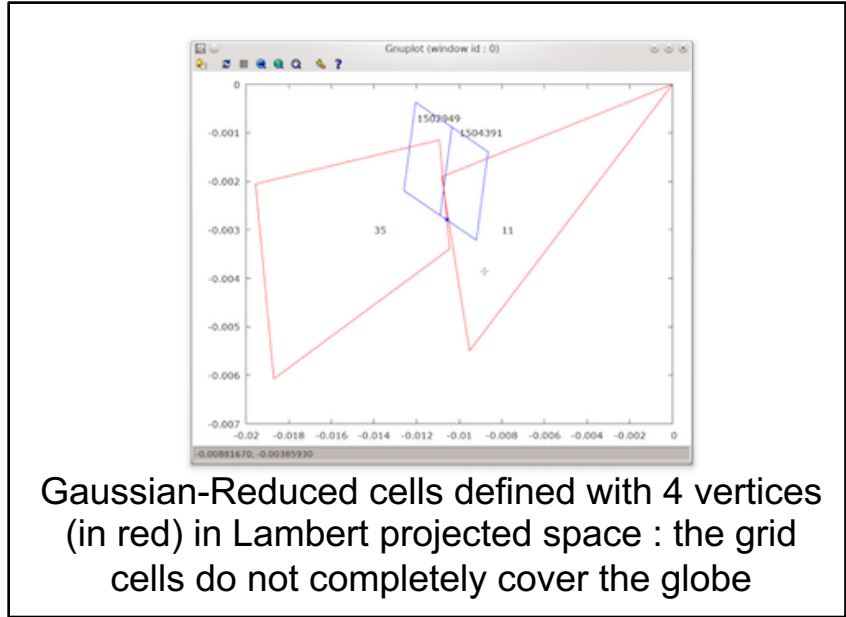
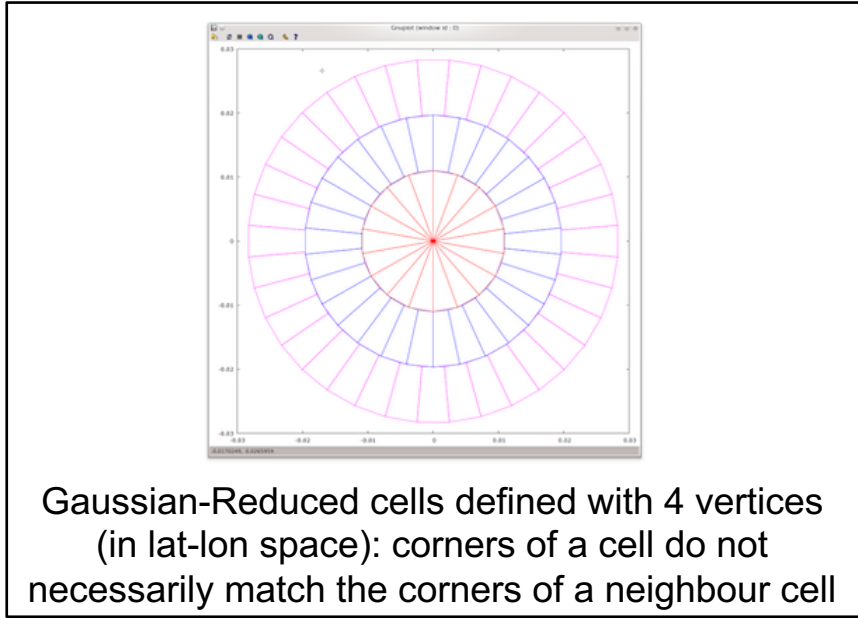
## Conclusion for lon-lat, logically-rectangular, icosahedral grids:

- 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  $\leftrightarrow$  lon-lat)
  - in some cases, only if Lambert projection is not activated (icos  $\rightarrow$  log.rect)
  - in some case, Lambert projection does not change the results (log.rect  $\rightarrow$  icos)

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



## Detailed 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

- 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





## THE CONSORTIUM

Coordinated by CNRS-IPSL, the IS-ENES3 project  
gathers 22 partners in 11 countries



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°824084*



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