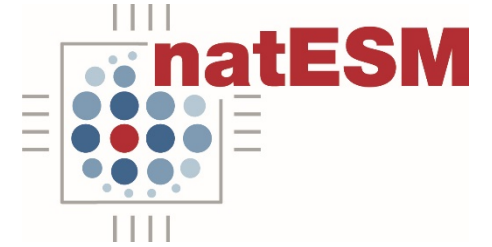


Workshop – natESM strategy

21. February 2022, virtual meeting



Booster for FESOM 2.1

GPU support for Finite-volumeE Sea ice-Ocean Model

Dmitry Sidorenko, Nikolay Koldunov, Patrick Scholz, Sergey Danilov, Jan Hegewald, Natalja Rakowsky, Thomas Jung

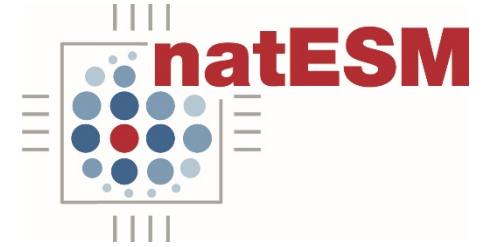
Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research,
Bremerhaven, Germany

The natESM support team is located at DKRZ and JSC. Based on a DKK initiative of the German Earth System Modelling Community, the overall goal is to build a national ESM strategy for the future.

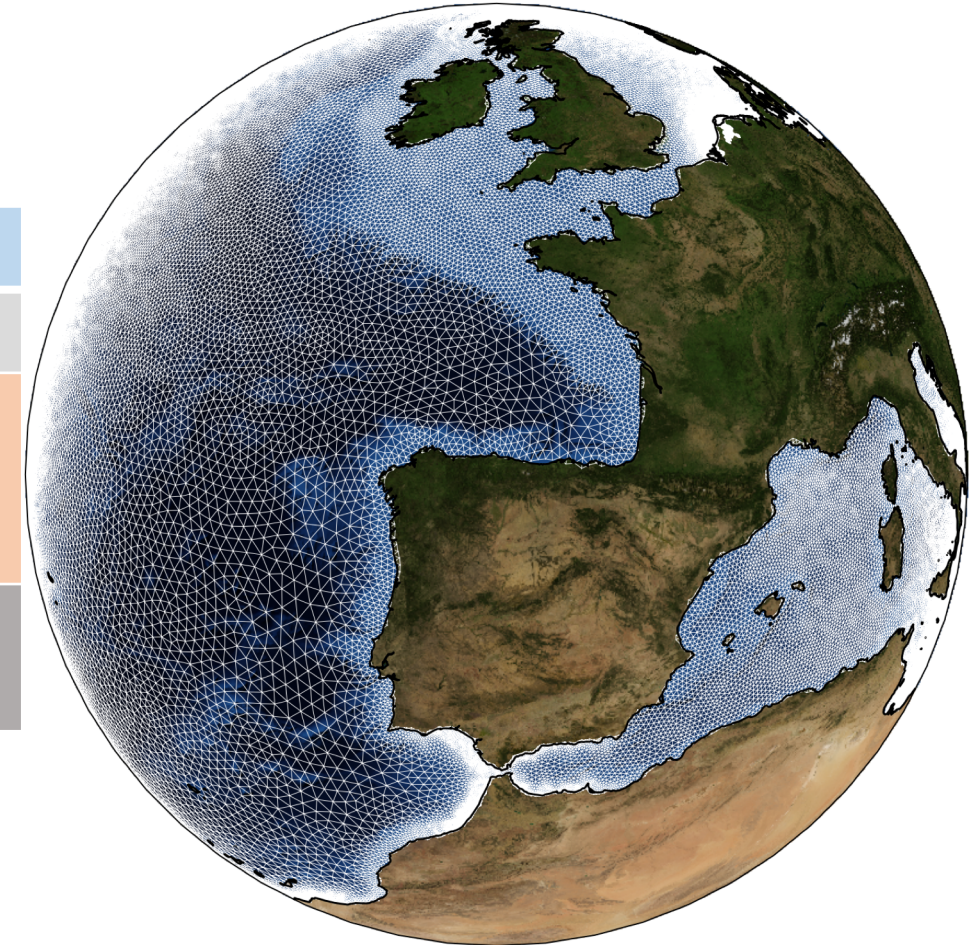


21 February 2022

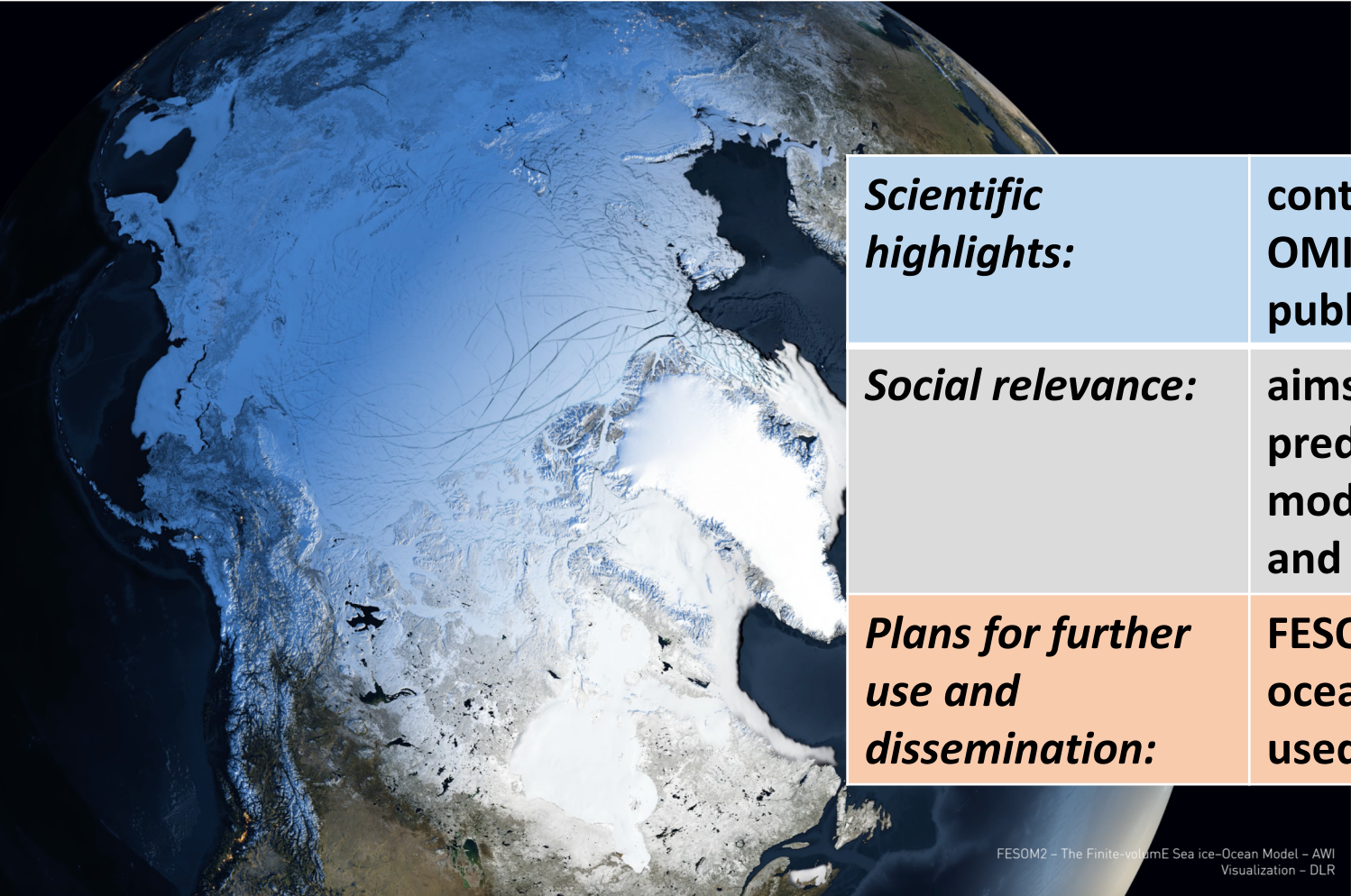
Brief Overview of FESOM (Finite-volumE Sea ice-Ocean Model)



| | |
|------------------------------------|---|
| <i>ESM field</i> | ocean and climate modelling |
| <i>User group</i> | more than 100 active users |
| <i>Targeted simulations</i> | very high resolution CMIP, OMIP, HighResMIP type simulations; HPC usage: MPI+OpenMP+(OpenACC) at JSC, DKRZ, HLRN, etc. |
| <i>Maintenance</i> | Development supported by AWI (in PoF IV), 4 FTE & 5+ project scientist; open source hosted at GitHub |



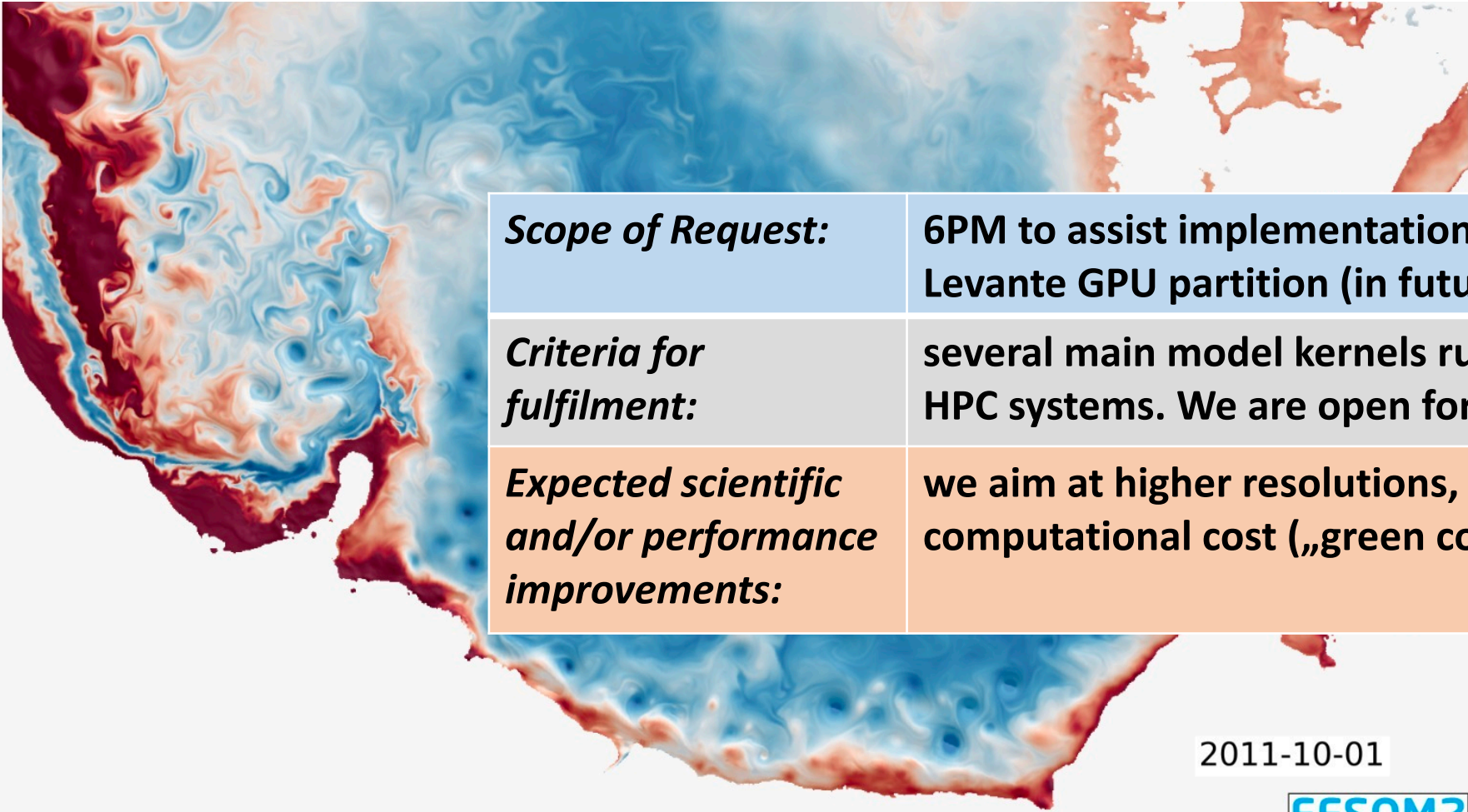
FESOM Application Field



FESOM2 – The Finite-volumeE Sea ice–Ocean Model – AWI
Visualization – DLR

| | |
|--|---|
| <p>Scientific highlights:</p> | <p>contributed to IPCC through CMIP6, HighResMIP, OMIP and PMIP projects. More than 200 scientific publications.</p> |
| <p>Social relevance:</p> | <p>aims at improving the weather and climate prediction; a partner of ECMWF (IFS+FESOM model); provide information for climate adaptation and mitigation (Digital Twin, CMIP7?)</p> |
| <p>Plans for further use and dissemination:</p> | <p>FESOM is the open source new generation ocean-sea ice model on unstructured meshes to be used in climate and ocean studies</p> |

Description of Planned Work



| | |
|--|---|
| <i>Scope of Request:</i> | 6PM to assist implementation of OpenACC at JSC Booster and Levante GPU partition (in future LUMI & Marenostrum5) |
| <i>Criteria for fulfilment:</i> | several main model kernels running on GPUs at new generation HPC systems. We are open for OpenACC & OpenMP5.X |
| <i>Expected scientific and/or performance improvements:</i> | we aim at higher resolutions, higher throughput and cheap computational cost („green computing“) |

2011-10-01

FESOM2