

IOW contribution to WP4 and WP5

Team: Leonie Barghorn (Postdoc), Sven
Karsten (Senior scientist), NN (PhD),
Markus Meier (PI)

Leibniz Institute for Baltic Sea Research
Warnemünde (IOW)
markus.meier@iow.de

Task 4.4 Assessment of climate change impact on target seas physics

[M18-M48] (IOW, ICTP, CNRS-CNRM,

CMCC, SMHI, ENEA, ULiege, METU) Based on the Task 4.3 grand ensemble, this task will establish a general and authoritative scientific assessment of the future evolution of the target seas physics for the decades to come at basin scale. This will include an uncertainty quantification and establish guidance on how to best use or sub-sample the grand ensemble depending on the applications. This can include the definition of possible plausible physically consistent futures and the placing of the WP4 ensemble within the larger CMIP6 ensemble.

D4.4 Basin-scale climate change assessment based on the grand ensemble (Task 4.4). [M48, IOW]

Task 5.3 Production of the high-resolution, multi-model, multi-sea grand ensemble of multi-decadal projections and of selected decadal predictions [M18-M48] (IOW, all PPs)

Biogeochemical model production for decadal and multi-decadal horizon: Production of an ensemble of multidecadal, historical and scenario simulations for biogeochemistry (BGC), in the three target seas following the protocol developed in Task 5.1. CMOR-compliant BGC model outputs will be produced, in line with CORDEXCMIP6 archive specifications, ready for ESGF. Selected decadal predictions of BGC in the three target seas, initialised with CMEMS products, will be carried out with ocean-atmosphere physics produced in WP3. Extreme Total Water Level projections for decadal and multi-decadal horizon: Production of multi-decadal scale probabilistic RSLR scenarios for the 3 target seas, using as input the steric and dynamic contributions to SLR produced in WP4, and adding other components (e.g., regional variations of local vertical land motion, glacial isostatic adjustment) from sources used in IPCC AR6. These RSLR scenarios will then be combined with available storm surge, wave setup and tide data to develop ETWL projections. Additionally, RSLR and ETWL projections will be produced using the steric and dynamic contributions to SLR from selected decadal prediction runs produced in WP3, setting the initialization requirements for each target sea.

Target basin Baltic Sea

Coupled physical system IOW-ESM with ERGOM www.ergom.net

Model spatial resolution 12 km ???, 5.4 km

Model type and complexity coupled model with an exchange grid, CCLM, MOM6 with a k-epsilon mixing scheme, vertical advection using Arbitrary-Lagrangian-Eulerian method

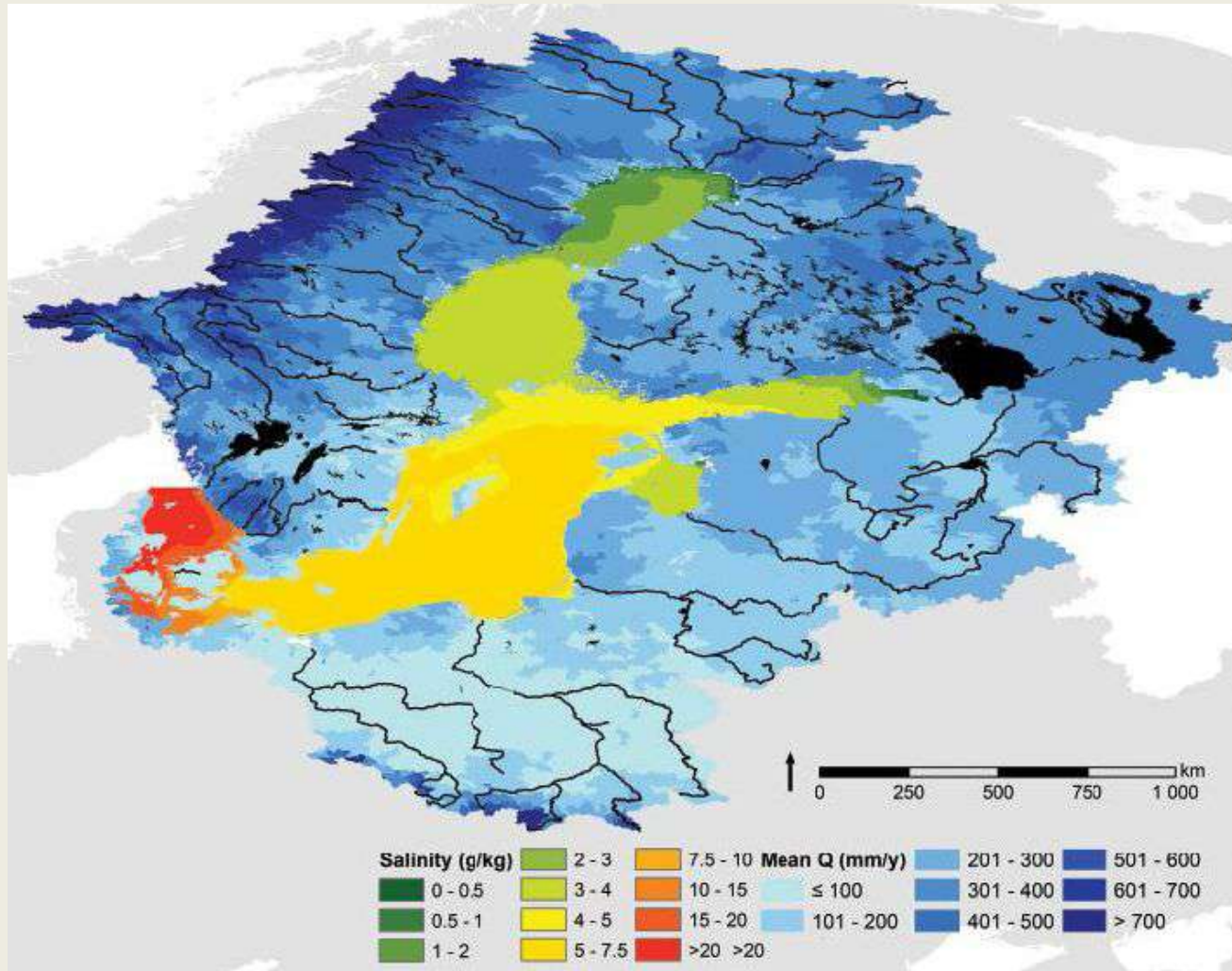
Main processes represented see next pages

State variables T, S, u,v, w, SSH,

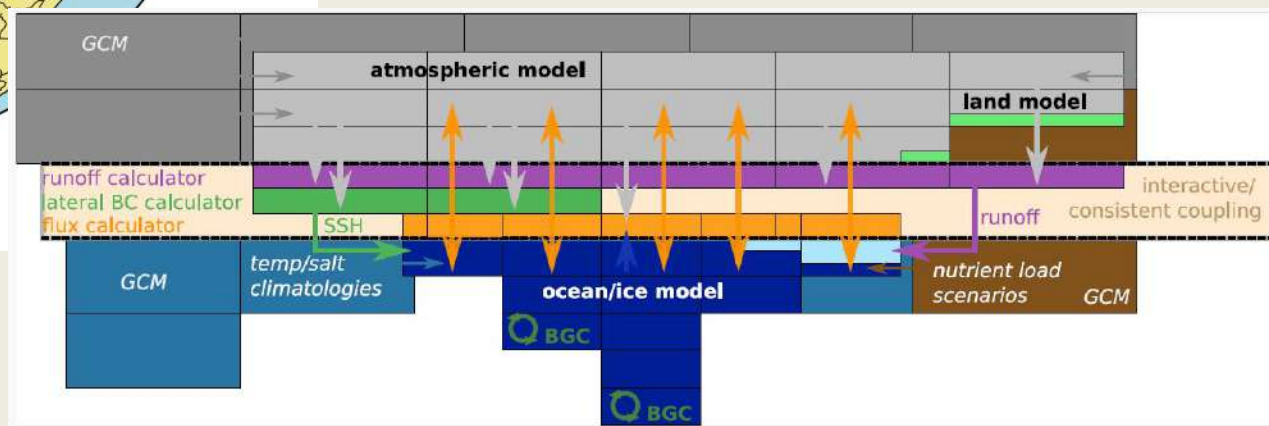
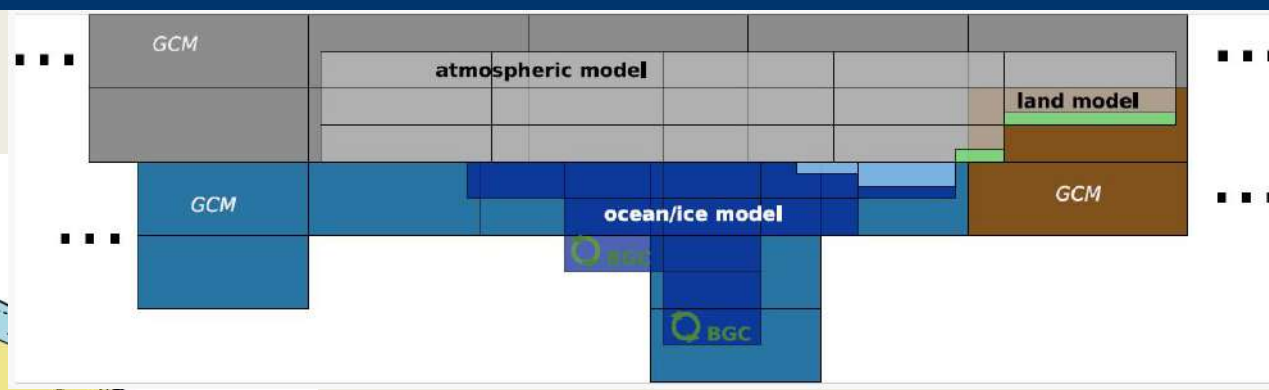
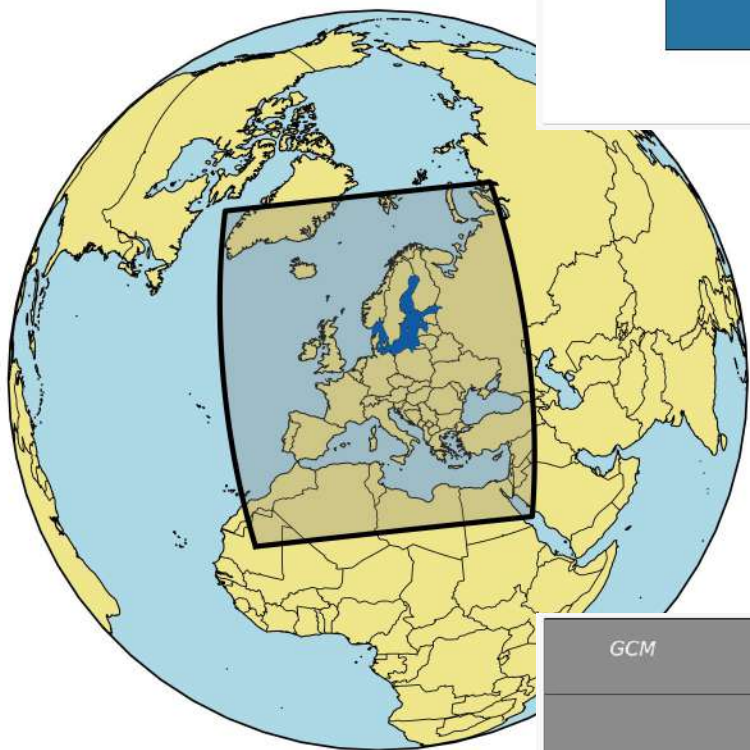
Graphical representation of model processes, links between state variables, inputs, forcing.... see next pages

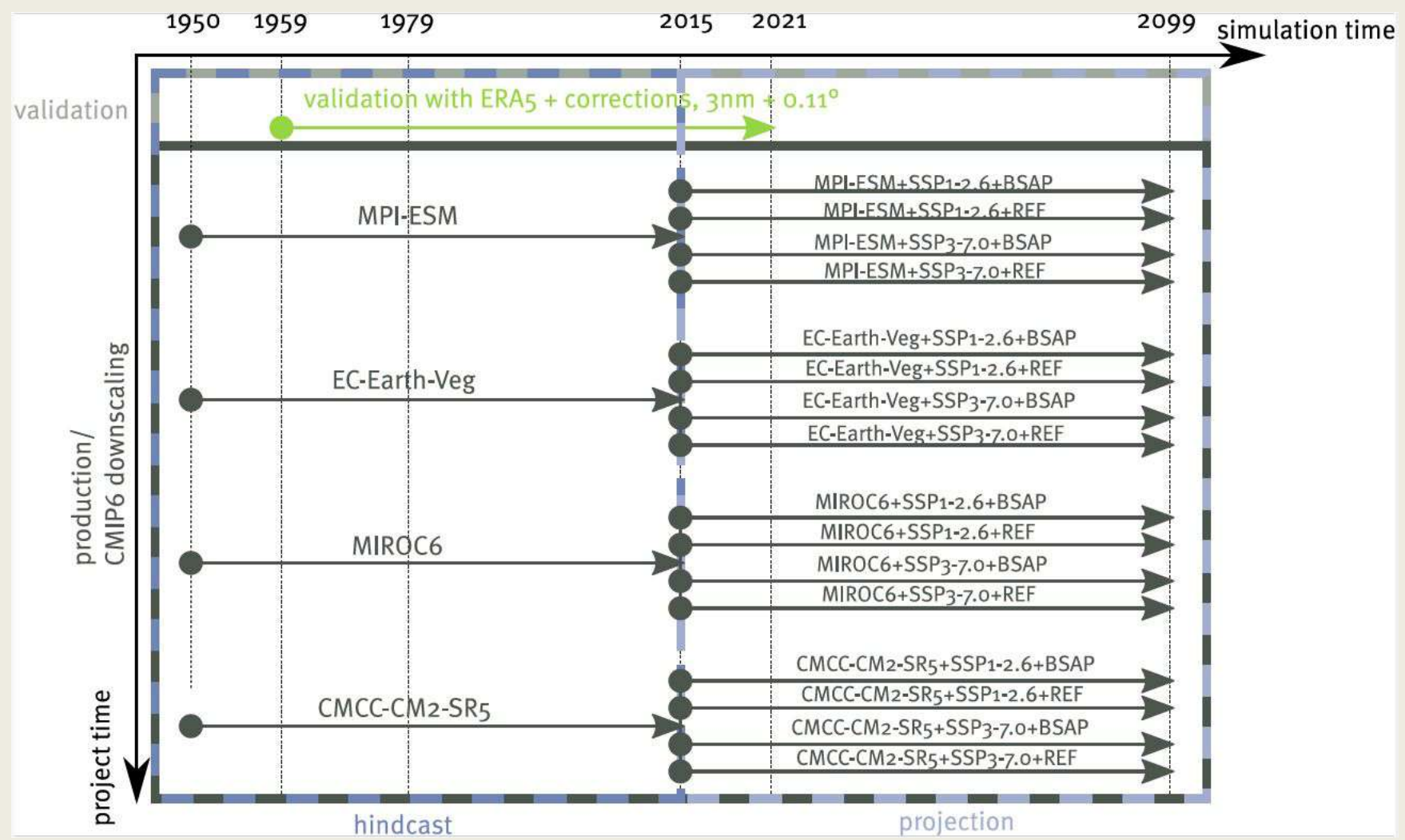
Proposed key variables for the climate services temperature, salinity, oxygen

Planned development and innovation introduced in Rivierade ICON-A instead of CCLM



Model domains





Neumann et al. (2022, GMD)

