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Title: Final report for IC project: "Fully-coupled climate simulations with an eddy-permitting ocean component"

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Report Viewgraphs for IC project: Fully-coupled climate simulations with an eddy-permitting ocean component

- Two sets of simulations were performed within this allocation:
 - 1) a 12-year fully-coupled experiment in pre-industrial conditions, using the CICE4 version of the sea-ice model;
 - 2) a set of multi-decadal ocean-ice-only experiments, forced with CORE-I atmospheric fields and using the CICE5 version of the sea-ice model.
- Results from simulation 1) are presented in Figures 1-3, and specific results from a simulation in 2) with tracer releases are presented in Figure 4. They show the initial adjustment of ocean heat content and sea-ice coverage, as expected from a simulation that started from rest and no-ice. Figure 3 also shows that the intermediate ocean resolution captures the eddy variability reasonably well, especially in areas with large mesoscale eddies. Finally, Fig. 4 represents the amount of light attenuation induced by the simulated organic matter (CDOM) released by Arctic rivers into the ocean, affecting biological productivity directly.

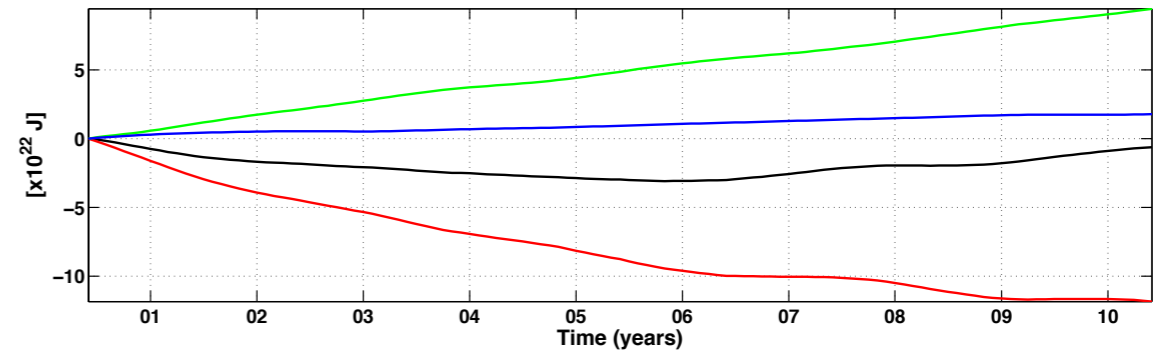


Figure 1: Time series of ocean heat content (OHC) for the fully-coupled model simulation computed from surface to bottom (black line), surface to 700 m depth (red line), 700-2000 m (green line), and 2000 m-bottom (blue line).

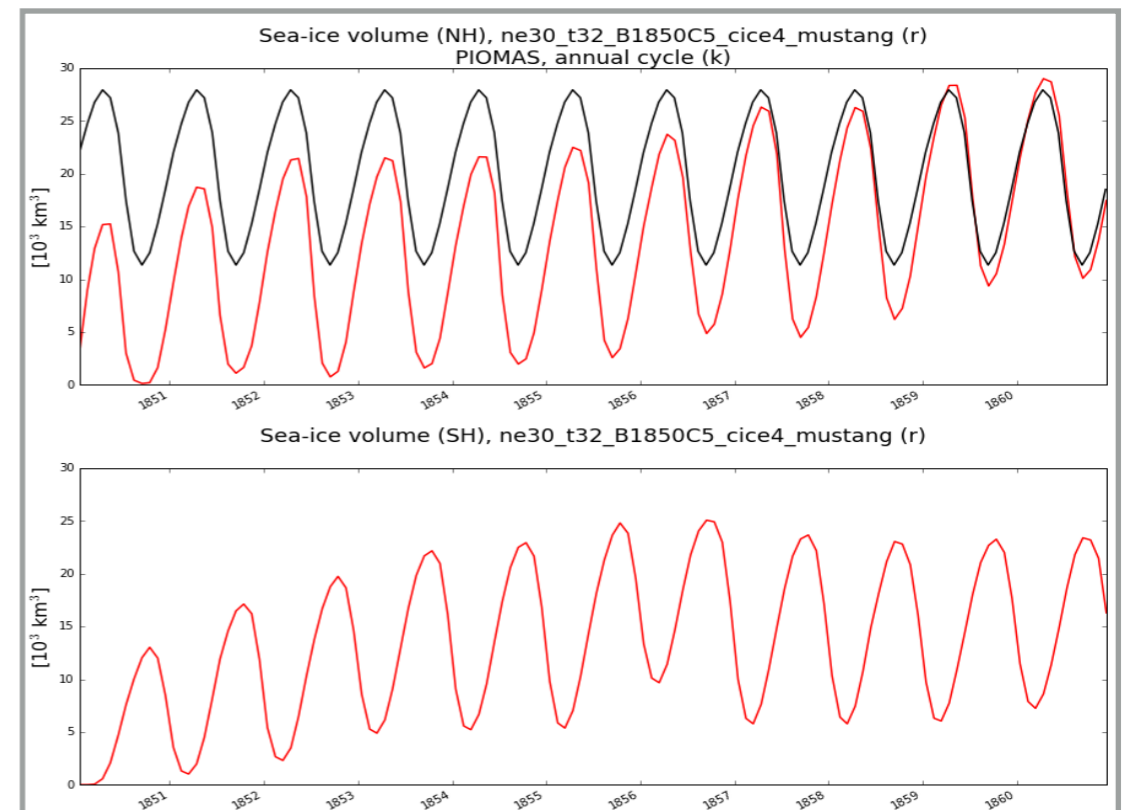


Figure 2: Time series of sea-ice volume from the fully-coupled simulation (red lines) in the Northern (upper panel) and Southern Hemisphere (lower panel). In the NH, the model results can be compared with the PIOMAS reanalysis data (black line).

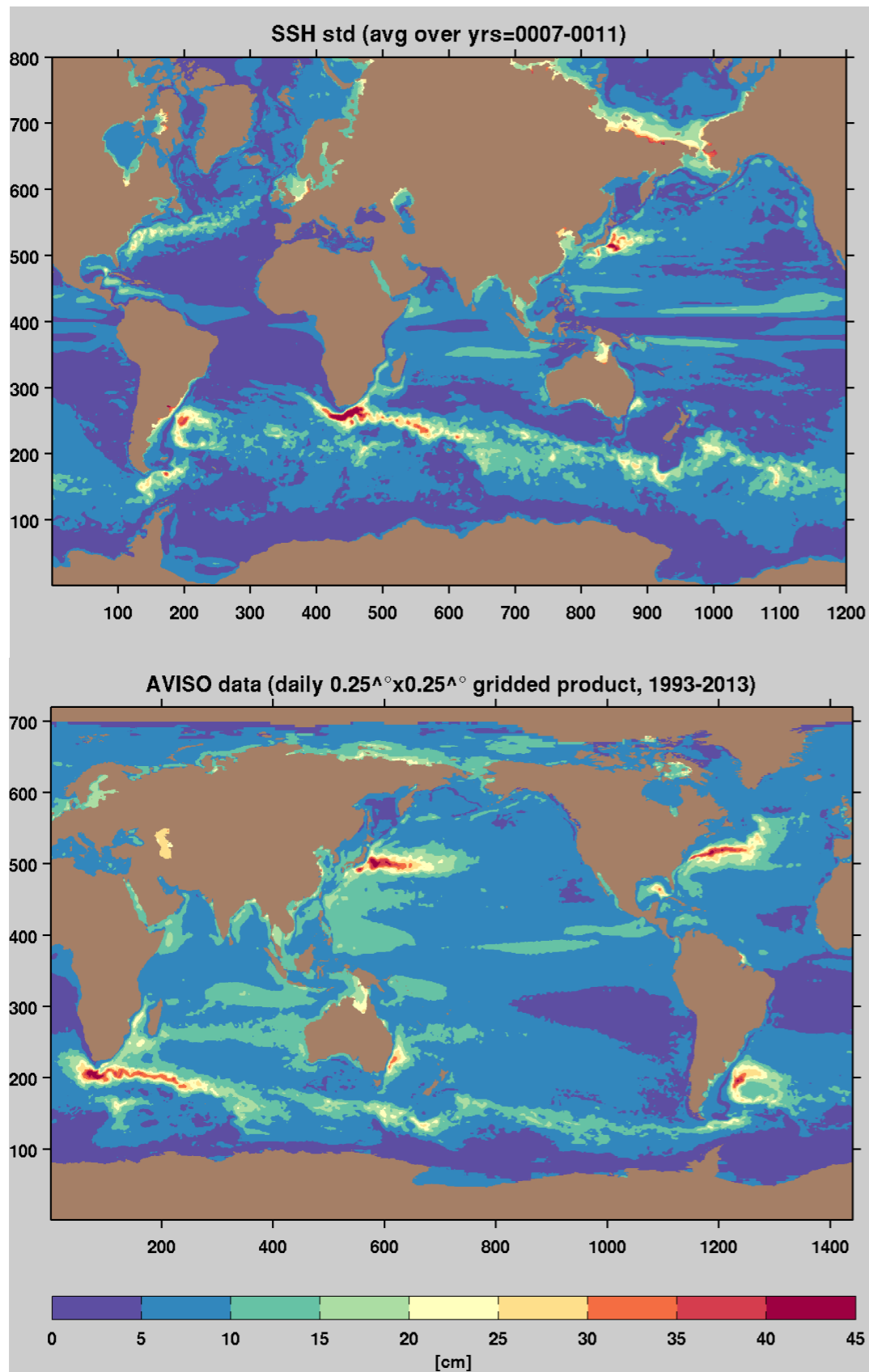


Figure 3: Sea Surface Height standard deviation computed over years 7-11 of the fully-coupled model solution (upper panel), compared with SSH derived from the AVISO satellite observational data set (lower panel).

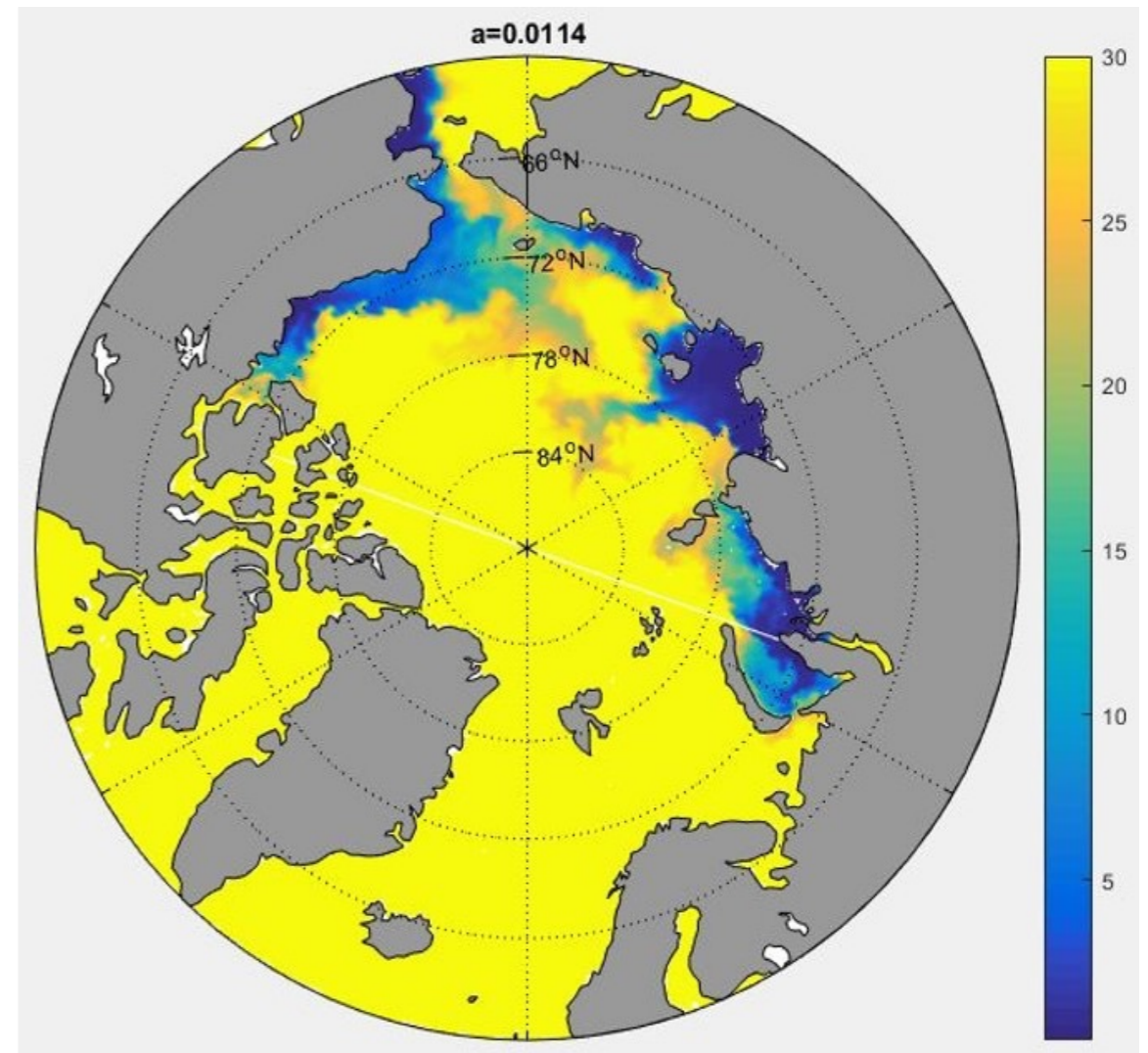


Figure 4: Light attenuation due to tracers that have been released in one of the ocean-ice-only eddy permitting simulations, to represent Chromophoric Dissolved Organic Matter (CDOM).