Climate storylines using the spectral nudged simulations with IFS-FESOM

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We are presenting our efforts to incorporate spectral nudging capabilities into the development and assessment of model-driven storyline scenarios using a km-scale coupled climate model. Working within the framework of the EU's Destination Earth project, we are working towards this objective by employing the ocean sea-ice model FESOM coupled with the atmospheric model IFS.

We showcase our preliminary results from the nudged runs of IFS-FESOM for the present day which will eventually lead the way into the storyline scenarios where the same winds would be imposed in different climates. We also show a glimpse of how the nudged simulations for the present-day climate serve to assess model quality against observations based on relatively short simulations, incorporating field campaign data like MOSAiC. In the future, these capabilities could be used to produce "storylines" that help to address the question of how recent extreme events would unfold in preindustrial, +1.5K, +2K, +3K and +4K climates.

Ultimately, our novel storyline scenarios have the potential to illustrate the impact of climate change on extreme events in a way that is more tangible and relatable and nicely complements the probabilistic approach. Since they are based on recent extreme events and explore probable variations in diverse plausible climates, these storylines establish a more profound connection to users' experiences. When these scenarios are presented to users it can foster discussions on future activities and necessary adaptation measures.