

Recent TipESM Activities

Publication: Large fisheries declines linked to compound and extreme climate events

Climate extremes are increasingly disrupting marine ecosystems and fisheries. A new study in Nature Communications, supported by TipESM, suggests that temperature extremes are only part of the story and compound extremes are the most important drivers. Using three decades of global data covering more than 6,500 fisheries time series and 1,246 species, the authors find that extreme ocean temperatures can increase the risk of exceptionally low catches. However, the strongest effects often occur when high temperatures and low primary productivity happen together or in sequence.



Read the paper [here](#)

Milestone: Modified source code for AERA



This milestone is achieved by successfully extending the Adaptive Emission Reduction Approach (AERA) to include ocean acidification alongside global surface air temperature targets. AERA was originally developed to determine emission pathways consistent with prescribed global surface air temperature targets and has been successfully applied across a wide range of Earth System Models.

The code is made available via [GitHub](#)
Check out the milestone report [here](#)

CMIP7 Emissions Scenarios

A new set of scenarios has been published for the seventh Coupled Model Intercomparison Project (CMIP7). Carbon Brief recently released an explainer on the new scenarios. Access it [here](#).

TipESM researchers have contributed to the development of the new scenarios, which were described in a high impact paper published in Geoscientific Model Development back in April. Access the paper [here](#).



Recent TipESM Activities

Publication: Catalogue of strong nonlinear surprises in ocean, sea-ice, and atmospheric variables in CMIP6



Access the paper [here](#).

A new study from the TipESM and OptimESM HE projects examines future climate projections from 54 CMIP6 models and identifies 73 examples of "Strong Nonlinear Surprises", which are abrupt changes or major shifts in ocean, sea-ice and atmospheric systems. The study highlights how internal climate feedbacks can trigger large-scale changes and provides one of the first systematic catalogues of these events across the CMIP6 archive. The message is clear: Every fraction of a degree matters when it comes to reducing the risk of unexpected and potentially irreversible climate change.

Deliverable 2.3: Downstream effect of tipping points

In TipESM's latest deliverable, we present the analysis of downstream effects of climate tipping points. The report focuses on the potential climatic impacts of the AMOC, Subpolar Gyre (SPG), and ice sheet tipping.

The results can be used by national institutes to construct complementary climate scenarios that account for effects of AMOC and SPG collapse, as well as sea-level rise scenarios that account for the effects of Antarctic Ice Sheet tipping. Results related to ocean acidification and coral reef loss are useful for anyone working on marine conservation.

Check out the full report [here](#)

Publication: ENSO-driven climatic and vegetation changes in Amazonia by the end of the century

A new publication in Environmental Research Letters with TipESM authors investigates ENSO-driven climate and vegetation changes in Amazonia using CMIP6 simulations. The study is yet another one pointing to potential straining of the rainforest and its ability to survive due to spatially and temporally amplified ENSO impacts in the near future, and ensuing extreme heat and precipitation episodes that could contribute to the onset of partial forest diebacks by the end of the century.

Read the paper [here](#)



Funded by
the European Union



UK Research
and Innovation



TipESM



@TipESM

Recent TipESM Activities

New publication: High-Resolution Dynamical Downscaling Refines the Time of Emergence of Sea Level Rise in the Northwestern Pacific

A new study in Earth's Future supported by TipESM estimates when sea-level rise becomes detectable above natural variability, its time of emergence, in the Northwestern Pacific marginal seas. Using 1/20° dynamical downscaling of four CMIP6 models under several Shared Socioeconomic Pathways through 2100, the regional simulations better capture boundary-current and mesoscale variability than coarse-resolution global models, refining emergence estimates.

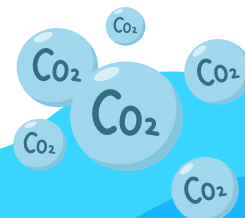
Read the paper [here](#)



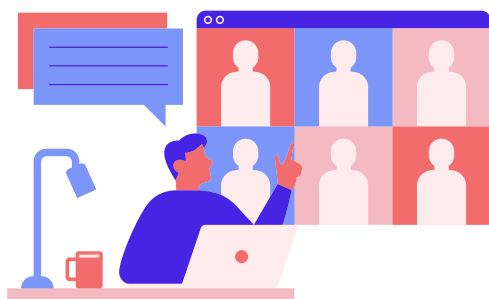
New publication: Enhanced carbon loss in the Southern Ocean under mitigation scenarios

A new paper in Science Advances uses idealized emission-driven CESM2 simulations to ask whether the Southern Ocean will keep absorbing anthropogenic CO₂ under mitigation. It finds the region shifts from a weak or near-neutral sink to a substantial CO₂ source during zero- and negative-emission phases. These results indicate that the present-day CO₂ sink may lose its effectiveness during climate mitigation, emphasizing the need to consider regional feedbacks for long-term climate policy effectiveness.

Read the paper [here](#)



Upcoming



TipESM Seminars

Every three weeks on Tuesdays (15:00-16:00 CET/CEST) we host a seminar discussing work in progress papers based on TIPMIP protocol.

To sign up and receive more information, fill out [this form](#).