

Project: **1448**

Project title: **First steps towards the realisation of the Tipping Point Modelling Intercomparison Project (TIPMIP): Results from coupled Earth system models**

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Report period: **2024-05-01 to 2025-04-30**

Summary Overall, within this allocation period, the project has moved from an initial conceptualisation and setup phase to production. TIPMIP-ESM runs are currently being conducted following finalisation of the protocol (including diagnostics and CMIP registration of TIPMIP), and individual standalone domains are in the process of finalising their respective protocols. The storage resources requested for this period have not been exhausted as these had been estimated in a precautionary way to make sure we can accommodate potentially incoming datasets.

Advances on experimental protocols

The overarching objectives and setup of TIPMIP are outlined in the **framework paper** (Winkelmann et al., submitted) finalised within the current allocation period. Moreover, throughout 2024 and into 2025 the TIPMIP experimental protocol for fully coupled Earth System Models (ESMs) was [defined](#). The resulting scheme is very flexible and extensible, and will be the framework for the upcoming Tier 2 and Tier 3 experiments. Several modelling groups have committed and are presently running the Tier 1 experiments, and the first datasets are expected to be available by June 2025. The TIPMIP-ESM protocol is outlined in a forthcoming publication (Jones et al., to be submitted). Similarly, following a series of meetings including the TIPMIP General Assembly in Baltimore (U.S.) in December 2024, significant advances in the protocols of the individual standalone domains could be achieved. To this end, the TIPMIP-AMOC protocol has been finalised, and the TIPMIP-Icesheets and TIPMIP-Permafrost domains are converging to individual protocols (all forthcoming in respective publications).

TIPMIP ESM Tier 1 experiment protocol: All experiments in CO₂-emission mode

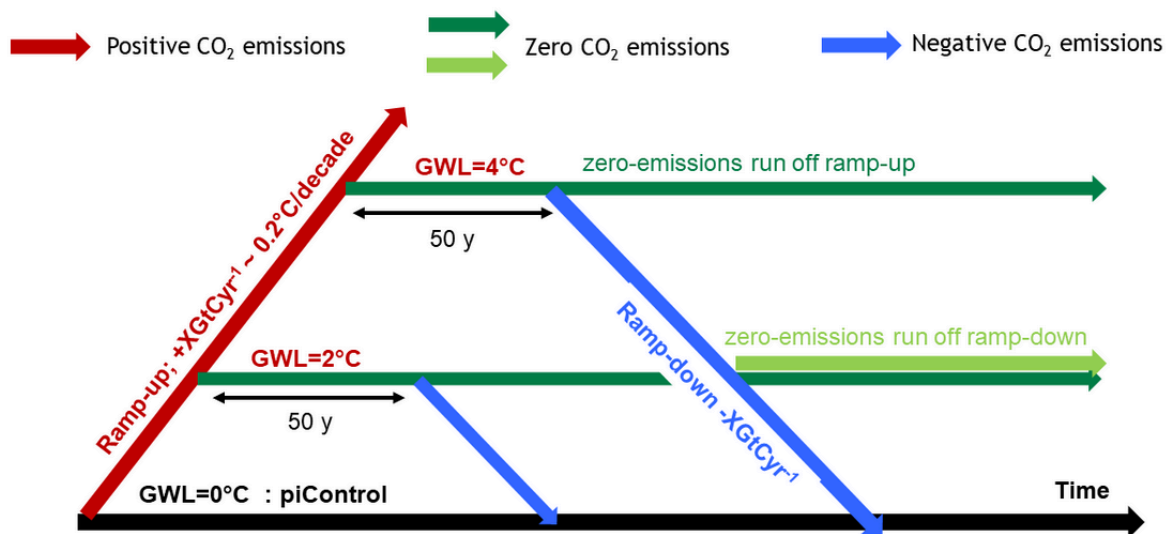


Fig.1: TIPMIP-ESM Tier 1 protocol currently being conducted by a range of modelling groups

CMIP registration

During 2024, the process of registering TIPMIP as a [CMIP6Plus activity](#) was carried out. This included defining the ESM experiment naming convention as well as the list of [ESM diagnostic variables](#) that is requested of participating ESMs. The latter had to be coordinated with other EU-funded projects (ClimTip, TipESM, OptimESM) and the wider TIPMIP community for downstream applications. In particular, the definition of forcing inputs for subsequent standalone model experiments has been at the focus of this effort, and had to match the timelines of the individual domain groups. We are now in a position to start distributing experimental results on ESGF as soon as the modelling groups finish their CMORization process.

At the same time, we also started with the analogous process for the upcoming CMIP7. We were involved in the definition of the CMIP7 data request, and defined a “data opportunity” as part of it: “Robust risk assessment of tipping points”.