

45th Session of the WCRP Joint Scientific Committee (JSC)

27-30 May 2024

Report to the WCRP Joint Scientific Committee

Safe Landing Climates

1. Highlights for Joint Scientific Committee (including high-level publications, new achievements/products, and capacity building activities – in particular anything you feel should go into a WCRP annual achievement report or brochure)

- Our Tipping Point Discussion Series, initiated with Earth Commission and AIMEs (Future Earth), continues a successful run with 26 events since it started in September 2021, typical attendance of 50-200 depending on the topic, and 85K total views on YouTube. The series is now running at a slower pace (roughly bi-monthly) but with continued good attendance and is intended to continue at least into 2025. <https://tippingpointseries.confetti.events>
- We have a paper in press at Earth's Future highlighting the motivating concerns and opportunities to be explored by this Lighthouse, which is also a call to arms to the IPCC and broader community to consider more integrative science aimed at a more comprehensive assessment of global risk and possible system interactions.
- We have an activity underway (one workshop so far) to lead a community assessment of the Transient Climate Response to cumulative carbon Emissions (TCRE), an important metric for climate change particularly relevant to higher-mitigation scenarios that is analogous to the Equilibrium Climate Sensitivity which is more relevant for higher emission scenarios and longer-term changes. Report from the January workshop: <https://www.wcrp-climate.org/WCRP-publications/2024/TCRE-Workshop-Report-c.pdf>
- Lighthouse team members have co-led and submitted a paper on the link between extreme events and tipping points and on policy related to tipping points to the special issue on tipping points in Surveys in Geophysics (Outcomes of the [ISSI workshop](#) that the LHA was involved in during 2022).
- A MIP aiming to use CMIP class models to evaluate the consequences of tipping points, 'WhatIfMip' is achieving some buy-in from modelling centres (see below).

2. Planned science initiatives and major events (over next 1- 5 years)

- The TCRE initiative described above plans to deliver an assessment by 2026, in time for publications to be useful for the AR7 process.
- Our "WhatIfMIP" proposal, a MIP designed to investigate the consequences of various climate system tipping events were they to occur, is gaining momentum and interest from modelling groups. The proposal currently targets five tipping possibilities: loss of boreal forests, loss of tropical rainforests, Sahel greening, loss of Greenland ice and loss of the West Antarctic Ice Sheet. We propose experiments using coupled models in their standard configurations. This proposal is complementary to efforts led elsewhere (e.g. TIPMIP) to predict the effects of tipping itself.
- We have an initiative with participation from economics and finance sectors to bring physical climate science more directly to bear on current practices in the modelling of climate damages and

equivalent financial costs. This will initiate with a workshop in November 2024 combining the three communities. The purpose will be to establish a better understanding of the limitations and possible advancements in current global-level financial impact modelling.

- Our cascading events initiative will also run a workshop joint with the economics/finance one, to examine cascading events and systemic shocks with an eye to their mechanism of cascading, their likelihood of occurrence, and their potential consequences.
- We are running a [Safe Landing Climate Webinar Series](#), which has held events on climate scenarios, the synergies and trade offs of navigating towards a sustainable future, cascading and compound shocks for food production and (on 23 May) on cascading risks for ecosystems. This series will continue into 2025.
- Other activities of the LHA are proceeding more slowly, but plan possible activities in 2025 to be reported in due course.

3. Planned Products, high-level assessments or other key outputs/publications

- The TCRE assessment described above is of direct interest to ESMO and WGCM and would entail the development of new climate scenarios relevant to higher or delayed mitigation.
- We are tentatively planning an assessment of tipping points and other climate surprises not typically accounted for in future climate scenarios. The assessment would be conducted in collaboration with the IPCC (for example through an Expert Meeting) and with broad community input and would aim to consider the evidence while balancing different perspectives on tipping point and other tail risks currently prevalent in the physical sciences community. An expected outcome will be to provide a report and contribute to consensus building for the next IPCC assessment round, where tipping points are expected to be a more pressing and challenging topic than in past assessments.

4. Linkages with other lighthouse Activities, Core Projects, Academy etc.

- As noted above, we are running activities with collaboration from ESMO (TCRE and 'WhatifMip').
- Our cascading shocks and severe extreme events activity is developing links to the EPESC Lighthouse Activity on extreme heat and drought, specifically.
- We will partner with APARC (and My Climate Risk) on the Workshop on "Data Science for Weather and Climate Research" and the Training School on "Climate Data Analysis and AI in the Global South (AI4Climate)."
- Our climate economics workshop will require the creation and dissemination of explanatory materials on the various disciplines for distribution prior to the workshop. We are interested in exploring whether this can be done with the help of the Academy.

5. Partnerships with entities outside of WCRP

- Our Tipping Point Discussions series is in partnership with Future Earth (AIMES and the Earth Commission).
- Our economics/finance initiative is in partnership with S&P Global Sustainable 1.

6. Suggestions, issues or challenges

- Geographic bias is a challenge for us since most of our Steering Group is from Europe/North America. The science areas of key concern to this LHA have not traditionally been a focus in the Global South.