LHA: Safe Landing Climates

Explores routes to safe landing spaces for Human and natural system; explore present-to-future “pathways” for achievement of key Sustainable Development Goals (SDGs).
Time scale: multi-decadal to millennial.

Team: Sherwood/Hegerl/Braconnot/Friedlingstein/Goelzer/Harris/Holland/H. Kim/Nobre/Otto-Bliesner/Reed/Renwick/

5 projects/topics:

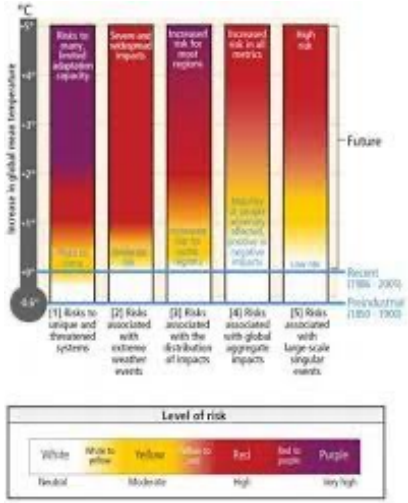
1. Defining safe landings: Defining safe (physical climate; impacts; biodiversity); pathway to it; adaptation/resilience
2. Global tail risks (ice sheet collapse; catastrophic large scale extremes; risk analysis; tipping points
3. Land carbon and Bioenergy Carbon Capture and Storage
4. Water availability – case studies
5. Sea level rise

Status: Have contacted potential partners.
Science plan by June 2021. Activities so far: AGU session proposed; Webinar series on tail risks; virtual discussions on safe landings; workshops planned 2022+ on: Tail risks and adaptation limits, land based mitigation, safe landing scenario development

1. Progress towards developing Science Plan

1. Defining Safe Landings

- Bring together an inclusive and interdisciplinary group of communities with the goal of defining a safe landing climate.
- Metrics of physical climate, human impacts, and biodiversity with understandings of relevant timescales.
- Pathways to safe landing climate that consider adaptability limits and resilience, and options including geoengineering.
- Framework in which there is an open and iterative dialogue to continually reassess the above.

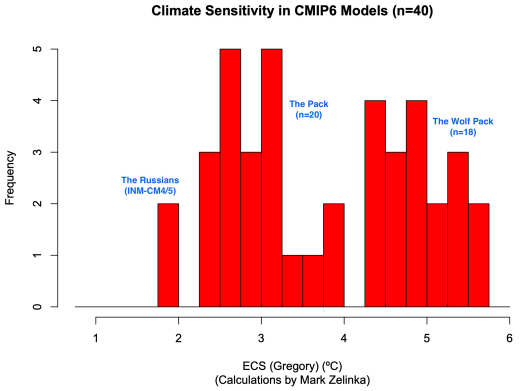


Potential partners: AIMES, WGII, ISC, IIASA, Cambridge Sustainability Group

1. Progress towards developing Science Plan

2. Tail Risks

- Identify and characterise key tail risks ("tipping points," risk of high ECS, large-scale extreme events, etc.) <= GEWEX linkpoints in extremes, fires, correlated large scale extremes etc
- Facilitate incorporation of uncertain risks into future projections, cost/benefit analysis and adaptation planning. Foster Earth System models that can represent them probabilistically.
- Examine how, or if, tail risks can be mitigated or avoided (or caused) by climate mitigation or geoengineering efforts.

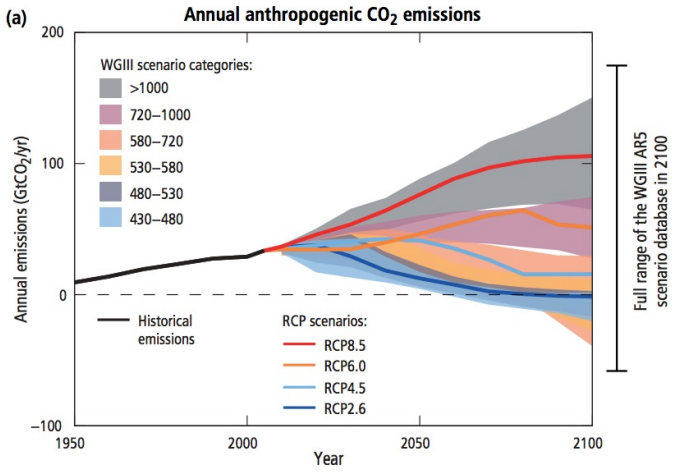


Partners (potential): AIMES, PAGES, SOLAS; ISIMIP, MCR LHA

1. Progress towards developing Science Plan

3. Land and Carbon

- Climate implications of carbon dioxide removal (CDR) systems (including BECCS) while maintaining food and water supply, preserving biodiversity, and limiting ocean acidification.
- Assess possible contribution to mitigation by CH4, N2O etc.
- Assess risk of surprises/rapid change in greenhouse gases due to land sources
- Ocean CDR TBD



Heritage: Carbon Cycle GC

Partners (potential): GCP, SOLAS, GEWEX, ILEAPS

1. Progress towards developing Science Plan

4. Water Availability

Currently two possible foci are being considered, TBD:

A. Integrative approach focusing on e.g. mountain glaciers—prediction, impacts, hazard.

B. Tropical rainforests—their role in the global water cycle, ecosystem services, and vulnerability

1. Progress towards developing Science Plan

5. Sea Level

- Habitable coasts: Quantify “acceptable” sea level rise, rate of SLR, and its irreversibility on time scales ranging from multiple decades to millennia.
- Estimate impact on low elevation lands communities and ecosystems, storm surges, hurricanes, ...
- Assess potential for adaptation.
- Facilitate interaction of modelling efforts across spatial scales from global to coastal
- Foster interaction and co-production between sea-level experts and coastal planners worldwide.

Heritage: Sea Level GC

Partners (potential): MCR LHA, PAGES, CliC, CLIVAR

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

4. Draft Timeline and Roadmap: Science Plans and LHA Launch

Science plan by June 2021.

Possible activities for 2021:

- AGU session proposed
- SLC white paper for journal publication
- Webinar series on Tail Risks
- Virtual Panel Discussion series on Defining Safe Landings

Additional activities (2022-):

Workshops on

Tail risks and adaptation limits
Land based mitigation
Safe landing scenario development
Others