H2020 Constraining uncertainty of multi-decadal climate projections programme (CONSTRAIN)

Efforts to outline greenhouse gas emission pathways compatible with 1.5°C and 2°C global temperature change targets stipulated in the Paris Agreement remain hampered by a lack of ability to constrain climate projections, especially on the 20-50 year timescale. The EU-funded Constraining uncertainty of multi-decadal climate projections programme (CONSTRAIN) will address this challenge by leveraging cutting-edge science to deliver improved climate projections for future policy impact.

CONSTRAIN will focus research on three climate science knowledge gaps and a policy-facing knowledge gap to significantly improve our understanding of how natural and human factors affect multi-decadal regional climate change:

Knowledge Gap A: The magnitude and pattern of effective radiative forcing.

Knowledge Gap B: The magnitude of cloud feedbacks and the role of cloud-circulation coupling in determining the pattern of climate change and climate sensitivity.

Knowledge Gap C: The manner in which ocean variability conditions the response of the climate system to effective radiative forcings on different timescales.

Knowledge Gap D: To translate insights and uncertainties in both variability and forced response on 20-50 year timescales into improved projections and effective adaptation and mitigation policy decisions.

CONSTRAIN will combine novel analyses of climate model integrations from the sixth Climate Model Intercomparison Project (CMIP6) with dedicated high resolution simulations and new observations. We will provide new capability to assess impacts of climate change under a broad range of emission scenarios for the next 20 – 50 years through the development of climate model emulators that integrate and operationalise learning from across the CONSTRAIN programme to effectively translate new physical science understanding into an improved evidence base for policy decisions.

Phase 1 (2019-20) of the programme will deliver a timely characterisation of physical science uncertainty and how it affects projections and committed levels of warming to the 2021 Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC AR6). Phase 2 (2020-23) will deliver constrained surface temperature projections for the 2023 United Nations Framework Convention on Climate Change (UNFCCC) Global Stocktake.

This 8€ million 4 year programme of research and stakeholder engagement will be led by the University of Leeds with 13 partners and around 40 researchers from 9 countries in the EU and Israel. Our partnering institutions are ETH Zurich, Max Planck Institute for Meteorology, Météo-France National Centre for Meteorological Research (CNRM), CICERO, Delft University of Technology, UK Met Office, Leipzig University, National Centre for Scientific Research – Institute Pierre-Simon Laplace (CNRS-IPSL), Stockholm University, Weizmann Institute of Science, Imperial College London, International Institute for Applied Systems Analysis (IIASA) and Climate Analytics.