

First Circular: Save the date

Towards Understanding, Explaining and Predicting Large-Scale Climate Circulation Changes and Extremes

14-18 June 2027 **University of Oxford, UK** **Further details by the end of 2026**

Background & Rationale

Understanding and attributing changes in large-scale atmospheric and oceanic circulation remains one of the most pressing challenges in climate science. While thermodynamic trends are increasingly well understood, significant discrepancies persist between observed and simulated circulation trends and decadal variability. Issues such as unresolved forced responses versus internal multi-decadal variability, too weak teleconnections in climate models and contrasting methodologies in dynamical extreme event attribution limit our confidence in regional climate projections.

The meeting will bring together scientists from the WCRP Lighthouse Activity "*Explaining and Predicting Earth System Change*" (EPESC), the "*Large Ensembles for Attribution of Dynamically-Driven Extremes*" initiative (LEADER), which is part of WCRP's core project "*Atmospheric Processes and their Role in Climate*" (APARC), and the Horizon Europe project "*Explaining and Predicting Climate Changes and Extremes*" (EXPECT). Building on the outcomes and research gaps identified at the WCRP EPESC–LEADER Joint Science Meeting in Busan, South Korea, in July 2025, it will provide a forum for sharing ideas, approaches and results across these research areas.

Key Themes

We encourage submissions on novel diagnostic methods, observational constraint frameworks, modelling experiments, and attribution case studies. The Large Ensemble Single Forcing Model Intercomparison Project (LESFMIP) remains a key community resource, and abstracts using this dataset are particularly welcome where they diagnose circulation responses to model forcing, the role of model error, and the predictability of large-scale circulations. Specific themes include:

- *Model–Observation Discrepancies:* Evaluating extratropical and tropical circulation trends and annual-to-decadal variability across high-resolution models, large ensembles, and observational records.
- *External Forcings vs. Internal Variability:* Disentangling the distinct regional circulation impacts of anthropogenic aerosols, greenhouse gases, and natural forcing mechanisms.
- *Extreme Event Attribution Frameworks*: Reconciling methodologies, such as physical storylines versus probabilistic ensemble attribution, for extreme weather events driven by circulation anomalies and subsequent climate hazards.
- *Reliable decadal predictions:* How do we build towards the vision of an integrated capability for attribution, early warning and prediction of Earth System Change on global and regional spatial scales and annual to decadal timescales?

Due to limited space, attendance is primarily for members of EPESC, EXPECT and LEADER. Early-career researchers and participants from underrepresented regions are strongly encouraged to apply.

Contact

Co-chairs: Antje Weisheimer (University of Oxford and ECMWF, UK) and Chaim Garfinkel (Hebrew University of Jerusalem, Israel)

Update

A timeline and further details will be published by the end of 2026.

WCRP Lighthouse Activities | Explaining and Predicting Earth System Change (EPESC)

EXPECT