

[4C \(former CCiCC\): Climate-Carbon Interactions in the Coming Century](#)

Description

CCiCC addresses the crucial knowledge gap in the climate sensitivity to carbon dioxide emissions, by reducing uncertainty in our quantitative understanding of carbon-climate interactions and feedbacks. This will be achieved through innovative integration of models and observations, providing new constraints on modelled carbon-climate interactions and climate projections, and supporting IPCC assessments and policy objectives.

To meet this objective, CCiCC will (a) provide a step change in our ability to quantify the key processes regulating the coupled carbonclimate system, (b) use observational constraints and improved processes understanding to provide multi-model near-term predictions and longterm projections of the climate in response to anthropogenic emissions, and (c) deliver policy-relevant carbon dioxide emission pathways consistent with the UNFCCC Paris Agreement (PA) goals.

To achieve its goals, CCiCC will develop and use: state-of-the-art Earth System Models (ESMs) including biogeochemical processes not included in previous IPCC reports; novel observations to constrain the contemporary carbon cycle and its natural variability; ESM-based decadal predictions including carbon-climate feedbacks and novel initialisation methods; novel emergent constraints and weighting methods to reduce uncertainty in carbon cycle and climate projections; and novel climate scenarios following adaptive CO₂ emission pathways.

CCiCC will support two central elements of the PA. First, the PA global stocktakes, by providing policy-relevant predictions of atmospheric CO₂ and climate in response to the national determined contributions. Second, the PA ambitions to keep global warming well below 2°C, by providing robust estimates of the remaining carbon budgets and available pathways. CCiCC will bring together leading European groups on climate modelling and on carbon cycle research, uniquely securing Europe's leadership in actionable science needed for the IPCC assessments.

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