



21st Century Compatible CO₂ emissions simulated for the RCP scenarios by multiple ESMs

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It is now well established that climate-carbon cycle feedbacks will have significant impact on the evolution of future atmospheric composition and hence climate. Currently about half of anthropogenic CO₂ emissions are naturally absorbed, but the response of the natural carbon cycle, both land and ocean, to future CO₂ and climate is uncertain. Both the strength of the feedback and the magnitude of its uncertainty are of similar size to key physical feedbacks such as due to clouds or ice-albedo. Hence an interactive carbon cycle is becoming more and more common in General Circulation Models (GCMs). These coupled-climate-carbon-cycle models are becoming known as Earth System Models (ESMs) and form a central contribution to the CMIP5 centennial scale (long-term) projections.

As well as simulating the future climate projections in response to the prescribed Representative Concentration Pathways (RCPs) of CO₂ and other climate forcings, they can simulate the anthropogenic fossil fuel emissions which are compatible with these scenario pathways. Here we present emerging multi-model projections and analysis of compatible CO₂ emissions for the 4 RCP scenarios and comparison with the underlying emissions simulated by the Integrated Assessment Models which created the scenarios. Preliminary results show that although there is significant spread between ESMs, the multi-model results are compatible with the IAMs - indicating general self-consistency within the RCP scenarios.