



Climate and carbon cycle dynamics in a continuous 850-2100 CE simulation with CESM1

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We completed a fully forced and continuous simulation from 850-2100 CE with the Community Earth System Model, applying a doubled Vieira and Solanki (2010) solar forcing as well as the RCP85 scenario for the future. This enables us to compare the forced response of the model during this time period to similar simulations with the Community Climate System Model (CCSM4) and other models participating in PMIP3/CMIP5. The inclusion of the carbon cycle module allows for a direct comparison with measured carbon cycle metrics as well as Earth System Models of Intermediate Complexity and the few fully coupled Earth System Models that ran a last millennium simulation. We investigate whether the external forcing applied is able at times to synchronize the ocean states of models and how such synchronization imprints the carbon cycle in the ocean and on land. Further, in reference to recent studies proposing an active sea ice-ocean feedback mechanism at the inception of the Little Ice Age, we illustrate to what extent this hypothesis depends on the sea ice state of a particular model and how proxy data can help to constrain this hypothesis.