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Angular momentum from CMIP5 climate change simulations, as related to Earth rotation excitation

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Atmospheric angular momentum parameters are calculated from revised scenarios of greenhouse gas concentration in use in the Coupled Model Intercomparison Project, phase 5, which investigates expected climate change. This phase includes new estimates for the so-called Representative Concentration Pathways (RCP), designed to simulate more realistically the future path of emissions of carbon dioxide and other greenhouse gases throughout the 21st century. From time series of atmosphere-ocean models that adopt these parameters, we calculate the impact on the excitations for length of day and polar motion through the course of the current century, and hence portions of the expected changes in the ERP's due to the atmosphere. We diagnose the most important geographic areas as regional sources of such variations; earlier such models revealed the particular importance of resulting relevant wind changes in the upper atmosphere of the middle latitudes and the southern hemisphere high latitudes. The spread among the RCP scenarios and among a number of different models gives us an understanding of possible uncertainties in the estimates. Earlier calculations were for the 20th and 21st centuries with less sophisticated greenhouse gas concentration scenarios. We can compare the Earth rotation excitations from the retrospective portions of the model-based estimates with atmospheric reanalyses that are in archives at the IERS Special Bureau for the Atmosphere.