



Versions of two global climate models used by the IPCC, the National Center for Atmospheric Research (NCAR) CCSM2 and the Canadian Centre for Climate Modeling and Analysis (CCCma) CGCM3, have very different climate sensitivities. For both models, a local feedback parameter field L (defined as the change in net top-of-atmosphere radiative flux per unit change in surface temperature) was diagnosed, and L was decomposed into components associated with shortwave and longwave radiative processes and in terms of cloud-free atmosphere-surface feedback and cloud feedback. This decomposition reveals that the most striking difference between the models arises from the different behaviors of the shortwave cloud (SC) component, the global mean being negative in the CCSM2, but positive in the CGCM3. Despite this difference, both models show a region of positive feedback in the tropical Pacific. In the Canadian model, the tropical Pacific L maximum is associated with an El Niño-like SST warming-pattern in the eastern Pacific; in the NCAR CCSM2, the strongest warming occurs in the western Pacific. The structure of the geographical pattern in each case is mainly attributable to the longwave cloud (LC) feedback.