

Decadal prediction in the Pacific

Gerald A. Meehl

Recent observational and modeling results have shown that peaks in the 11 year solar cycle produce a La Nina-like response in the tropical Pacific, with colder than normal SST anomalies in the equatorial eastern Pacific, enhanced rainfall in the ITCZ and SPCZ, and an associated teleconnection pattern over North America characterized by reduced rainfall over significant parts of the continent. This response to solar forcing argues strongly for including the 11 year solar cycle in decadal predictions for future climate.

Another prominent feature of Pacific climate is the Pacific Decadal Oscillation (PDO), sometimes known as the Interdecadal Pacific Oscillation (IPO). It is characterized as a dominant pattern of low frequency variability in the Pacific that is connected to climate anomalies around the Pacific rim. Thus it would be of interest for decadal climate prediction to be able to forecast the evolution of this pattern. In two different experimental configurations (five 20th century runs branched from a control run with ocean initial conditions separated by 20 years, and a 29 member ensemble branched from the end of a 20th century simulation and perturbed by atmospheric initial states from different days), about a third of the ensemble members qualitatively capture the time evolution of the IPO over the next 15 years or so, suggesting that for at least these ensemble members there could be some predictive skill for the IPO. However, the remaining ensemble members that do not reproduce the evolution of the IPO indicate an interesting science question regarding what determines which ensemble members are skillful and which are not.