



Understanding late Holocene climate transitions in the Pacific: Results from proxy-guided AGCM experiments

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A wide variety of proxy records from western North America indicate that the Medieval Climate Epoch (MCE) was marked by much drier than present conditions extending from northern Mexico, across California and into southern Oregon, while relatively wet conditions prevailed farther north. At the same time, marine proxy records indicate that sea surface temperatures (SSTs) were much cooler than in the modern record along the coast of central California and in the central equatorial Pacific during the MCE, and much warmer than present in the far western equatorial Pacific. The transition (approximately 1200-1600 AD) from the MCE into the Little Ice Age (LIA) saw a sharp and approximately contemporaneous reversal of the conditions described above. The tropical – extra-tropical teleconnections seen in the modern record suggest the hypothesis that the MCE-LIA climate transition in western North America resulted from the changes in tropical Pacific SSTs. We have performed proxy-guided experiments with atmospheric general circulation models (AGCMs) designed to test this hypothesis. In these ensemble experiments, SST anomaly patterns inferred for the MCE from the tropical Pacific proxy records were used as prescribed boundary forcing for the AGCMs. Model results obtained to date are consistent with the hypothesized “tropical forcing” mechanism for the MCE-LIA climate transition in western North America. These results will be presented and discussed, along with those from ongoing sensitivity experiments.