Significant Modulation of Variability and Projected Change in California Winter Precipitation by Extratropical Cyclone Activity

Edmund Chang  
(Stony Brook University, New York)

Abstract

Extratropical cyclones give rise to much of the precipitation over California. Observed California winter precipitation is highly correlated to a metric of extratropical cyclone activity over the Eastern Pacific. The lack of precipitation over the past 3 winters is coincident with three consecutive winters of much below average cyclone activity. Analysis of variability in cyclone activity and California precipitation simulated by models participating in Coupled Model Intercomparison Project phase 5 indicates that most models can simulate the relationship between cyclone activity and precipitation well. Examination of projected change suggests 1) no evidence of a long-term downward trend in California-region cyclone activity within the examined scenarios; and 2) that the inter-model spread in California precipitation projection can be largely explained by the spread in the projection of extratropical cyclone activity. This highlights the need to further understand physical mechanisms for the variation in projection of cyclone activity in this region.