

**Title: On the causes and underlying dynamics of the early twentieth century North American pluvial**

**Authors: Benjamin I Cook, Richard Seager, Ron L Miller**

**Abstract:** The early twentieth century North American pluvial (1905-1917) was one of the most extreme wet periods of the last five hundred years and directly led to overly-generous water use policies in the water limited American West. Here we examine the underlying causes of the pluvial event and determine the future likelihood of occurrence. The character of the pluvial moisture surpluses differed by region, driven alternatively by increased winter precipitation (the southwest), cool summer temperatures (the central plains), or a combination of the two (the Pacific northwest). Cool temperature anomalies over North America were part of a global and hemispheric period of cooler temperatures. Anomalous subsidence over central North America acted to suppress precipitation during this season, while a high frequency of El Nino events and cold central Pacific sea surface temperatures set up circulation patterns favorable for moisture advection into the southwest. In sum, conditions during the pluvial represented a 'perfect storm' of conditions that allowed this period to experience largely unprecedented moisture surpluses, at least within the context of the last five hundred years.