

The Dust Bowl as an analogue for North American megadroughts during the Medieval Climate Anomaly

Benjamin Cook[†]; Ron Miller; Richard Seager

[†] NASA GISS, USA

Leading author: bc9z@ldeo.columbia.edu

During the Medieval Climate Anomaly (MCA), North America experienced severe drought, vegetation mortality, and dune mobilization at levels largely unprecedented during the modern observational era. One instrumental era drought, the Dust Bowl (1932-1939), experienced similar, although human caused, land surface degradation, and may provide key clues to processes underlying the MCA megadroughts. Using a new ensemble of high resolution climate model simulations (at one degree horizontal resolution), we investigate the impact of 1) vegetation, 2) dust aerosols, and 3) sea surface temperatures on precipitation and temperature anomalies during the Dust Bowl drought. Constrained by observations, results from these simulations will be used to calculate the magnitude of forcing from these three factors that would be required to sustain and exacerbate droughts during the megadroughts during the MCA. Results will highlight the interactive role played by the land surface, aerosols, and sea surface temperatures in modulating North American hydroclimatic variability.