Geophysical Research Abstracts
Vol. 20, EGU2018-11593, 2018
EGU General Assembly 2018

Climatological Occurrence and Projected Changes of Cold-Shore Days along the Eastern Coast of the United States

Colin Raymond
Columbia University, Earth and Environmental Sciences, New York, United States (cr2630@columbia.edu)

During periods of extreme heat, cooler temperatures along the coast provide a measure of relief for residents as well as for visitors from nearby urban areas. This research examines the characteristics of and projected changes in these “cold-shore days” for inland hot days along the Atlantic and Gulf coasts of the United States. Using gridded 4-km temperature data, a strong seasonal cycle of cold-shore-day occurrence is found, with increasing amplitude at higher latitudes. In accordance, the magnitude of the coastal-inland temperature difference is found to be larger in regions with cooler SSTs. Composites of the co-occurring atmospheric states are constructed for cold-shore days versus hot-but-non-cold-shore days, and significant differences are found especially in the associated z500 patterns, with the details differing among the eight regions examined. Application of machine-learning techniques allows for identification of predictors that can parameterize cold-shore-day occurrence for each region. Two particularly important predictors are the strength of the westerly wind at 850 hPa, and the size of the local SST-to-inland temperature gradient. These predictors are in turn applied to CMIP5 model projections, with the end result that cold-shore days may modestly increase in frequency under climate change throughout the study region. Using our methodology, the increase is especially large in parts of the Gulf Coast due to increasing land-ocean temperature contrast. This research represents a first effort to parameterize this important phenomenon and to obtain regionally specific estimates of changes to it in a computationally efficient way.