



Statistical Downscaling of a surface wind field over northeastern North America: annual to centennial variability.

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The region of North Eastern North America is located in a privileged geographical position that allows for interesting relationships between various large-scale circulation modes and the seasonal surface wind. This is a region where the large-scale configurations foster the transit of tropical cyclonic events during the summer season and even more intense extratropical cyclones during winter.

In this work we present a statistical downscaling method based on Canonical Correlation Analysis (CCA) that exploits the relationships among the main modes of circulation over the North Atlantic and Pacific Sectors and the behaviour of surface wind. The statistical technique has been implemented with predictor variables (mean sea level pressure and geopotential height at different levels) provided by all the reanalysis products available to date. The regional scale data consist of a set of 526 sites distributed over North Eastern North America that span over a period of about 60 years (1953-2010). These data have been previously subjected to an exhaustive quality control process, height standardization and wind direction homogenization. Several decades of observations allow for the study of intra to multidecadal variability. Also, the sensitivity of the downscaling methodology to the selection of a systematic sampling of model parameter values has been explored.

The statistical relationship obtained by this method also allows for the reconstruction of the regional wind behaviour back to the mid 19th century through various 20th century reanalysis and instrumental sea level pressure datasets.