Session: B1 Oral presentation

The influence of low-frequency variability on the life cycles of high-impact weather during the winters of 2009-2011: simulations, predictions and observations

Joseph Tribbia [†]; Mel Shapiro
[†] NCAR, USA
Leading author: tribbia@ucar.edu

It has been widely noted that the anomalously extreme weather events of the recent winter seasons coincided with large-amplitude sub-seasonal to seasonal anomalies, particularly in the arctic modes of variability, i.e., Northern Annular Mode and North Atlantic Oscillation. We hypothesize that these low-frequency variations were sufficient to alter the breaking†behavior of the extratropical storm-track synoptic eddies and their internal weather characteristics. Simmons and Hoskins (1976) were first to perform idealized numerical experiments to demonstrating that the life cycle of extratropical cyclones can be modulated by their background environment, leading to a distinction between cyclonic and anticyclonic wave breaking at the tropopause and surface cyclone structure.† Subsequent studies, e.g., Shapiro and collaborators, revealed that this characterization is valid in both idealized studies, observations and numerical forecasts. The present study uses the current version of the NCAR CCSM in a hierarchy of† configurations ranging from idealized dynamical experiments to full-physics, global mesoscale resolution forecasts, to address the relevance of the low-frequency flow anomalies on the events of the recent winters.