Ensemble Prediction of Atmospheric Refractivity Conditions for EM Propagation

Qingyun Zhao*[1], Tracy Haack[1], Ted Rogers[2], Neil Gordon[2], and Ian Will[3]
[1]Marina Meteorology Division, Naval Research Laboratory, Monterey, CA
[2]SPAWAR Systems Center, San Diego, CA
[3]Tactical Electronic Warfare Division, Naval Research Laboratory, Washington DC

Abstract

An ensemble forecast system has been developed at the Naval Research Laboratory to improve the analyses and forecasts of the atmospheric refractivity conditions for EM propagation with the capability of fully accounting for the uncertainties in model forecasts. Algorithms for a matrix of ensemble statistics have also been developed to analyze the occurrence, location, intensity, and structure of ducting of various types. Major features of ducting layers and their ensemble statistics are calculated from the ensemble forecasts and their relationships to the large scale and mesoscale environment are also investigated. The Wallops-2000 MPME field experiment, conducted in late April to early May 2000, is selected as a valuable dataset to test the system. This region off the U.S. east coast is where the boundary between land and the coastal shelf waters and the Gulf Stream all have a strong influence on marine boundary layer structures and the formation of ducting layers over water. Soundings, buoy data and other *in-situ* observations during the field experiment are used in the study to further understand the formation and structures of the ducting layers and also to validate the ensemble forecast system. Interesting results from the experiments will be presented and discussed at the conference.