

## **Updates and Validation for the Navy Atmospheric Vertical Surface Layer Model (NAVSLaM)**

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The Navy Atmospheric Vertical Surface Layer Model (NAVSLaM) is widely used within the U.S. Navy and Department of Defense as a standard model for characterizing surface layer refractivity over the ocean, including the important evaporation duct. NAVSLaM is used both with in situ measured data and forecasted data from numerical weather prediction (NWP) models. NAVSLaM has also been used to construct evaporation duct climatology datasets. The behavior and performance of NAVSLaM is highly dependent upon certain physical parameterizations used within the model. In this presentation the use of various dimensionless profile functions for air temperature, humidity and wind speed will be evaluated and validated. Different forms of these functions are used in unstable (the air cooler than the underlying sea surface) and stable (the air warmer than the underlying sea surface) conditions. In the past, it has been common to use blended forms of the profile functions that attempt to better characterize both weak and strong unstable and stable regimes. This blending may produce unrealistic profile functions if not performed carefully and therefore the methods used and the need for blending will be examined in this presentation. The performance of NAVSLaM when using different blended and unblended profile functions and other parameterizations will be validated with measured atmospheric and propagation data from recent at-sea experiments. Lastly, the latest version of NAVSLaM to be developed will also characterize the surface layer vertical profiles of the refractive index structure parameter ( $C_n^2$ ), and a brief overview of this aspect of the model will also be presented.