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A PHYSICALLY-BASED AMBIGUITY REMOVAL SCHEME FOR SCATTEROMETER WINDS

by

Young-Joon Kim (Young-Joon.Kim@jpl.nasa.gov)
Carol S. Hsu, Kyung S. Pak, Philip S. Callahan

Jet Propulsion Laboratory
4800 Oak Grove Drive, Pasadena, CA 91109-8099

A new approach, which uses physically-based planetary boundary layer (PBL) models, is proposed for removing the ambiguity of the overdetermined wind direction processed from the scatterometer wind data.

This approach is based on the fact that sea level pressure is a scalar quantity and its field is more coherent than corresponding wind field, and that the measurement errors of sea level pressure are small compared with those of wind vectors. The wind field from the scatterometer data is first used to derive the pressure field by using a PBL model. After proper filtering or smoothing of the noise in the derived pressure field, the wind field is retrieved by using an Ekman layer model. This derived wind information is then used to perform the ambiguity selection processing.

We have developed a scheme to apply this approach to scatterometer swath wind data by modifying and coupling the PBL model by Brown and Liu and the Ekman layer model by T.- W. Yu.

We expect that the ambiguity removal skill of the SeaWinds algorithm will be improved when our scheme is properly used in conjunction with the median filter currently used in the scatterometer wind dealiasing. Moreover, we believe that our methodology will eventually remove the dependency of the SeaWinds algorithm on an external input, i.e., numerical weather prediction (NWP) model products. Some frequently occurring phenomena such as storms and mesoscale systems have been proven difficult for NWP models to resolve. This undesirably leads to the fact that the performance of the ambiguity removal algorithm cannot be better than that of the NWP model.

In the meeting, we will present the methodology along with some preliminary results obtained from our new algorithm.