

TOWARD IMPROVED USE OF GOES SATELLITE-DERIVED WINDS AT THE NCEP ENVIRONMENTAL MODELLING CENTER

Xiujuan Su¹, John Derber², Steve Lord², Christopher S. Velden³

1. General Science Corporation

2. Environmental Modelling Center, NCEP

3. Cooperative Institute for Meteorological Satellite Studies

1,2:EMC/NOAA, 5200 Auth Rd., Camp Springs, MD 20742 USA

3:UMCIMSS, 1225 West Dayton St., Madison, WI 53706 USA

ABSTRACT

There are two types of GOES satellite derived winds which are now used operationally at NCEP. They are cloud-drift and cloud-top water vapor winds. These winds provide valuable information for numerical model initialization over regions where conventional observations are not available. However, inaccurate wind data have the potential to degrade the quality of model forecasts. Previous experiments have shown that forecast impacts from satellite derived winds are minor. Therefore, more work needs to be done in order maximize the impacts of utilizing these winds. In order to do this, a three step approach is planned.

The first step is to examine the satellite derived winds, including the quality indicators such as the recursive filter flag (RFF) developed by Cooperative Institute for Meteorological Satellite Studies (CIMSS) and the quality indicator (QI) developed by European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). Some relationships which need to be studied are how QI, RFF vary in relation to differences between satellite derived winds and model winds; between satellite winds and conventional wind measurements, such as radiosondes and aircraft; and between model guess and satellite derived winds. The guess fields used in the derived satellite winds algorithm are compared with our model guess field. Winds at different heights determined by different height assignment methods, will be investigated. After this step, we hope to develop other indicators besides quality mark RFF and QI for filtering derived satellite winds into analysis system. The second step focuses on the studying the impacts of satellite derived winds on our model forecasts. The impact study experiments include the different wind inputs by different RFF, QI values and the indicators developed by our study. Some case studies on storms and jet streams are chosen for the derived satellite wind impacts. As a third step, any revealed weaknesses in our data assimilation system for derived satellite will be improved.