SESSION II

Mesoscale Applications

Chairperson: Xu Jianmin

The second session provided four papers.
In the first paper presented by Rabin, the CIMSS water vapor wind algorithm is applied in real time at 30-minute intervals over the U. S. Objective analysis of kinematic wind properties at 300 hPa (divergence, vorticity) was examined for a variety of convective and winter storm events. Results show a consistent relation between high level divergence and evolution of precipitation in winter storms. Significant vorticity or divergence perturbations do not always precede (however emerge with) development of MCS. Convection persisting for several hours is associated with high level divergence on scales of 200 km or more. Finally MCS development occurs in the vicinity of upper level ridges near minimum in absolute vorticity.

In the first part of the second paper presented by Mecikalsky demonstrated several real time diagnostics, based heavily on the processing of geostationary satellite data that may be used to predict tropical cyclone intensity and intensity changes. The presented diagnosis help to assess interactions of storm outflow with upper tropospheric potential vorticity fields and the formation of synoptic scale outflow corridors for tropical cyclones. The second part of the presentation outlined a method for estimating deep troposphere convective momentum fluxes, by combining 10-meter wind data from the NASA/JPL Sea Winds Scatterometer aboard the Quick Scatterometer (QuickSCAT) satellite, intercloud winds derived from Tropical Rainfall Measuring Mission's Precipitation Radar (TRMM PR) data, and GOES derived cloud motion wind information. Both subjects address the opportunity to use GOES cloud motion winds to understand mesoscale processes associated with convective system across the tropics.

The third paper presented by Schmetz uses frequent water vapor winds to study the diurnal cycle of the upper level divergence of the deep convective system. Results from a deep convective system over central Africa show consistency with the well-known diurnal cycle of deep convective clouds. The phase relationship between the cloud development and observed divergence fields is analyzed. Potential applications and limitations are discussed.

The fourth paper by Soden presents the fourth paper presented a study to seek better understanding of the evolution of cirrus clouds and their impact on the radiative and moisture budgets of the upper troposphere by utilizing of the tracking capabilities of geostationary satellites. Lagrangian composites of cirrus cloud properties are constructed by objectively tracking radiance patterns from successive geostationary images of in the 11 and 6.7 μm bands. The evolution of the cirrus cloud cover and their impact on the upper tropospheric humidity are diagnosed and compared to that predicted from a high-resolution cloud resolving model integration under various parameter settings. Surface based Lidar measurements from the ARM tropical western Pacific field side are also combined with the satellite tracked clouds to help characterize the evolution of cirrus vertical structure and cloud optical properties.

Xu Jianmin, Chairperson of Session II
National Satellite Meteorological Center, Beijing