REPORT OF THE CHAIRPERSON OF SESSION V AND THE MODIS BREAK-OUT WORKING GROUP: POLAR WINDS

Chairperson: C. Velden

The session began with a project status by Dave Santek (CIMSS) on the production of polar winds from MODIS. Real-time demonstrational datasets are now being produced over both polar regions at both CIMSS and NOAA/NESDIS/ORA. Operational production has commenced at NESDIS as well, as they are routinely generating the MODIS winds from Terra & Aqua and distributing them in BUFR format onto their ftp server for interested users. The NESDIS datasets use the GFS forecast fields and have shown improved performance results. CIMSS is now also using the GFS fields. Corrections for parallax effects have been tested at CIMSS and are being implemented into the polar winds tracking code.

Jeff Key (NOAA/NESDIS) followed this talk with a presentation on some of the important issues that are affecting the quality of the MODIS winds. Wind vector height assignment methods were examined in terms of their applicability in the polar regions. Some of assumptions of the methods are invalid at high latitudes, and some of the limitations are amplified. The following recommendations were made:

- CO2-slicing should not be used for clouds below (in altitude) 700 hPa. Surface temperatures used in radiative transfer calculations need to be carefully evaluated.
- Surface emission in the dry polar atmosphere will complicate H2O height assignment in clear sky conditions. An estimate of total precipitable water could be used to avoid situations where this is a problem, or surface emission could be removed from the measured radiance.
- For the IR window method, cloud optical depth should be estimated and the cloud temperature should be adjusted for the transmission of radiation from below the cloud.

Regarding MODIS polar winds, the use of additional spectral channels might benefit not only height assignment, but also the labeling of cloudy pixels and the identification of thin clouds.

The remainder of the session focused on presentations from the MODIS winds user community; specifically, the NWP centers that are evaluating the datasets. Almost all of the centers found that the quality of the NESDIS winds were superior to the datasets being produced at CIMSS, as was expected. Alexander Cress (DWD) reported good model forecast impact in both hemispheres in their respective Spring seasons, and neutral in their respective Autumn seasons. Lueder von Bremen (ECMWF) reported positive impact using the NESDIS winds in the tropics and Southern Hemisphere (SH). ECMWF has switched to the NESDIS product for their operational assimilation. Masahiro Kazumori (JMA) presented results that showed positive impact of the MODIS winds on JMA model forecasts in the Northern Hemisphere (NH), and neutral elsewhere. He also showed positive impact on tropical cyclone forecast tracks. Mary Forsythe (Met Office) found positive impact with the NESDIS winds in the NH, and neutral in the SH. It was noted that the stringent data assimilation blacklisting invoked by the Met Office might be relaxed given the new positive results. They expect the MODIS winds to be operational by around the end of 2004. Lars Peter Riishojaard (NASA-GMAO) reported on the impact experiments using the GMAO data assimilation and forecast system. Positive impact was noted with both the NESDIS and CIMSS datasets: more with the NESDIS winds. They also noted that using the datasets from both Terra and Aqua was better than assimilating winds from one satellite alone. Last but not least, Real Sarrazin (CMC) also reported on positive impact on the Canadian global forecast system, more so in the SH. Since the workshop, John LeMarshall (NCEP/JCSDA) has reported significant positive impact of the MODIS winds on the NCEP global forecast system. Plans for operational assimilation are underway.

The session was followed the next day by a special working group breakout session. During this WG meeting, issues were discussed in regards to conducting a second MODIS winds special acquisition period (MOWSAP II) to complement the first MOWSAP and evaluate the NH summer period. All assimilation centers agreed to take part in this MOWSAP II during July and August 2004. It was also agreed that NESDIS would become the primary site for retrieving real time MODIS winds, and that CIMSS would continue to process winds, but with experimental/demonstrational code upgrades allowed. For example, the CIMSS product will include a correction for parallax. Also, datasets derived from a combination of Terra and Aqua satellite passes will be tested at CIMSS. Upon successful demonstration, the code upgrades will be made available to Jaime Daniels (NESDIS/ORA), for eventual implementation into the NESDIS operational production code. A final, important issue brought up was the timeliness of the real time MODIS data for operational assimilation by the global NWP centers. Most centers have in place a data cutoff in the 2-3 hour timeframe after synoptic time. Longer thresholds exist (5-7 hrs) for the run that uses data for the background forecast for the next model cycle. Since the MODIS data being received at NASA (and processed by CIMSS/NESDIS) is delayed by 2-7 hours, most of the winds are not getting into the real time direct model cycles. Efforts to acquire the data via several direct broadcast (DB) sites are underway. It is hoped that at least some of the possible DB sites can be providing MODIS real time data for winds processing by sometime in 2005.

Finally, Lars Peter Riishojgaard gave a special presentation on a proposed new satellite that could lead to good winds coverage over the NH polar regions during the expected time gap in water vapor channel coverage between the MODIS on current satellites and the VIIRS-3/4 instruments anticipated on polar-orbiting satellites ~10 years from now. The proposed satellite would be part of NASA's Earth System Science Pathfinder Program, and operate in a Molniya orbit, hovering near geostationary about 2/3 of the time. As of the time of this writing, the imaging channels, sampling times, and instrument precision specifications are still being negotiated.