Summary of Session 3: Polar Winds

The Polar Winds session was comprised of six presentations describing the status of current polar winds products, new product development using heritage and new sensors, potential products with future sensors, and various aspects of impacts on numerical weather prediction.

**Jeff Key** (NOAA) began the session with a description of a polar wind product using the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument on the Suomi National Polar-orbiting Partnership (NPP) satellite. NPP was launched in October 2011. The unique characteristics of VIIRS that are expected to have an impact on a VIIRS wind product include: higher resolution (750 m for most bands; 375 m for some), a wider swath, constrained pixel growth (better resolution at edge of swath), and a day-night band (DNB). Unfortunately, VIIRS will not have a thermal water vapor band, so clear-sky winds will not be retrieved. For VIIRS polar winds, the new nested tracking GOES-R algorithm will be employed. The product is expected to be operational in October 2012.

**Ken Homlund** (EUMETSAT) discussed the possibility of a wind product using AVHRR data from Metop-A and the near-future Metop-B. These two satellites will be the same orbit roughly 48 minutes apart, providing approximately half-a-swath overlap at the equator and greater overlap in the high latitudes. A global wind product is therefore possible. The product would help fill the 60-70 degree latitude gap between polar and geostationary wind products, and could be used for cross-validation of high- and mid-latitude atmospheric motion vectors.

**Greg Dew** (EUMETSAT) presented the current status and future plans for AVHRR polar winds products at EUMETSAT. The Metop-A AVHRR product has been operational since early 2011. Many changes have been made to the processing system since IWW10 (February 2010). Notably, co-located InfraRed Atmospheric Sounding Interferometer (IASI) cloud top height information is used, when available, to improve wind vector height assignment, and corrections are made for image parallax. Additional improvements are planned. The EUMETSAT AVHRR Polar Winds processor has been prepared for use with Metop-B, and will be able to generate winds from the two Metop satellites (as discussed by K. Homlund).

The impact of a new LEO-GEO polar winds product on forecasts was described by **Brett Hoover** (CIMSS/University of Wisconsin). To help fill the 60-70 degree latitude gap between current polar and geostationary wind products, and in preparation for the higher-resolution GOES-R Advanced Baseline Imager (ABI), winds are derived from a composite of multiple polar-orbiting and geostationary imagers. A 12-week (May-July) impact experiment was performed using NCEP’s GDAS/GFS (Global Data Assimilation System/Global Forecast System). Results showed a positive impact in the Southern Hemisphere, with the greatest improvement in the dynamical jetstream region.

The discussion of polar winds impacts continued with a presentation by **Dave Santek** (CIMSS) on the use of the expected error (EE) in quality control. Until recently, no error estimate was provided with the polar wind data, so numerical weather prediction (NWP) centers rely on quality flags assigned to each wind vector. The EE combines a variety of parameters to provide an error estimate in units of speed. A series of experiments were performed where MODIS winds were assimilated in the GDAS/GFS for various EE selection criteria. It was found that observation-minus-background and observation-minus-analysis statistics were similar to the current quality control methods, but there is evidence that worst cases are improved using the EE criteria.

The Canadian Space Agency’s (CSA) planned Polar Communications and Weather (PCW) satellite mission will put two satellites in highly elliptical orbits (HEO) over the Arctic for communication and meteorological purposes. Imagery will cover the entire circumpolar area from 50°N to the pole every 15 minutes at 2-3 km spatial resolution using an imager similar to the ABI.
Louis Garand (Environment Canada) presented the results of an Observing System Simulation Experiment (OSSE) to evaluate the impact of PCW winds. The HEO winds were extracted from simulated imagery at the model cloud top every six hours. The OSSE showed a clear positive impact from the HEO winds up to three days. The overall conclusion is that filling the 50-70 °N wind gap, a key baroclinic area, is beneficial for the entire 20-90 °N region.

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