**Investigating AMV and NWP model errors using the NWP SAF monitoring**

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Abstract

The NWP SAF (Satellite Application Facility for Numerical Weather Prediction) is a EUMETSAT-funded activity that exists to co-ordinate research and development efforts among the SAF partners to improve the interface between satellite data and NWP for the benefit of EUMETSAT member states.

The main aim of the NWP SAF atmospheric motion vector (AMV) monitoring is to improve our understanding of AMV error characteristics in order to aid improvements to the AMV derivation and their treatment in NWP models. One of the ways this can be achieved is via long term monitoring of trends and patterns in observed minus background (O-B) statistics. The AMV wind retrievals are compared with short-range forecasts from a numerical weather prediction (NWP) model, valid at the same time and location of the observation. The NWP SAF maintains an archive of O-B statistics against both the Met Office and ECMWF global model backgrounds, providing a framework in which we can attempt to separate error contributions. Differences between centres suggest model-dependent problems whereas similarities suggest either problems with the AMVs or problems shared by the NWP models.

The NWP SAF O-B monitoring hosts a wealth of information for different satellites, channels and AMV producers and to exploit this resource requires a comprehensive and thorough investigation. This is where the AMV *analysis reports* come in. These reports, published very 2 years, attempt to summarise the main features identified in the O-B monitoring and record how they have evolved over time as updates are made to the AMV derivation and the NWP systems. Where possible, an attempt is made to diagnose the cause of the observed bias using tools such as model best-fit pressure and comparison to other wind and cloud top height products. This talk will highlight some interesting features from the 6th AMV analysis report published in early 2014.

**AMV impact studies at the Met Office**

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Abstract

Atmospheric motion vectors (AMVs) derived from polar and geostationary satellite imagery provide tropospheric wind information with near-global coverage, at a high temporal frequency, and so are an important input to numerical weather prediction (NWP) analyses. This talk gives an overview of the status of AMV assimilation at the Met Office and efforts to diagnose and improve their impact in NWP.

A significant change in the use of AMVs at the Met Office has been the implementation of a temporal thinning scheme which, combined with a better handling of observation errors, has allowed the observations to be used at a far greater density. The overall impact of all observations within the Met Office NWP system has been diagnosed using the adjoint forecast-sensitivity to observations (FSO) technique and a substantial improvement has been observed in the impact of the AMVs on short range forecasts as a result of recent changes.

Further impact studies have been conducted at the Met Office to assess the potential of AMV datasets that are not currently assimilated in operations. The quality and impact of AMVs derived from the Chinese FY-2E satellite have been compared with those from Meteosat-7 as part of an investigation of winds providing coverage over the Indian Ocean. The Metop AVHRR wind products from EUMETSAT have the potential to improve coverage at mid-high latitudes. A set of polar wind impact experiments have been performed to compare the Metop wind products from CIMSS and EUMETSAT.

There have also been significant updates to AMV data sets currently used in operations. The EUMETSAT Meteosat Second Generation (MSG) AMV processing was updated to make use of the Cross Correlation Contribution (CCC) method bringing some significant improvements to the quality of the MSG winds. However, the statistics for the low level winds were slightly degraded. Results will be shown from efforts to establish the full impact of the CCC change and the subsequent update implemented by EUMETSAT.