

NWP-SAF Science plan for deliverable D2.3

Integrated monitoring and tuning reports

This documentation was developed within the context of the EUMETSAT Satellite Application Facility on Numerical Weather Prediction (NWP SAF), under the Cooperation Agreement dated 25 November 1998, between EUMETSAT and the Met Office, UK, by one or more partners within the NWP SAF. The partners in the NWP SAF are the Met Office, ECMWF, KNMI and Météo France.

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Change record			
Version	Date	Author / changed by	Remarks
1.0	15.3.00	S J English	Baseline document
2.0	23.10.00	S J English	Section 4.2 (med/long term plans) extended
3.0	6.7.01	S J English	Section 4 brought up to date
3.1	21.11.01	B J Conway	Web references updated
3.2	8.10.02	S J English	Updated for Y4-5

1. Rationale and outline description

1.1 Objective

The quality of ATOVS data (and indeed any observation) for use in Numerical Weather Prediction (NWP) assimilation systems is monitored by NWP centres by examining the differences between the observed values and values calculated from short range NWP model forecasts. Differences are usually small. It can be difficult to determine whether a change arises from a change in the observations or a change in the characteristics of the short range forecast. Equally large systematic differences (e.g. biases) may arise from the observations or the model. There is a need for NWP centres to exchange monitoring information in order to locate the source of a change or a systematic bias. This is most effectively achieved by placing unified monitoring reports on the Internet. In the short term useful information can be obtained by unifying some features (e.g. showing the same quantities for the same areas) and providing hypertext links between different centres' monitoring web pages. The objective is to provide some benefits in the short term by monitoring the same things whilst working towards unified monitoring in the longer term. This is of benefit to any user of ATOVS data.

1.2 Situation at the start of SAF development

NWP centres in Europe were monitoring incoming data for their own purposes only. ECMWF and the Met Office, UK, were producing time series of the mean difference between the observed brightness temperatures and those calculated from the NWP model short range forecast for different regions. The standard deviation of the differences was also plotted. Météo France were plotting similar differences for locally received brightness temperatures against values calculated from collocated radiosondes. The Met Office were producing similar monthly datasets of global and local area radiosonde collocations. None of these monitoring plots were being placed on any external internet site although the Met Office plots were distributed monthly in a "TOVS Monitoring Report". Data coverage plots were being produced at ECMWF and the Met Office for internal use.

1.3 Deficiencies of the initial situation

- No monitoring information was being placed on the Internet
- Monitoring was for different areas
- Monitoring was for different quantities (e.g. all data or just clear air data)
- The monitoring information was displayed in different ways making comparison difficult.

1.4 Description of the deliverable up to the present (July 2001)

Year 1: The Met Office placed monthly monitoring on the Internet. (This is for non-real time use and is not necessarily kept up to date.)

The ECMWF placed data coverage plots on the Internet.

Year 2: The Met Office, ECMWF and Météo France (Lannion) put real time ATOVS monitoring plots on the Internet. The Météo France site monitors local area data whilst the ECMWF and Met Office sites monitor global data for the regions 90N-70N, 70N-20N, 20N-20S, 20S-70S, 70S-90S. In addition Met Office data coverage plots equivalent to those already being produced by ECMWF were placed on the internet. The Met Office has also supplied details on which data has been rejected by the data assimilation system and why.

Year 3: A single site has been setup on the NWP SAF website giving links to all NWP SAF monitoring reports (Météo France, ECMWF, Met Office) and links to other non-SAF monitoring reports (NESDIS, NCEP). (See <http://www.metoffice.com/research/interproj/nwpsaf/atovs>)

1.5 Means of distribution

Internet.

2. Scientific approach

The main requirement is to ensure that the data monitoring information is easily compared so that users of the site can quickly determine if there is likely to be a change in the data quality which might be a concern to them. To this end it has been agreed to adopt the ECMWF internal monitoring format. This will be achieved by producing daily time series of the mean and standard deviation of the difference between observed and calculated brightness temperatures for each channel for the regions listed in section 1. In addition data coverage plots will be shown so that the user can determine whether the data being analysed are the same.

When a user of such data sees an apparent change in their system the first priority is to determine whether the change is a change in the incoming data or a change in their system. This is most easily determined by examining whether other centres using the data have seen the same change. This can only be achieved if centres provide real time data monitoring showing the same quantities displayed in a very similar manner (ideally identically). Initially there will be subtle differences. ECMWF will plot mean and observation \pm one standard deviation as three curves. Met Office will plot standard deviation and mean difference as two curves. The plots will be shown for the same regions as currently used by ECMWF. The Met Office site will further subdivide the data into: sea, land, sea-ice, all observations, all assimilated observations.

The plots will cover a period of approximately two months to allow changes to be placed in context.

One risk of monitoring solely against short range forecasts from NWP models is that the short range forecasts from ECMWF and the Met Office might change due to a change in the global observing network (e.g. temporary loss of a key data type). Therefore it is important to have a completely independent real time monitoring. This will be provided by Météo France at Lannion placing results of real-time monitoring against radiosondes on the internet.

3. Technical description of the deliverable

Web pages will be produced with hypertext links to gif files which will display the information.

4. Development strategy

4.1 Year 4 (Mar 2002 - Feb 2003) developments.

Update for new launches, and add links to new sites to NWP SAF sites.

4.2 Major developments expected for Y5 (Mar 2003 - Feb 2004)

4.2.1 Further integration of plots to produce as close a match in format as possible. Ideally the same software will be used to produce all plots which are showing the same information so that plots are very easily compared.

4.2.2 Response to user requests. Feedback on the plots may point to a user requirement for a new monitoring plot which the centres should add.

4.2.3 Handling of new satellite launches. Currently NOAA-15 and NOAA-16 are monitored. NOAA-M will be added in due course.

4.2.4 Adaptation for METOP. The AMSU-A , MHS and HIRS on METOP will be monitored after launch.

4.2.5 Information will be added on bias adjustment uncertainties, observation errors assumed and radiative transfer model used to generate the monitoring plots.

4.2.6 Detailed guidance will be provided on options for bias correction. Global scan dependent bias corrections will be added to the monitoring page and a report will be written and placed on the web site which introduces many different options for bias correction.

4.3 Validation plans

The monitoring plots on the external sites will be regularly compared with internal plots to ensure consistency. A contact address will be added to the external page for users to contact if there is a problem.

Plan last updated 8 October 2002 by Steve English (steve.senglish@metoffice.com).