STATUS OF ARCHIVE DATA REPROCESSING AT EUMETSAT

This document reports on the status of archived data reprocessing activities by EUMETSAT, and responds to CGMS Action 28.31.

CGMS Members are invited to take note.

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1 INTRODUCTION

This paper provides a status report on the Archive Data Reprocessing Project carried out by EUMETSAT over recent years.

2 PROJECT PLAN

The project has been divided into several phases:

- Establishment of a reprocessing system environment. This phase was completed in early 1999.

- Pilot reprocessing of Meteosat Surface Albedo for 1996 (Meteosat-5). The production of this pilot product was completed in August 1999, and the product made available to beta-testers.

- Operational reprocessing of wind products from 1981-1989 (Meteosat-2) in support of the ECMWF 40-year re-analysis project. This phase is ongoing.

- Upgrade the hardware of the reprocessing system in order to produce albedo products for Meteosat-5 Indian Ocean Data Coverage (IODC) images alongside wind product reprocessing in support of the ERA-40 Reprocessing Project. Additionally, upgrade of the Meteosat Surface Albedo algorithm to remove bias, thus enabling inter-annual comparisons. This phase will last from July 2001 till November 2001.

- Operational reprocessing of surface albedo products from 2001 (Meteosat-5 IODC). This phase will run from December 2001 till April 2002.

- A feasibility study concerning the possibilities for reprocessing surface albedo products from the pre-operational series of Meteosat spacecraft (Meteosat-2 and Meteosat-3) is foreseen in 2002.

3 REPROCESSING OF WINDS FROM METEOSAT-2 (1981-1989) IN SUPPORT OF THE ECMWF 40-YEAR RE-ANALYSIS

3.1 Status

Preparations for the reprocessing of Meteosat-2 data started in 2000. The reprocessing software was validated successfully with recent Meteosat-7 data, and validation work started on Meteosat-2 data dating from October 1983.

The problems related to the very high level of instrument noise in the Meteosat-2 WV channel have been solved by reducing the Meteosat-2 6-bit data resolution to 5-bit resolution. This reduces the number of clusters extracted to an acceptable level and enables a realistic cluster classification and semi-transparency correction. As Meteosat-2 data characteristics were never considered in the design phase of the Meteorological Product Extraction Facility software, these problems required a significant amount of investigation.

The Expanded Low Resolution Wind (ELW) products for the October 1983 period have been delivered to ECMWF. Upon the request of ECMWF, a 6 week period starting on 1st July 1988 has been reprocessed, in order to allow ECMWF to better assess the quality of the ELW products, as this period has been reanalysed by ECMWF.

A problem concerning the geometric correction of the VIS-imagery was discovered during the quality assessments by ECMWF and EUMETSAT. After an upgrade of the geometric correction software, the wind products for this period were reprocessed again, and the improved products were delivered to ECMWF. As a consequence of the improved geometric correction, the quality of the High Resolution Visible (HRV) Wind product has improved, and these products are also now being offered to ECMWF for potential inclusion in the ERA-40 reprocessing.

3.2   Plans for 2001 and 2002

Because of the additional request from ECMWF for another validation period (July 1988), it was not possible to start the operational reprocessing of Meteosat-2 data in April 2001. The actual start of the operational Meteosat-2 reprocessing was July 2001, and will last till August 2002. This schedule is still compatible with the schedule of the ECMWF 40-year reanalysis.

4   METEOSAT SURFACE ALBEDO PRODUCT

4.1   Status

The reprocessing of the Meteosat Surface Albedo from Meteosat-5 data from 1996 was performed as a pilot activity in 1999. The algorithm was coded by Space Applications Institute of the EU's Joint Research Centre, Ispra, Italy, and integrated into the reprocessing system with limited additional EUMETSAT effort. The reprocessing of 1996 was conducted in the period April-August 1999, and proved the reprocessing system concept.

The final set of albedo products (one product per 10 calendar days for the whole of 1996) has been delivered to a set of beta-testers to assess their usefulness primarily through simulations with Global Circulation Models (GCM). As of now, feedback has been received from the Max Planck Institute (MPI) in Hamburg, showing that the new albedo data set has brought GCM simulated precipitation over Northern Africa in much better agreement with observations. MPI suggested that a reprocessed Meteosat-5 IODC albedo product from 63°E would be of considerable interest for the simulation of the Indian Monsoon. MPI also indicated that reprocessing of Meteosat-2 data from the 80s could provide closer insight into the feedback mechanisms responsible for the Sahel drought in the 80s and subsequent transition to wet conditions. Discussions are also under way with ECMWF to evaluate the potential value of this product for their activities.

A second request from JRC has been received for reprocessing Meteosat image data to obtain albedo products for a period of five consecutive years, preferably 1992 to 1997. The beta-products from 1996 have been supplied. As the accuracy of the albedo products for inter-annual comparison might be not high enough, an upgrade of the albedo algorithm is envisaged. The surface albedo products are foreseen to be used to generate an initial climatology of surface and atmospheric variables for the region observed by Meteosat.

4.2   Plans for 2001 and 2002

The reprocessing of Surface Albedo from IODC Meteosat-5 data suggested by MPI would give a virtually complete test data set for the Eurasian/African region for assessment by beta-testers. The reprocessing is straightforward, as it exploits the existing system environment and uses the original algorithm delivered from JRC/SAI which is already tuned for use with Meteosat-5 data. Very importantly, the 2001 reprocessing can also be performed in parallel with the wind reprocessing for Meteosat-2. It is, therefore, planned to perform reprocessing of 2001 data to create an IODC albedo

data set, and distribute this to beta testers. The data set will be completely processed by the end of the first quarter of 2002.

In autumn 2001 it is envisaged to upgrade the albedo algorithm with support from the JRC, in order to eliminate a consistent bias in the albedo products. This bias needs to be removed when studying the inter-annual variability of the surface albedo and generating an initial climatology of surface albedo.

Regarding the suggestion of MPI to analyse the dry Sahel of the 80s, it is clear that the Meteosat-2 Surface Albedo could provide very important insight into climate feedback mechanisms over Africa. It is however also clear that the albedo accuracy required for this type of land-atmosphere feedback analysis and inter-annual variability detection is much higher than that achievable currently with Meteosat-2 data. Such a reprocessing activity, therefore, requires completion of a feasibility analysis, before a decision can be made.

5.   Conclusion

CGMS is invited to take note of the status of archive data reprocessing by EUMETSAT.