

EUMETSAT Headquarters, Darmstadt, Germany

Central Operations Report for the period July to December 2010





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The Central Operations Reports can be found under 'Service Status' on <u>www.eumetsat.int</u>



Introduction

Welcome to the report on EUMETSAT Central Operations for the second half of 2010.

This half-year saw good service availability in general, although two major problems occurred, one which impacted the Rapid-Scan Service and the other the general EUMETCast distribution of data and products. The first concerned the occurrence of a safemode on the Meteosat-8 satellite and the second involved the uplink equipment of the EUMETCast Dissemination System. More information is provided on slide 8 of this report.

The half-year saw some important enhancements in the third-party data services, see slides 49-50. In particular operational dissemination of global level 1 data from the microwave instruments on the Chinese FY-3A satellite was started on Dec 6. This is a very important result of the strategic cooperation between EUMETSAT and the China Meteorological Administration. In 2011 we are expecting also to provide services from the partner satellite FY-3B, successfully launched in November 2010.



Introduction (continued)

Preparatory activities for the forthcoming launches of the Metop-B and MSG-3 satellites (foreseen for April and June 2012 respectively) are making very good progress and the end of 2010 saw successful performance of the first phase of verification of the ground segment systems required to support MSG-3. A second phase will commence in April 2011, involving the use of a new antenna at the Usingen ground station, which will allow the support of 3 MSG satellites in parallel.

Very shortly before the end of 2010, the first Metop-A data from the McMurdo Sound station in the Antarctic was successfully received at EUMETSAT. This was an important milestone in preparing for the so-called demonstration phase to commence in May 2011. In this phase level 1 data from around 10 out of 14 orbits per day will be provided some 50-60 minutes earlier through the combined usage of McMurdo and the primary Svalbard station in the Arctic. The full operational phase, with improved timeliness for all orbits, will start in 2014.

Best regards, Mikael Rattenborg Director of Operations



Performance Reporting: Categories

The charts on the following slides present a summary view of the performance of the services within the categories listed here:

- Meteosat Services
- Metop/NOAA Global Data Service
- Metop/NOAA Regional Data Service (EARS)
- Search and Rescue Support
- Jason-2 OGDR Service
- Other Geostationary Satellite Services
- The EUMETSAT Data Centre
- EUMETSAT's User Support Service

Several terms with special meaning (e.g. Nominal RCs) appear in the following slides. A glossary is provided at the end of the report.



Performance Reporting: Conventions

Availability of EUMETSAT Services:

The availability of most operational services provided by EUMETSAT is measured against service-specific monthly targets. This report presents the performance of the individual services in the form of charts showing their month-by-month availability, accompanied by commentary identifying any significant events or factors (whether satellite or ground-segment in nature) which may have had impact on the provision of them.

Operational Events with General Impact:

An event which significantly affected the availability of a single service (e.g. the malfunction of a single instrument) is indicated on the relevant slide for that service.

Some operational events impact the availability of more than one individual service (e.g. an outage of EUMETCast). Such events are described on separate slides near the start of the 'Meteosat Services' and 'Metop/NOAA Global Data Service' sections. Where needed, slides concerning other services make reference to one or the other.



Meteosat Services

This service category refers to the dissemination of data and products produced with the Meteosat System, which comprises geostationary satellites positioned at longitudes 0°, 9.5°E and 57°E. These satellites nominally support the prime imaging, Rapid-Scan and 'Indian Ocean Data Coverage' (IODC) services respectively.

The individual services addressed in this section are as follows:

- Meteosat 'Full-Earth Scan' image data acquired at 0° and 57°E
- Meteosat 'Rapid Scan' image data acquired at 9.5°E
- Meteorological products derived from that image data
- Data Collection and Retransmission (the DCP service)



Meteosat Services: Operational Events with General / Significant Impact

The following events impacted the Meteosat Services to the extent described:

- <u>30 July 2 August 2010 (OPS Incident #42):</u> : Meteosat-8 entered safemode as a result of a suspected SEU (Single Event Upset), as suggested by characteristics seen which were similar to those of previous MSG safemodes. This safemode occurrence resulted in approximately 3½ days outage of the 9.5°E Rapid-Scan Service (both image data and meteorological products).
- <u>26 December 2010 (OPS Incident #43):</u> EUMETCast suffered a 2³/₄ hour outage which impacted all dissemination services carried by that system to varying degrees (dependent on dissemination priorities for the services). The Metop/NOAA Global and Regional Data Services were also impacted, as were all products and data carried for 3rd party providers.



Meteosat Services → SEVIRI 0° Image Data

Performance measured in terms of:

- 1) the number of <u>Nominal</u> Level 1.0 Repeat Cycles (RCs) which have been generated 'ontime', as a percentage of those scheduled
- 2) the combined timely availability of <u>all</u> (nominal and otherwise) Level 1.5 RCs (High-Rate and Low-Rate) via EUMETCast

Events Which Impacted Availability:

- 3 Aug 2010: Nominal L1.0 RCs impacted by a North-South station-keeping manoeuvre
- 25 Oct 2010: Nominal L1.0 RCs impacted by an East-West station-keeping manoeuvre
- 26 Dec 2010: EUMETCast Dissemination of L1.5 RCs impacted by a 3-hour outage of the EUMETCast system (see slide 8).
- General: Regular impact on nominal RCs in period July-October caused by satellite tank heater-switching.





Meteosat Services → IODC 57°E Image Data

Performance measured in terms of:

- (1) the number of Perfect Images which have been generated, as a percentage of those scheduled,
- (2) the availability of Perfect Formats directly disseminated via Meteosat-7, as a percentage of those scheduled.

Events Which Impacted Availability:

None significant.

Note: the downwards performance trend due to satellite downlink interruptions and radiometerposition jumps seen in the first half of 2010 changed for the better during the second half. Investigation generally points to the ageing of the Met-7 satellite as the root cause.





Meteosat Services → SEVIRI 9.5°E Rapid-Scan Image Data

Meteosat-8 currently supports the MSG Rapid-Scan Service (RSS), using a scan period of 5 minutes, covering the latitude range of 15 to 70°N, using all 12 SEVIRI spectral channels.

Performance is measured in terms of the number of <u>nominal</u> Level 1.0 Repeat Cycles (RCs) which have been generated 'on-time', as a percentage of those scheduled, plus the availability of all Level 1.5 RCs disseminated via EUMETCast.

Note that, due to operational constraints, RSS is interrupted approximately once a month to perform full-Earth scanning, and also for a full month in the November/December timeframe. More information can be found on <u>www.eumetsat.int</u> under 'Access to Data'.

Events Which Impacted Availability:

30-July – 2-August: Meteosat-8 safemode (see slide 8).

26 December: EUMETCast Dissemination of L1.5 RCs impacted by a 3-hour outage of the EUMETCast system (see slide 8)





Meteosat Services \rightarrow Meteorological Products derived from 0° Data

Performance measured in terms of the number of meteorological products which have been generated at EUMETSAT, as a percentage of those scheduled.

Events Which Impacted Availability:

December: A problem with the statistical data generation mechanism reduced the availability figure – actual product generation was higher.





Meteosat Services → Meteorological Products derived from 57°E Data

Performance of this component of the IODC service is measured in terms of the number of meteorological products which have been generated at EUMETSAT, as a percentage of those scheduled.

Events Which Impacted Availability:

None significant.





Meteosat Services → Meteorological Products derived from 9.5°E RS Data

Meteorological products derived from the 5minute Rapid-Scan (RS) image Repeat Cycles produced using Meteosat-8.

Performance of this service is measured in terms of the number of meteorological products which have been generated at EUMETSAT, as a percentage of those scheduled.

Events Which Impacted Availability:

30 July - 2 August: Meteosat-8 safe-mode (see slide 8).



-RSS Met Product Target Availability 98%



Meteosat Services \rightarrow DCP Channel Availability at 0°

Data Collection and Retransmission operations at 0° utilise Meteosat-9's international and regional DCP channels.

As of the end of December 2010, there were 572 active Data Collection Platforms (DCPs) out of a total of 1049 registered units, belonging to 127 operators.

Availability of the 0° service is shown on the chart to the right. It is measured in terms of the number of hourly reference DCP messages on all operational regional channels which have been successfully received back by EUMETSAT, as a percentage of those sent.

(Note that the availability of the 4 DCP channels supported by Meteosat-6 as part of the Indian Ocean Tsunami Warning System (IOTWS) is not included)

Events Which Impacted Availability:

None significant.





Metop/NOAA Global Data Service

This service comprises the provision of Level 0 data and Level 1 products derived from the data generated by the following Metop-A instruments:

A-DCS, AMSU-A, ASCAT, AVHRR, GOME-2, GRAS, HIRS, IASI, MHS, SEM

EUMETSAT also produces Level 1 products based on the data from NOAA-19's AMSU, AVHRR, HIRS and MHS instruments.

In addition, the Global Data Service also includes Level 2 products based on Metop-A IASI and ATOVS data.

The charts on the following slides show the month-by-month availability of the products, identifying any significant events which impacted the service.

Note: Unless otherwise indicated, the availability figures are derived as shown here:

- For Level 0: production statistics from EUMETSAT's EPS Product Generation Facility (PGF)
- For Level 1: reception statistics from EUMETSAT's reference EUMETCast User Station (US)
- For Level 2: as for Level 1



Metop/NOAA Global Data Service: Definition of Availability

Unless otherwise indicated in the availability slides, then the monthly figures are those for 'timely availability', where 'timely' is used to mean the following:

- Level 0 & 1: available within 2 hours 15 minutes of sensing
- Level 2: available within 3 hours of sensing

Availability figures are given per instrument and for one or more data levels thereof. It is measured in terms of the data / products that have been generated / disseminated for each of the months in the reporting period, as a percentage of that which would nominally have been generated / disseminated in the month had continuous operations been achieved without any deviation.

Note that there are certain cases where the availability of Level 2 products is indicated as being marginally higher than that of Level 1, and similarly, for Level 1 compared to Level 0. This arises because of the differences in time-logging between different stages of production influencing the generation of statistics.

Metop/NOAA Global Data Service: Operational Events with General Impact

The following events impacted the Metop/NOAA Global Data Service to the extent described:

- 5-6 October 2010: A Metop-A 'Out-Of-Plane' double manoeuvre was conducted, which necessitated the suspension of measurements from the AMSU, HIRS, IASI, MHS and SEM instruments for a period of 22-24 hours and the GOME instrument for about 19 hours. The ASCAT and GRAS instruments remained activated. Level 0 data continued flowing from all instruments, although it was not usable, thus outages of Level 1 data resulted, and the ASCAT Soil Moisture product & ATOVS sounding products were not generated.
- <u>26 December 2010</u>: (As also reported for Meteosat Services) EUMETCast suffered a 2³/₄ hour outage which impacted all dissemination services carried by that system. The event was classified as OPS Incident #43.



Metop/NOAA Global Data Service → A-DCS Level 0 Data

Metop-A carries an instrument for the Argos Advanced Data Collection System (A-DCS). Environmental data transmitted by measurement platforms (on land or sea or in the atmosphere) is collected and relayed by EUMETSAT to CLS (a CNES subsidiary) in Toulouse.

Events Which Impacted Availability:

None significant.





Metop/NOAA Global Data Service \rightarrow AMSU Level 1B BUFR Products

The Advanced Microwave Sounding Unit (AMSU) is a 15-channel microwave radiometer supplied by NOAA which measures atmospheric temperature profiles.

Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

5-6 October: Level 1B data unavailable due to Metop-A out-of-plane manoeuvre (see slide 18)

Notes: Metop-A's AMSU channel 7 has degraded beyond specification and is thus no longer used for product processing. Degradation of NOAA-19's AMSU channel 8 has not degraded further in this reporting period and so the data is still considered usable for the time-being.



The transfer of Level 0 data via the transatlantic link between the NOAA ground stations and EUMETSAT is subject to occasional recurrent anomalies which impacts the availability of the NOAA data.



Metop Global Data Service \rightarrow ASCAT Level 1B (SZO & SZR) Products

The Advanced Scatterometer (ASCAT) is a Cband radar provided by ESA which measures global ocean wind vectors.

Performance of the Level 1B service is measured in terms of the timely availability of the 'SZO' and 'SZR' products (spatial resolutions of 50 and 25 km respectively) on the EUMETCast reference user station (US).

Events Which Impacted Availability:

5-6 October: Level 1B data unavailable due to Metop-A out-of-plane manoeuvre (see slide 18)





Metop/NOAA Global Data Service \rightarrow ATOVS Level 2 Products

ATOVS Level 2 product processing transforms the calibrated radiance measurements from the AMSU-A, MHS and HIRS instruments (onboard Metop and NOAA-19 satellites) into information on the vertical distribution of atmosphere state parameters, on cloud and surface parameters and total atmosphere contents. All the parameters derived are assembled in one ATOVS L2 sounding product for each satellite.

Performance of the Level 2 service is measured in terms of the timely availability of the BUFRencoded products received on the EUMETCast reference user station (US).

Events Which Impacted Availability:

5-6 October: Metop Products not generated because of unavailability of usable L0 data due to out-of-plane manoeuvre (see slide 18)



Note: Metop-A's AMSU channel 7 has degraded beyond spec and is thus no longer used for ATOVS L2 product processing.



Metop/NOAA Global Data Service → AVHRR Level 1B Products

The Advanced Very High Resolution Radiometer (AVHRR) is a multi-spectral imaging instrument provided by NOAA which produces global cloud imagery and images of land and sea surfaces. Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability: None significant.



The transfer of Level 0 data via the transatlantic link between the NOAA ground stations and EUMETSAT is subject to occasional recurrent anomalies which impacts the availability of the NOAA data.



Metop Global Data Service → GOME-2 Level 1B Products

The Global Ozone Monitoring Experiment-2 (GOME-2) is a scanning spectrometer used to measure profiles and total columns of atmospheric ozone and other trace gases.

Events Which Impacted Availability:

5-6 October: Level 1B data unavailable due to Metop-A out-of-plane manoeuvre (see slide 18)

Note: The study of the throughput loss problem's impact on Level 2 product quality continues, and results are now expected in early 2011.



The degradation of instrument throughput, which varies in accordance with wavelength and angle of scan, has an affect on products. Since the second test campaign, the rate of degradation appears to have slowed - see the long-term monitoring report under 'documentation' on the webpage 'gome.eumetsat.int'. Also see the long-term in-orbit degradation status reports under: <u>www.eumetsat.int</u> → Data & Products → Resources, sub-heading 'EPS Product Validation Reports'.



Metop Global Data Service → GRAS Level 1B Products

The GNSS Receiver for Atmospheric Sounding (GRAS) is a radio occultation instrument which determines atmospheric profiles using GPS signals.

The chart shows (1) the numbers of those dissemination packets produced per month which contain at least one GRAS Level 1B occultation and associated geolocation and quality flags, and (2) the daily average of such packets for each month.

Events Which Impacted Availability:

5-6 October: GRAS instrument configuration modified during Metop-A manoeuvre in order to extend the tropospheric measurement coverage. Some impact due to the first burn of the manoeuvre was seen.

The number of occultations achieved is dependent on the positions of the GPS satellites relative to Metop-A. Efforts to establish a mechanism to provide more precise measurement of the numbers of occultations had to be abandoned because of the complexity of factors influencing the outcome. For the time-being, the existing approach of estimation will be continued.



In addition to the outages associated with Metop-A manoeuvres, GRAS L1B data is flagged 'degraded quality' for a fixed 8 hours following any anomaly, regardless of the actual level.



Metop/NOAA Global Data Service → HIRS Level 1B BUFR Products

The High Resolution Infrared Radiation Sounder (HIRS) measures incident radiation using 19 infrared channels and 1 visible channel, the data contributing to the determination of the atmosphere's vertical temperature profile and water vapour from the Earth's surface to an altitude of about 40 km. Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

5-6 October: Level 1B data unavailable due to Metop-A out-of-plane manoeuvre (see slide 18)



The transfer of Level 0 data via the transatlantic link between the NOAA ground stations and EUMETSAT is subject to occasional recurrent anomalies which impacts the availability of the NOAA data.



Metop Global Data Service → IASI Level 1C & Level 2 BUFR Products

The Infrared Atmospheric Sounding Interferometer (IASI) is used for global measurement of atmospheric temperature, water vapour and trace gases, as well as surface temperature, surface emissivity and cloud characteristics.

Events Which Impacted Availability:

- 30-31 July: Moon intrusion / external calibration impacted L1 and L2 data
- 30 Aug 3 Sept: Instrument decontamination (no data or products)
- 5-6 October: Level 1B data unavailable due to Metop-A out-of-plane manoeuvre (see slide 18)
- 24-25 Dec: Moon intrusion / external calibration impacted L1 and L2 data



Note that external calibrations are performed typically on a monthly basis that reduce the availability of Level 1 / Level 2 data relative to that of the Level 0 data by approximately 0.5 - 0.6% of the scheduled availability.



Metop/NOAA Global Data Service → MHS Level 1B BUFR Products

The Microwave Humidity Sounder (MHS) is used to measure atmospheric humidity primarily, but also to measure cloud liquid water content and to provide qualitative estimates of precipitation. Level 1B products are derived from the data generated by the instruments onboard both Metop-A and NOAA-19 satellites.

Events Which Impacted Availability:

- 3-4 October: Metop MHS instrument entered fault mode on 3rd Oct, resulting in a Level 1 product outage of 24 hours
- 5-6 October: Out-of-plane manoeuvre (see slide 18) impacted Metop Level 1B. A second MHS fault mode occurred during the standby period, recovery from which was achieved after manoeuvre completion

Note: NOAA-19's MHS instrument's channel 3 remains out of spec and users are recommended to use channel 4 instead.



The transfer of Level 0 data via the transatlantic link between the NOAA ground stations and EUMETSAT is subject to occasional recurrent anomalies which impacts the availability of the NOAA data.



Metop/NOAA Global Data Service → SEM Level 0 Data

The Space Environment Monitor (SEM) consists of a pair of instruments which provide data to determine the intensity of the Earth's radiation belts and the flux of charged particles at the satellite's orbiting altitude.

Level 0 data (consisting of the SEM instrument source packets in EPS native format) is provided to NOAA via dedicated terrestrial line.

Events Which Impacted Availability:

None significant.





Metop/NOAA Regional Data Service

This service category comprises EARS-ATOVS, EARS-AVHRR and EARS-ASCAT services.

For EARS-ASCAT, Metop-A Level 0 data is provided by the Fast Dump Extract System (FDES) at Svalbard. This system provides fast access to the most recent part of each X-band dump and transfers the relevant data to the EARS system for further Level 1 processing. The resultant Level 1 products are forwarded to KNMI in the Netherlands for the generation of Level 2 data.

ATOVS Level 0 data is acquired by the EARS network of HRPT stations, Level 1 products are generated at those locations and forwarded to EUMETSAT for distribution. As of 9th March 2010, ATOVS data from FDES has been available in addition.

AVHRR data is also acquired and processed by the EARS network. Since 16th March 2010, the network has been processing AVHRR data from Metop-A in addition to that from NOAA satellites.

Performance of the EARS services is measured in terms of the availability of the data on the user reception stations being within 30 minutes of the instrument's observations, with the exception of the Edmonton, Gander and Monterey stations, for which a less-stringent timeliness of 45 minutes for data availability is allowed.

See the 'Changes To EUMETSAT's Services' slides near the end of this report for further information related to the Metop/NOAA Regional Data Service in 2010/H2.

Metop/NOAA Regional Data Service \rightarrow EARS-ATOVS

This service provides ATOVS products covering data-sparse areas, derived from data received from the NOAA satellites N15, N16, N17, N18 and N19, and from Metop-A (AHRPT partial coverage data and FDES).

Availability shown on the chart is for the products received by users (relative to scheduled ground station passes) and covers Levels 1A and 1C in BUFR and Level 1D products.

Events Which Impacted Availability:

- General Issue 1: Ongoing low data quality from Ewa Beach and Miami stations, especially due to N16 reception using incorrect polarisation (station upgrade being planned).
- General Issue 2: Problem with the AVHRR instrument onboard NOAA's N17 satellite continues to impact the operation of the ATOVS instruments, resulting in fewer products overall.





Metop/NOAA Regional Data Service → EARS-AVHRR

This service provides data from the AVHRR instrument onboard the NOAA satellite N19 (also N17 up until 14th Sept 2010) and from the instrument on Metop-A (AHRPT partial coverage data and FDES).

Availability shown on the chart is for Level 0 data received by users (relative to scheduled regional passes). Note that no higher-level products are generated.

Events Which Impacted Availability:

None significant.

(Satellite N17's AVHRR instrument suffered scan motor issues which gave degraded product quality, hence its omission from the EARS service as of 14-Sept-2010).





Metop/NOAA Regional Data Service → EARS-ASCAT

This service provides products derived from the data produced by the ASCAT instrument onboard the Metop-A satellite.

As explained earlier, the Fast Dump Extract System (FDES) at the Svalbard ground station extracts the relevant data from the X-band dump acquired there and provides it to EARS, which performs Level 1 processing and forwards the resultant products to KNMI in the Netherlands for the generation of Level 2 data.

Availability shown on the chart is that of the Level 2 data received by users (relative to scheduled passes).

Events Which Impacted Availability:

October 5-6: Unavailability of Level 1B products during the Metop-A out-of-plane manoeuvre(see slide 18) impacted Level 2 availability.





Search & Rescue Support

EUMETSAT supports the Cospas-Sarsat System for Search and Rescue (SAR) by flying a transponder onboard each of its more recently-launched satellites, namely Meteosat-8, Meteosat-9 and Metop-A.

The Cospas-Sarsat System is designed to provide distress alert and location data to assist SAR operations, using a constellation of geostationary and low-altitude Earth-orbiting satellites to relay signals from distress beacons to ground terminals. More information concerning the system can be found on <u>www.cospas-sarsat.org</u>.

The availability of the transponders onboard Meteosat-9 and Metop-A was 100% for the reporting period July – December 2010. That for the transponder onboard Meteosat-8 was 99.98%, due to the occurrence of a satellite safe-mode on 30-July-2010.



Jason-2 OGDR Service

This service delivers the 'Operation Geophysical Data Record' products, derived from the altimetry data acquired from the Jason-2 satellite.

Jason-2 is the second satellite of the space segment of the Ocean Surface Topography Mission (OSTM), a cooperation between AVISO, CNES, NASA and NOAA. EUMETSAT and NOAA work together to process data from the Jason-2 satellite in near real-time and to archive and disseminate the products.

The chart on the next slide shows the availability of the products within timeliness constraints of 3 hours and 5 hours from the time of sensing.







Jason-2 OGDR Service

The chart shows the availability of the Jason-2 near real-time Operational Geophysical Data Record products disseminated via EUMETCast.

The target figure of 95% applies to the availability of data received on EUMETCast reception stations with a timeliness of 5 hours. The further target of 75% is for the more demanding objective of 3-hour timeliness.

Events Which Impacted Availability:

4-8 October: Annual maintenance of the Earth Terminal in Usingen impacted the timeliness of day passes.

(In general, redumps at next visibility (or by other ground station) are taken in cases of problematic passes and connection problems – this ensures minimisation of data loss, although some impact on timeliness occurs)





Other Geostationary Satellite Services

In addition to the Meteosat geostationary satellite data, EUMETSAT relays satellite data from partner organisations. Part of an international cooperation, the geostationary satellite data from the National Oceanic and Atmospheric Administration (NOAA) and the Japanese Meteorological Agency (JMA) are made available via EUMETCast, Direct Dissemination and the Internet.

The chart on the next slide shows availability of image data from the following satellites:

- NOAA's GOES-East (GOES-12) satellite stationed at 75°W
- NOAA's GOES-West (GOES-11) satellite stationed at 135°W
- JMA's MTSAT-2 satellite stationed at 145°E



Other Geostationary Satellite Services → GOES and MTSAT Image Data

The chart shows the timely availability of formats disseminated via EUMETCast of image data originating from the indicated satellites.

Events Which Impacted Availability:

In July: Thunderstorms marginally disrupted EUMETSAT's reference reception of EUMETCast dissemination.

Note that MTSAT-2 took over from MTSAT-1R as the nominal operational satellite for JMA (the Japan Meteorological Agency) as of 1-July-2010. The MTSAT-1R satellite was used again temporarily from 7-October to 22-December because of a ground station problem.





The EUMETSAT Data Centre

EUMETSAT's Data Centre archives all payload data acquired from EUMETSAT's operational satellites and most of the products derived from that data.

The Data Centre allows registered users to request data and products from the archive by use of its online 'self-service' ordering mechanism and supplies the requested items via physical media and the Internet. It also allows 'bulk orders' for long time-periods of data and 'standing orders' for repeated delivery of data / products over specified time periods to be requested for special needs.

Charts on the following themes appear on the next 3 slides:

- Orders Processed and Data Delivered
- Data Volumes Delivered by Country
- Top 10 Products and Data Delivered



The EUMETSAT Data Centre → Orders Processed and Data Delivered

The chart here shows the orders processed monthly by the Data Centre and the resulting volumes of data delivered to the users, for the 12 months of 2010. All types of orders (regular, bulk and standing) are included in the statistics.

There can be significant variation in the amount of data delivered per order, which thus gives rise to only a loose correlation between the numbers of orders processed in a month and the total volume of data delivered.

The significant decrease seen at the end of 2010 in the number of orders processed corresponds to the seasonal expiry of standing orders. These only contribute marginally to the total delivery volumes, however – the latter continued at a high level until year-end.





The EUMETSAT Data Centre → Data Volumes Delivered by Country in 2010

This chart shows the relative volumes of data delivered in 2010 to the 'top 10' countries (member state or otherwise). Note that the relative volume provided to internal users at EUMETSAT is also shown for comparison.

The full pie chart represents the total of 313 Terabytes of data delivered in the course of the year.





The EUMETSAT Data Centre → Top 10 Products and Data Delivered in 2010

This chart shows the 'Top 10 products' for the full year of 2010.

The 'popularity' of the products order-wise was used for ranking them, not the total absolute numbers of items ordered in the year.

The y-scale dimension is the ratio of items delivered relative to the total number of items held in the archive.

All types of order (regular, bulk and standing) were taken into account.





User Support Service

EUMETSAT's User Helpdesk provides support to the users of its services, handling enquiries, registrations, user feedback comments, problems experienced and enhancement requests.

This section includes charts on the following subjects:

- User interaction history from 2002 onwards
- The countries and groups that gave rise to the largest numbers of user interactions
- Breakdown of user interactions by category
- Distribution of EUMETCast Users Worldwide
- EUMETCast Growth Over the Years



User Support Service → User interaction History

The chart here shows the number of user interactions handled by EUMETSAT's User Helpdesk in each half-year since the beginning of 2002.

The all-time high in half-yearly levels of interactions seen in the first half of 2004 correlated with Meteosat-8 (the first second generation satellite) going into operational use and the users registering for EUMETCast to receive its data and derived products.

The next 2 slides focus on the user interactions for the current reporting period, in which a total of 1754 interactions were handled.



User Transactions in the Half-Year Ending the Month Shown



User Support Service → User interactions 2010/H2 by Country of Origin





User Support Service \rightarrow User interactions 2010/H2 by Category

The chart shows the numbers of interactions in the second half of 2010 in terms of the main categories of:

- Enquiries (3 types)
- Registrations
- 'Compliments, Problems and Enhancement Requests'

The number of interactions for the half-year totalled 1754.





User Support Service → EUMETCast Users Worldwide as of December 2010



User Support Service → EUMETCast Growth Over the Years

A suitable method of showing the growth of the EUMETCast community is by means of charting the trend of registrations of EUMETCast user stations.

The EUMETCast system was first conceived to disseminate EARS data. It evolved into a means of dissemination for the MSG programme (a solution to MSG-1's HRIT failure), and was extended to provide Metop and Jason-2 data in more recent years.

Over time, products of partner organisations such as NOAA and DWD have been added to the system. The significant increase in stations in 2010 is largely a result of the migration of the community of users of Météo-France's RETIM system to EUMETCast.

Changes to EUMETSAT's Services

This section lists the changes to services that have taken place in this reporting period:

Date	Service / Product(s)	Description
27 July	Metop/NOAA Regional Data	EUMETCast dissemination of ATOVS products from the Muscat HRPT station commenced
11 August	Metop Global Data	EUMETCast dissemination of Metop Level 2 Polar Winds (based in AVHRR data) in BUFR format commenced
14 September	Metop Global Data	EUMETCast and GTS dissemination of IASI sounding products generated by the 'Day 2' version of the IASI Level 2 product processing chain commenced
14 September	Metop/NOAA Regional Data	Data from NOAA-17 satellite's AVHRR instrument excluded from EARS-AVHRR due to product quality reduced by fault on the instrument.
29 September	Metop Global Data	EUMETCast dissemination of IASI Principle Component Scores in BUFR format commenced (for demonstration purposes initially – still undergoing validation)
2 November	MODIS products	MODIS Active Fires product from CSIR moved from the 'AIDA-1' channel to 'Data Channel 12' on EUMETCast

Section continued on next slide...

Changes to EUMETSAT's Services (continued)

Date	Service / Product(s)	Description
9 November	Training material on EUMETCast	The training session 'Basic Satellite Interpretation in the Tropics' was made available on EUMETCast from 9-Nov-10 to 10-Dec-10
11 November	TAMSAT (University of Reading) Products	EUMETCast dissemination of TAMSAT Rainfall Estimate Anomaly products for Africa commenced
30 November	Metop Global Data	EUMETCast dissemination of IASI Surface Emissivity products commenced
30 November	MODIS products	EUMETCast dissemination of MODIS Direct Broadcast Wind products in BUFR format commenced
30 November	Metop Global Data	EUMETCast dissemination of multimission Polar Wind products with NOAA-19 AVHRR direct broadcast winds included in the product in BUFR format commenced
6 December	EUMETCast Support for Partner Organisation	Sounding data from China Meteorological Administration's FY-3A polar-orbiting satellite added to EUMETCast
7 December	MODIS and MERIS products	EUMETCast dissemination of Level 3 Near-Real-Time Ocean products commenced. Products provided through EU FP7-funded projects (DevCoCast and EAMNet)

Note that details of all products can be found in EUMETSAT's Product Navigator, accessible via www.eumetsat.int

Glossary

Special terms used in this report are explained in the table below (continued on several subsequent slides).

Term	Context in which used	Description
A-DCS	Metop/NOAA Global Data	The 'Advanced Data Collection System' instrument on Metop contributes to the Argos programme, which is a satellite-based data location and collection system dedicated to monitoring and protecting the environment.
AMSU-A	Metop/NOAA Global Data	The 'Advanced Microwave Sounding Unit-A' is a multi-channel microwave radiometer provided by NOAA, flying on Metop-A, which is used in combination with the HIRS instrument for measuring global atmospheric temperature profiles.
ASCAT	Metop/NOAA Global Data	The 'Advanced Scatterometer' is a C-band radar provided by ESA, flying on Metop-A, which measures global ocean wind vectors.
ATOVS	Metop/NOAA Global Data	Calibrated radiance measurements from the 'Advanced TIROS Operational Vertical Sounders', namely the AMSU-A, MHS and HIRS instruments, are transformed into various parameters and assembled in the ATOVS L2 product.
AVHRR	Metop/NOAA Global Data	The 'Advanced Very High Resolution Radiometer' is a multi-spectral imaging instrument provided by NOAA which produces global cloud imagery and images of land and sea surfaces.

Glossary (continued)

Term	Context in which used	Description
DCP	Meteosat	A 'Data Collection Platform' measures and transmits environmental data which is relayed by Meteosat satellite first to EUMETSAT's central operations, and then forwarded on to the DCP operator via direct, EUMETCast or GTS dissemination.
Formats	Meteosat (IODC)	This refers to the High-Resolution Image (HRI) formats disseminated via Meteosat's direct dissemination broadcasts.
GOME-2	Metop/NOAA Global Data	The 'Global Ozone Monitoring Experiment-2' instrument flying on Metop-A is a scanning spectrometer used to measure profiles of atmospheric ozone and other trace gases.
GRAS	Metop/NOAA Global Data	The 'GNSS Receiver for Atmospheric Sounding' instrument flying on Metop-A is a radio occultation instrument which determines atmospheric profiles using GPS signals.
GTS	General	The 'Global Telecommunications System', established by the WMO, is used by national meteorological services to exchange meteorological data and products. See also 'RMDCN'.

Glossary (continued)

Term	Context in which used	Description
HIRS	Metop/NOAA Global Data	The 'High Resolution Infrared Radiation Sounder' measures incident radiation in for determining the atmosphere's vertical temperature profile and water vapour from the Earth's surface to an altitude of about 40 km.
IASI	Metop/NOAA Global Data	The 'Infrared Atmospheric Sounding Interferometer' is a multi-purpose sounding instrument used for global measurement of temperature, water vapour, trace gases such as ozone, nitrous oxide, carbon dioxide and methane, as well as surface temperature, surface emissivity, and cloud characteristics.
Level 0	Metop/NOAA Global Data	An instrument's raw data which has been demultiplexed from the total set of data dumped from one orbit of the Metop satellite.
Level 1.0	Meteosat	The raw image data acquired from a Meteosat satellite and preprocessed at the ground station, which is then received by a EUMETSAT image-processing facility, to be geometrically rectified and radiometrically corrected.
Level 1.5	Meteosat	Level 1.0 image data that has been corrected for radiometric and geometric non- linearity and is accompanied by the appropriate ancillary information that allows the user to calculate the geographical position and radiance of any pixel.

Glossary (continued)

Term	Context in which used	Description
Level 1A	Metop/NOAA Global Data	Instrument data in full resolution with radiometric and geometric (i.e. Earth location) calibration computed and appended but not applied.
Level 1B	Metop/NOAA Global Data	Calibrated, earth-located and quality-controlled product, in the original pixel location, packaged with ancillary, engineering and auxiliary data.
Level 1C	Metop/NOAA Global Data	In the case of the IASI spectra, Level 1B data after the application of the apodization function.
Level 2	Metop/NOAA Global Data	Earth-located values converted to geophysical parameters at the same spatial and temporal sampling as the Level 1B and 1C data.
MHS	Metop/NOAA Global Data	The 'Microwave Humidity Sounder' is a new 5-channel microwave instrument developed for EUMETSAT to measure profiles of atmospheric humidity. Five flight models in total will be flown on the 3 Metop satellites, plus NOAA-N and NOAA-N'.

Glossary (continued)

Term	Context in which used	Description
Nominal RCs	Meteosat (0° SEVIRI)	SEVIRI repeat cycles consisting of geometrically and radiometrically-corrected data in all 12 channels, with less than 18 missing detector lines in the scanned Earth area for any given spectral channel (54 for HRV), where less than 12 of those lines (36 for HRV) are adjacent to each other.
'On-Time'	AII	The data or product has been generated or received 'on-time' at a specified location (e.g. at generation facility or EUMETCast user station respectively) within the relevant timeliness constraint.
Perfect Formats	Meteosat (IODC)	High-Resolution Image (HRI) formats which have no missing lines and are based on the latest scanned image according to schedule.
Perfect Images	Meteosat (IODC)	Rectified images which are 100% complete.
PGF	On Metop performance charts	The Metop 'Product Generation Facility' is the part of the EPS CGS (Core Ground System) which generates Level 0 data and controls the generation of Level 1 and 2 products by the relevant PPFs (Product Processing Facilities).

Glossary (continued)

Term	Context in which used	Description
Repeat Cycles (or RCs)	Meteosat (0° SEVIRI)	The period in which the MSG SEVIRI instrument performs one scan and then is repositioned ready for the next repeat cycle. A nominal repeat cycle (a scan of the entire Earth disc) has a duration of 15 minutes.
RMDCN	General	The 'Regional Meteorological Data Communication Network' is used by WMO Region VI to carry GTS traffic within Europe. See also 'GTS'.
RSS	Meteosat (9.5° SEVIRI)	Rapid-Scan Service (for MSG), where the repeat cycle has a duration of only 5 minutes, covering the latitude range of 15 to 70°N.
SEM	Metop/NOAA Global Data	The 'Space Environment Monitor' consists of a pair of instruments which provide data to determine the intensity of the Earth's radiation belts and the flux of charged particles at the satellite's orbiting altitude.
SEU	Satellite or instrument outages	'Single Event Upset', the term used to refer to an effect on onboard electronics caused by solar particles, possibly resulting in a switch-off of an electronic system.