EUCOS

The EUMETNET Composite Observing System

Status and new programmatic objectives 2009-2011

Jochen Dibbern

EUCOS Programme Manager

COST Action ES0702 Workshop, Oslo,

18 March 2009

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Content

- **EUCOS programme and objectives**
- **The current EUCOS network**
- **EUCOS Information System and Quality Monitoring**
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- **EUCOS interest in EG-CLIMET activities**

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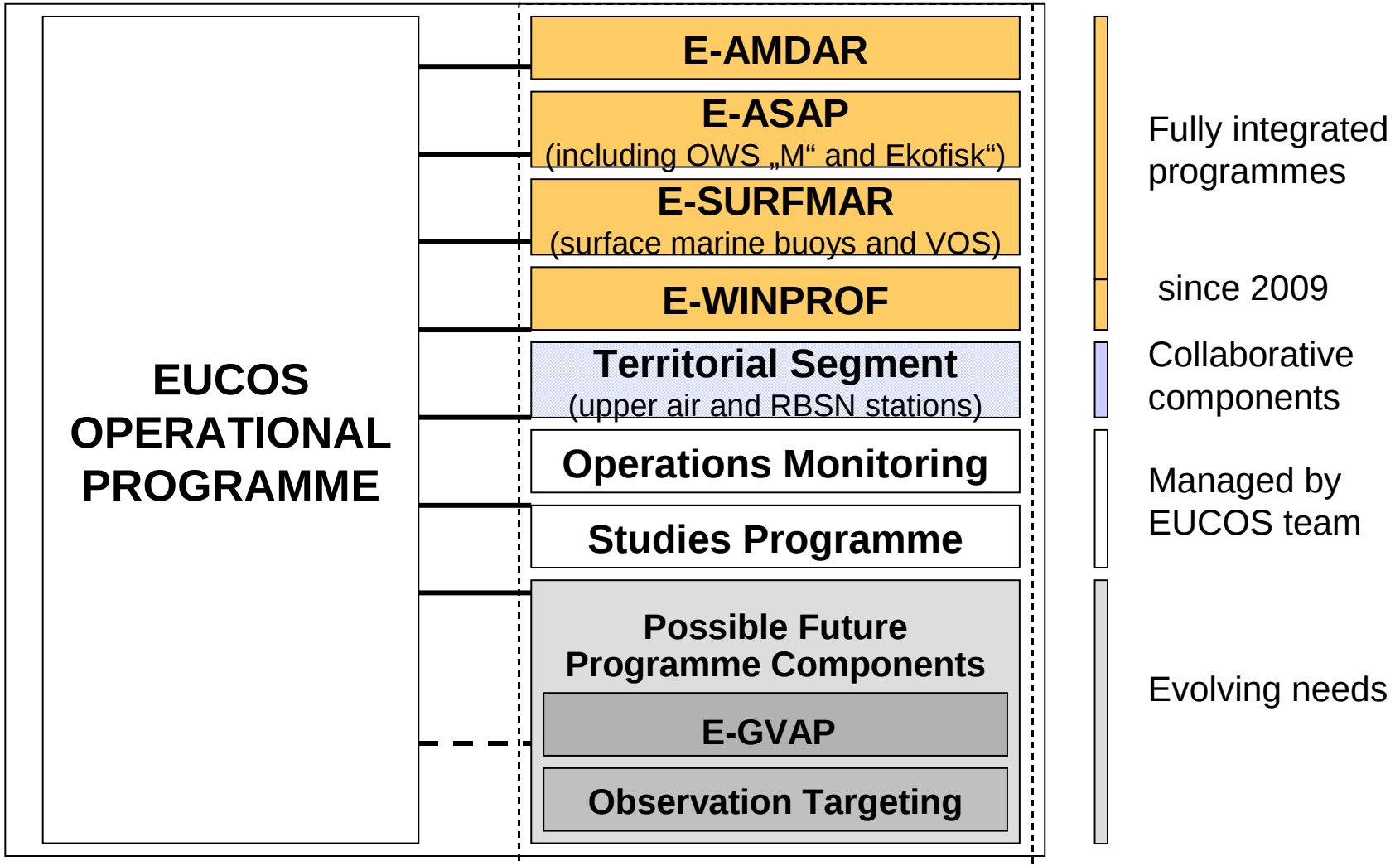
EUCOS governance (1)



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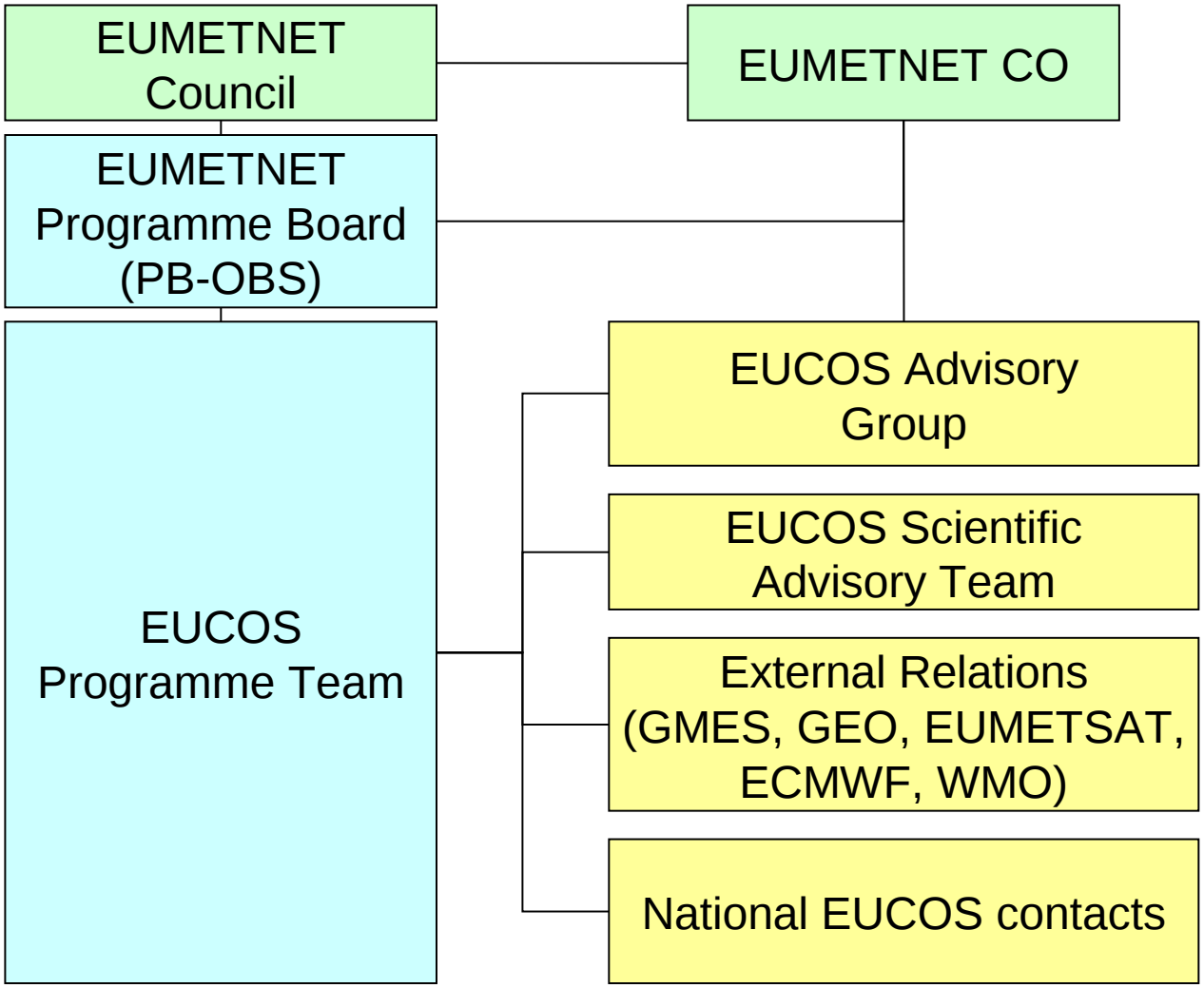
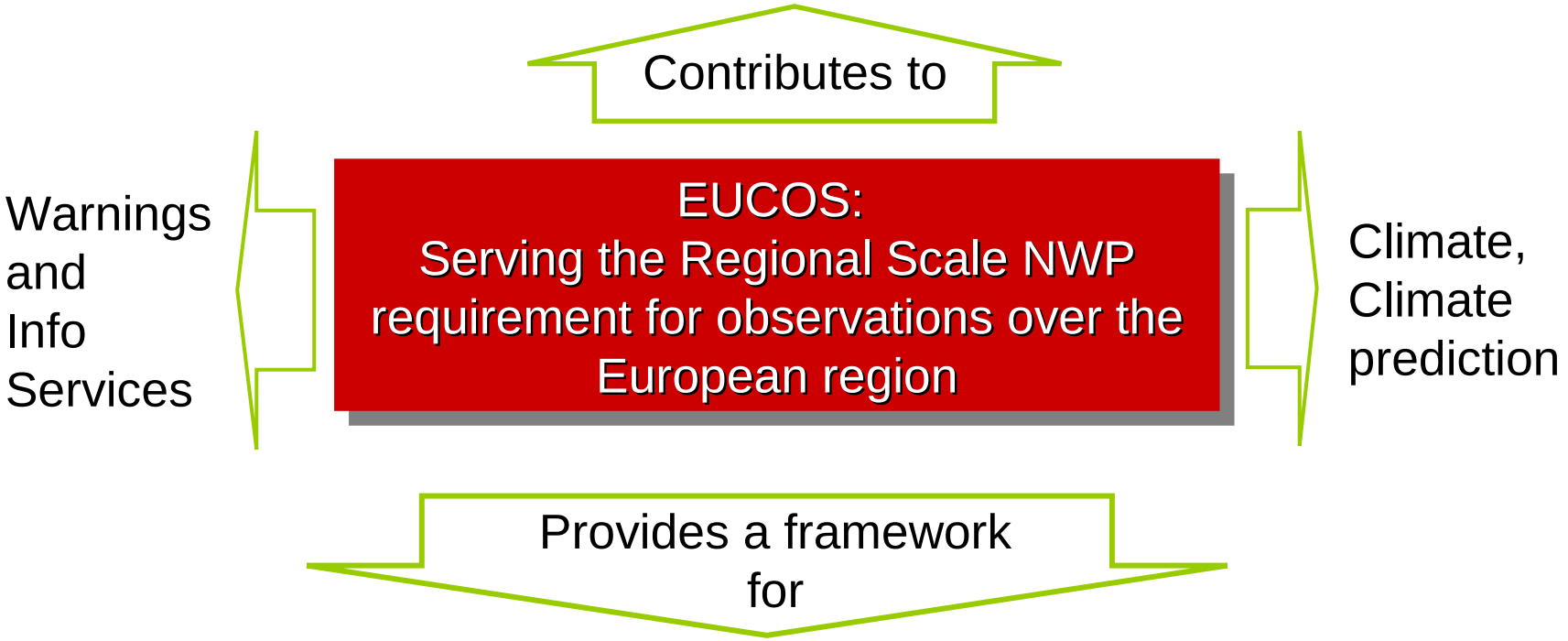
EUCOS governance (2)



EUCOS objectives

Medium and extended range weather prediction over the Globe



Very short range and nowcasting over national territories

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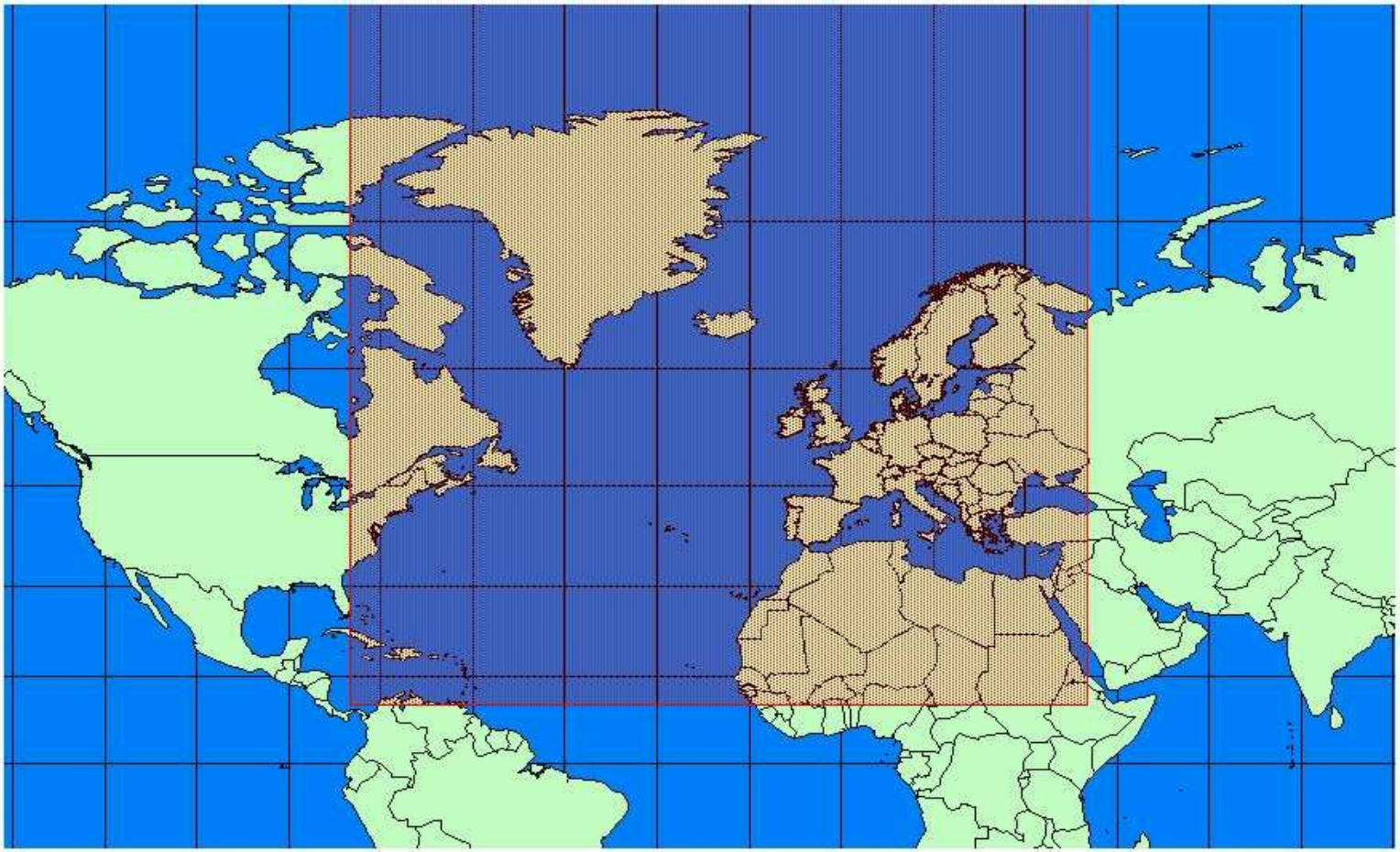
EUCOS area (10N-90N, 70W-40E)



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The current EUCOS network

The network comprises

- All European ships of the Automated Ship Aerological Programme - ASAP (10 E-ASAP integrated, 6 national)
- All European measurements from commercial aircrafts (AMDAR)
- European wind profiler and weather radar wind profiles
- Ocean weather ship „M“ and Ekofisk oil platform
- Selected moored buoys and all European drifting buoys
- European Voluntary Observing Ships
- Selected European radiosonde stations
- Selected European synoptic weather stations

The EUCOS Team is responsible for providing statistics summarising the performance of each component of the network

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E-ASAP: The oceanic upper-air segment

Responsible Member: DWD

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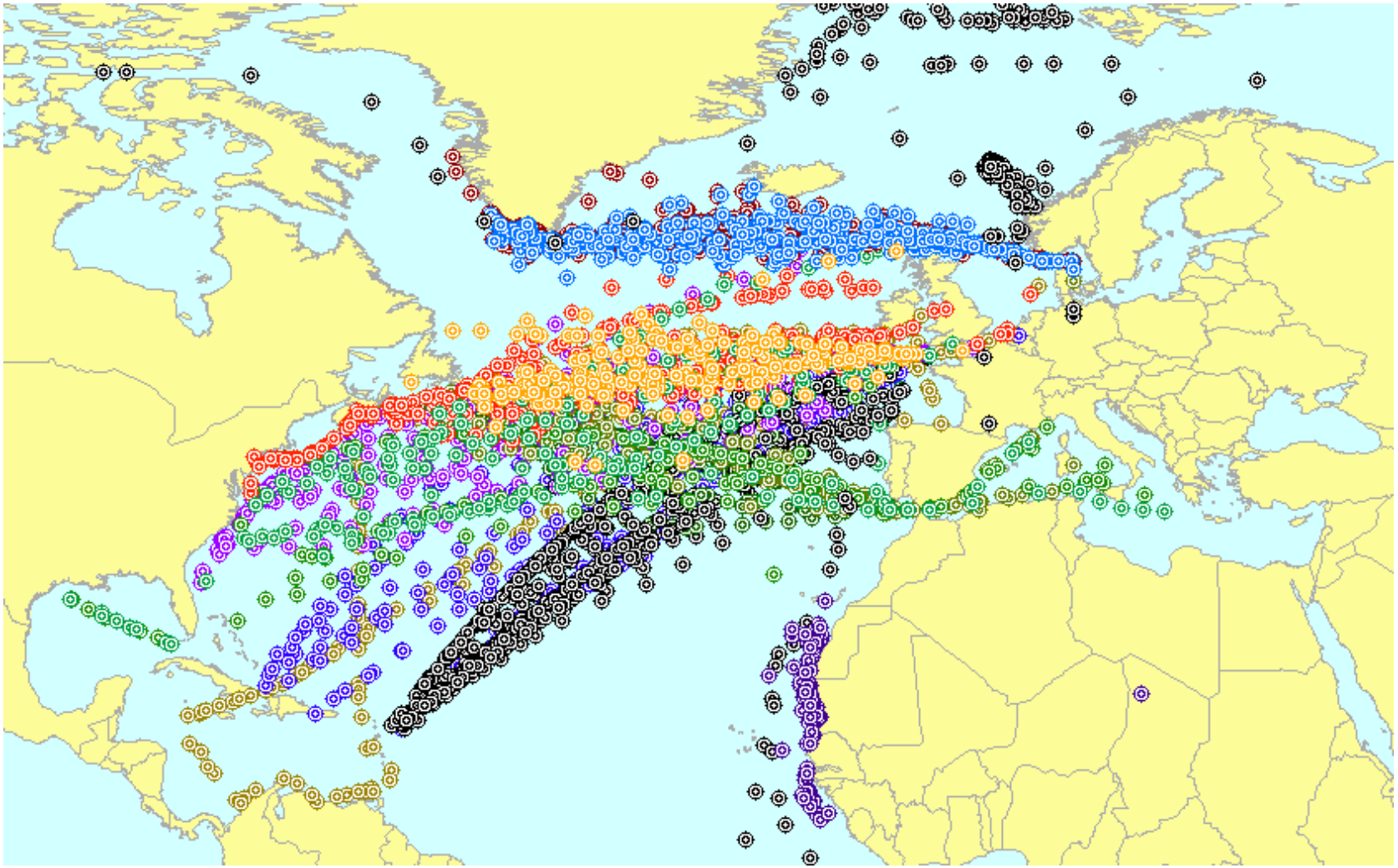
E-ASAP network coverage 2008



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E-SURMAR: the oceanic surface segment

Responsible Member: Météo France

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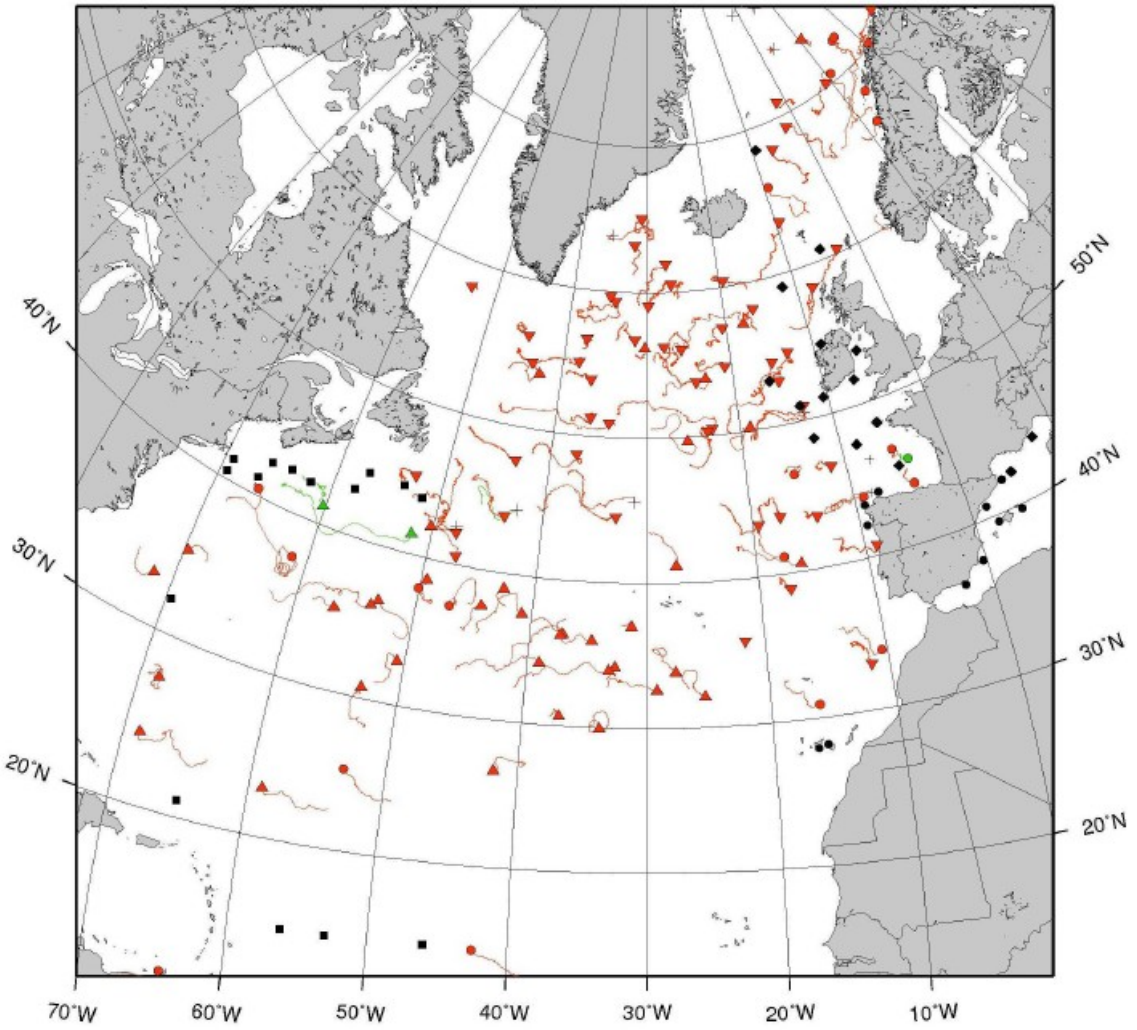
Drifting buoys tracks

Iridium SVP-B

Argos SVP-B

SVP-BW

(moored buoys)



January 2009

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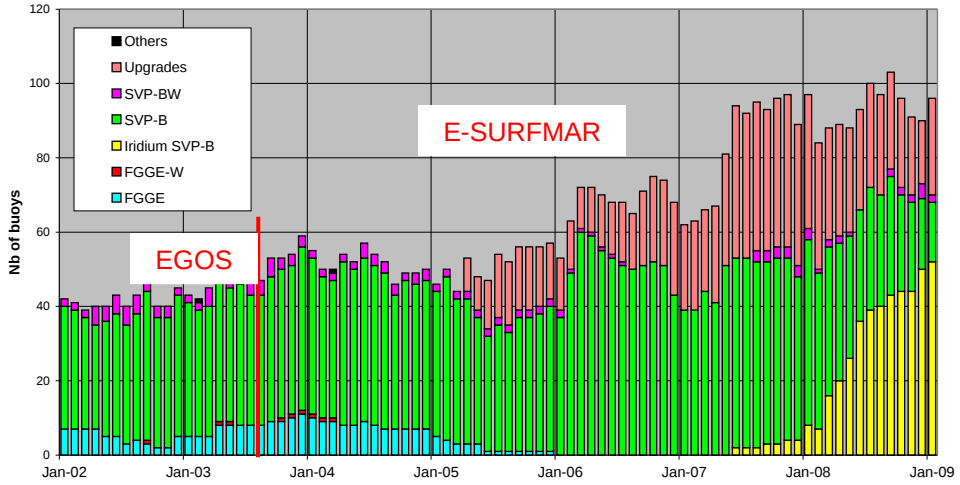
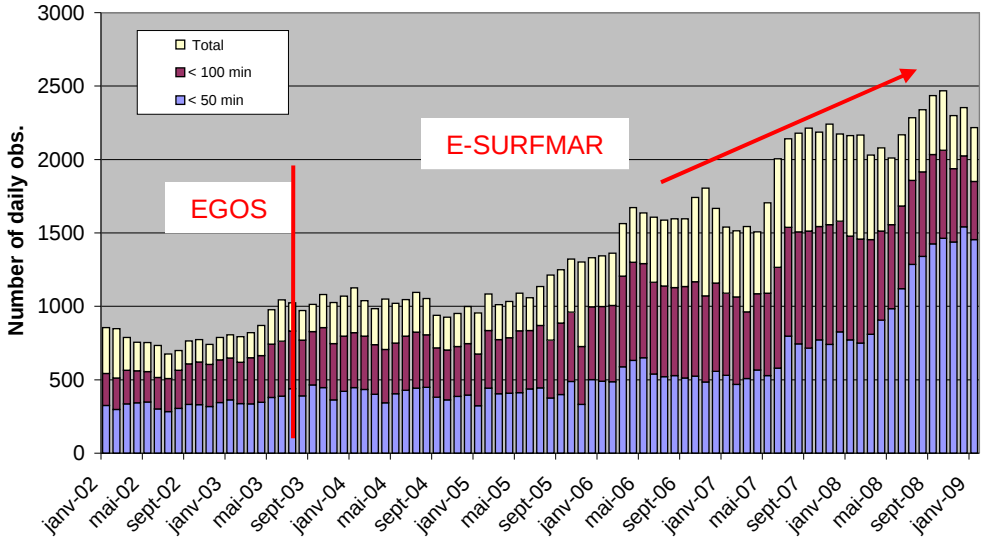
Drifting Buoys - Data Availability





Number of operating buoys : 250% increase over 6 years

Volume of data : 330% increase over 6 years

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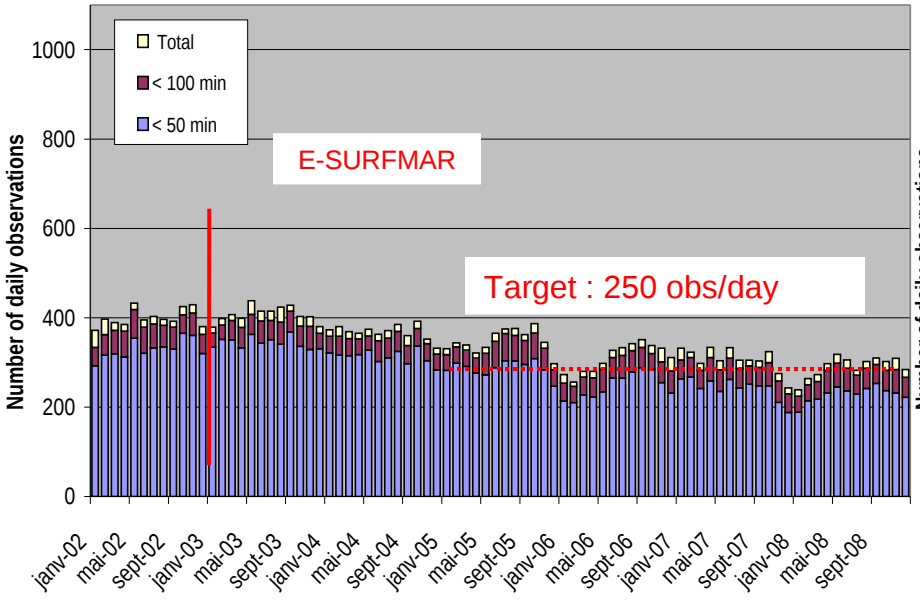
VOS Observations

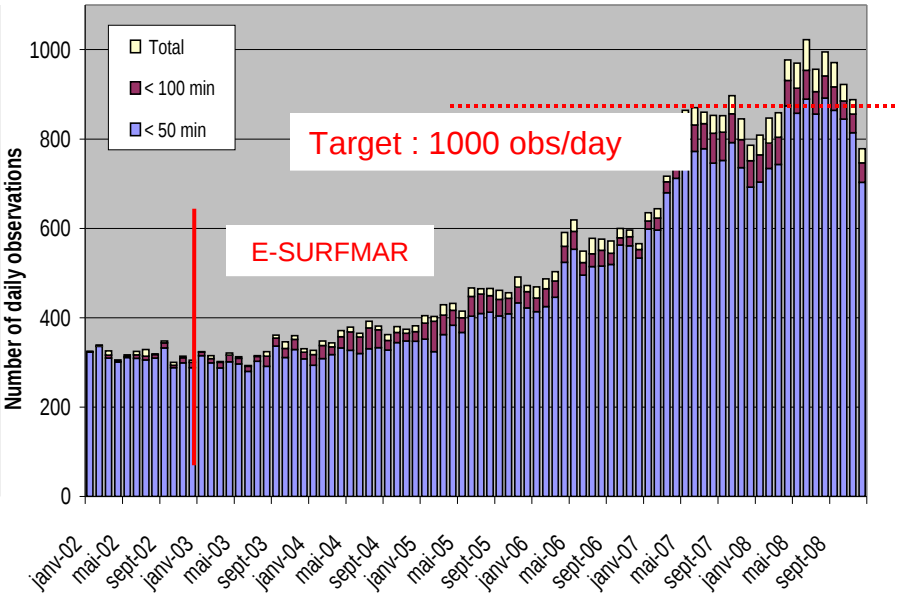
Data Availability
Average number of daily reports from the EUCOS area

EUMETNET manned VOS - Data availability in the EUCOS area
Average number of observations per day



Conventional VOS

EUMETNET automated VOS - Data availability in the EUCOS area
Average number of observations per day



Automated VOS (AWS)

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E-AMDAR: the aeronautical segment

Responsible Member: SMHI

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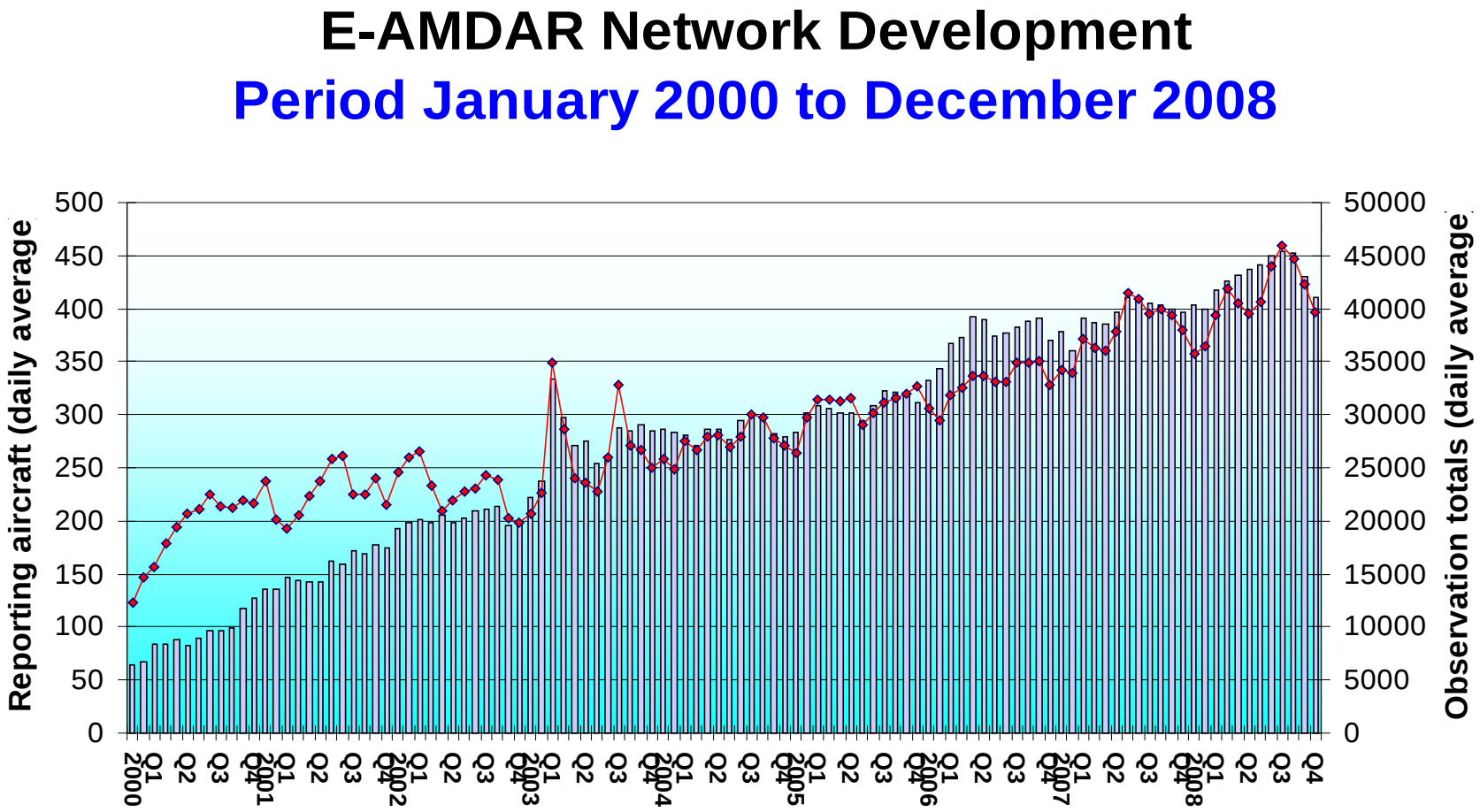
E-AMDAR network growth



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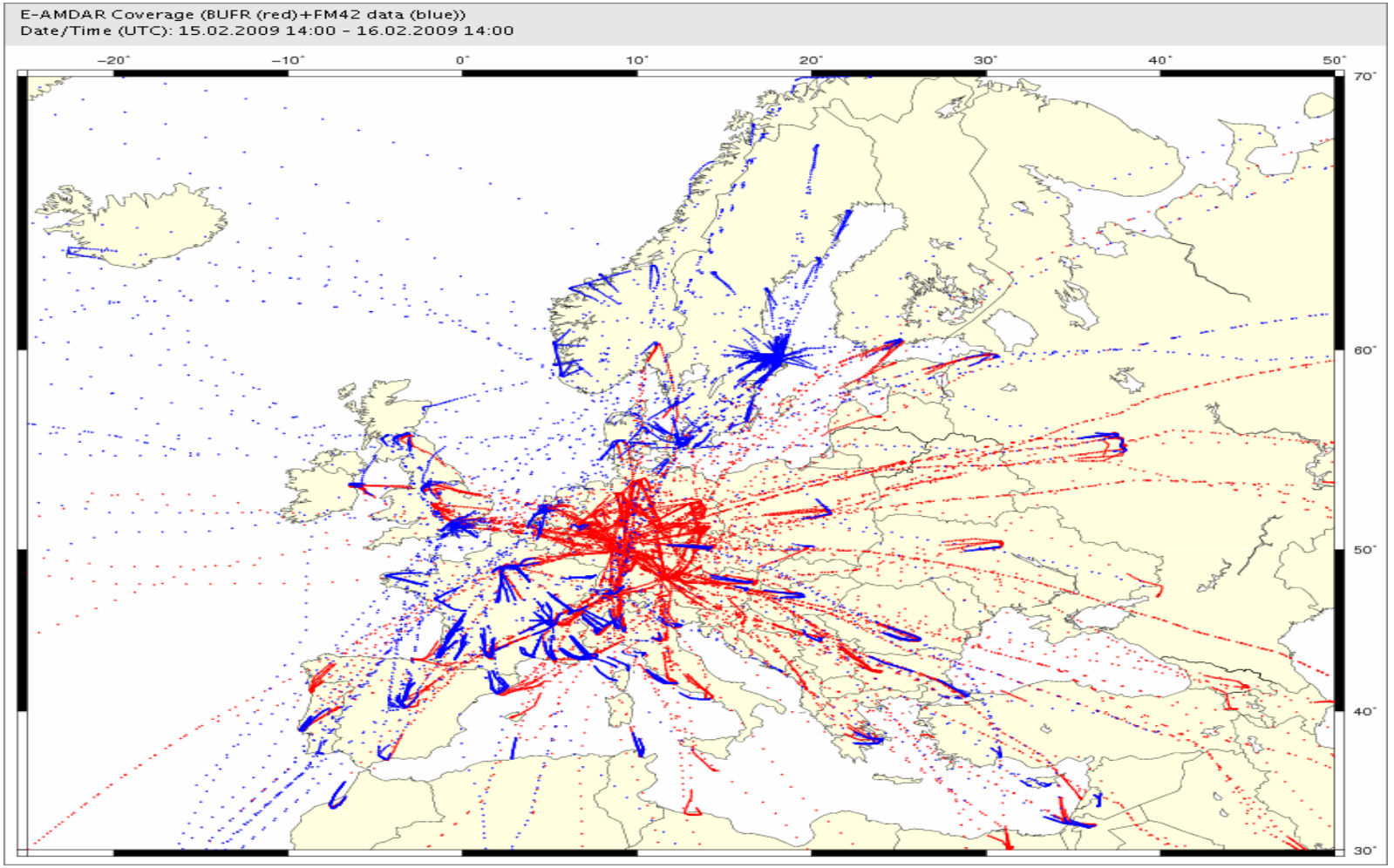
E-AMDAR – Network coverage



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WINPROF: The European wind profiler network








Responsible Member: Met Office

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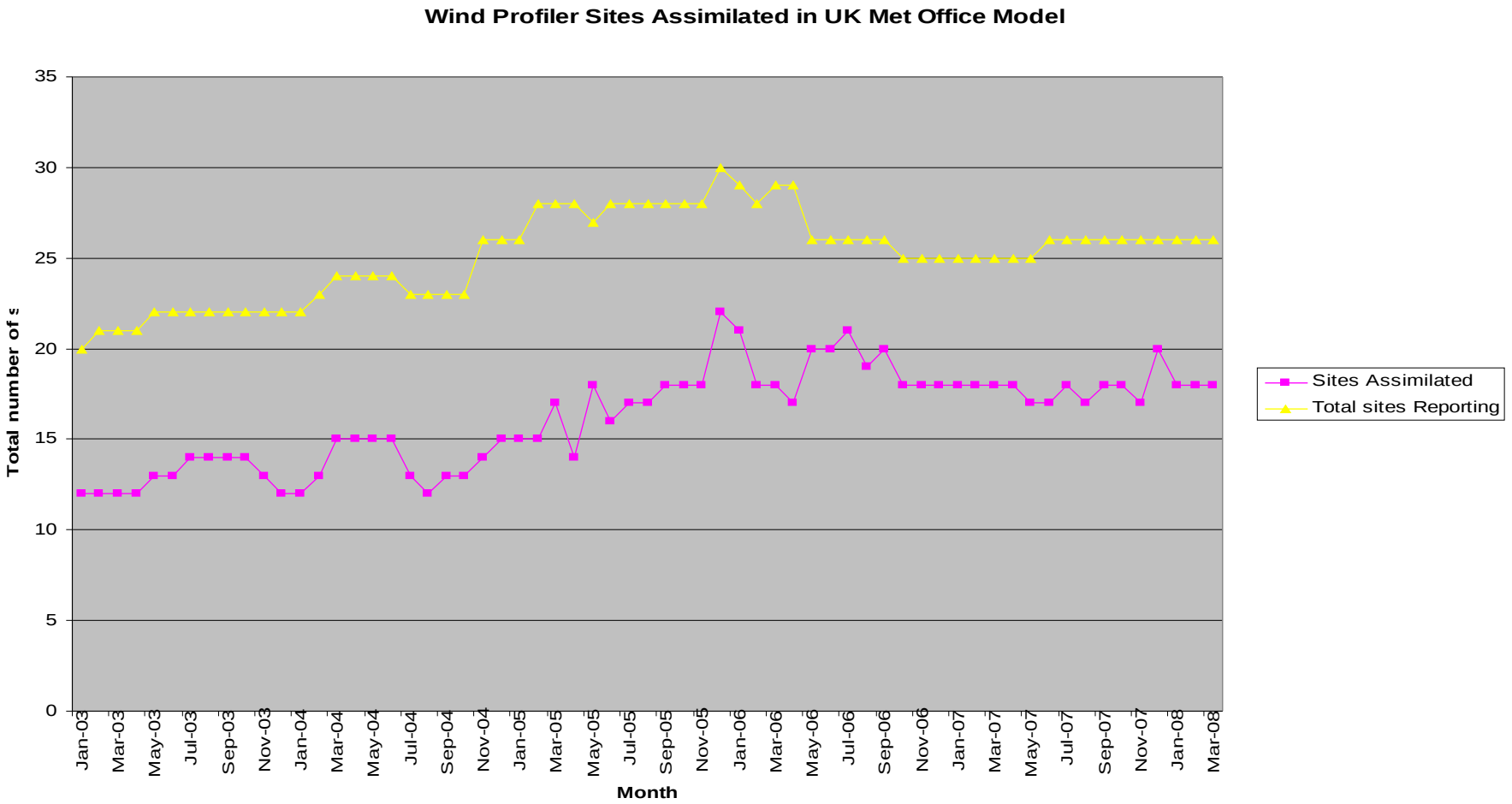
Wind Profiler UK Assimilation



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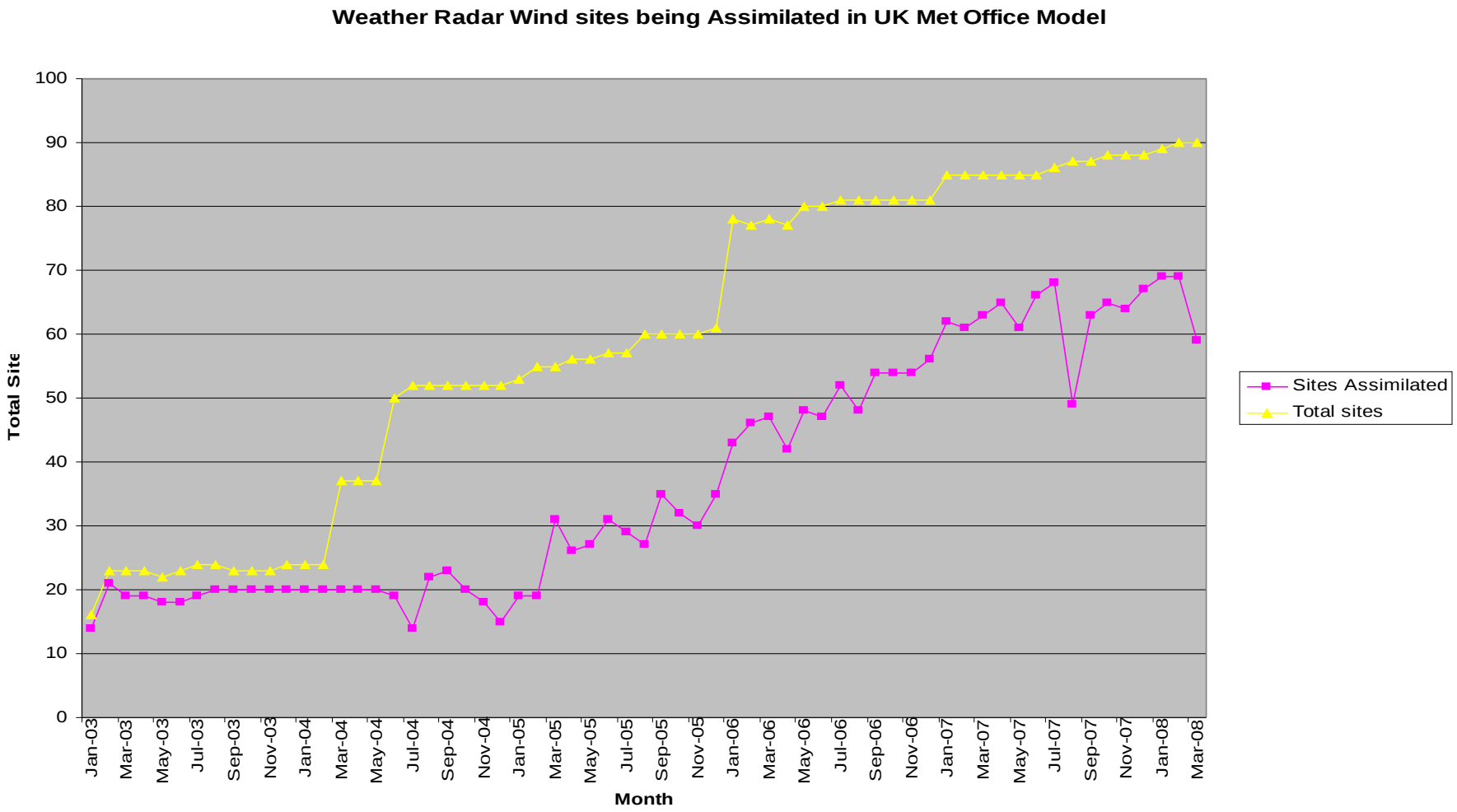
WRWP UK Assimilation



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EUCOS territorial segment

EUCOS Operations Manager / Quality Monitoring Coordinator

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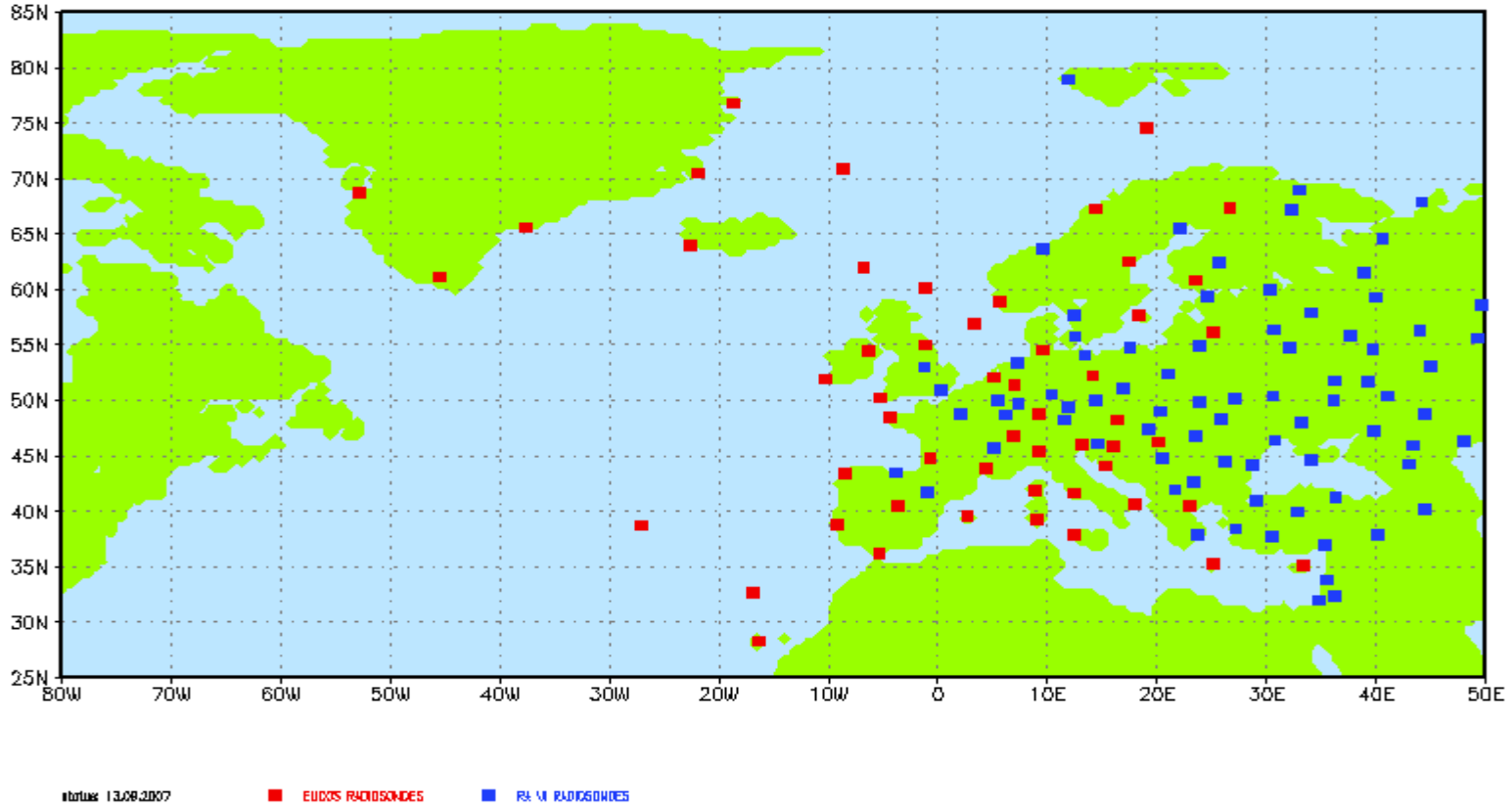
EUCOS radiosonde station network



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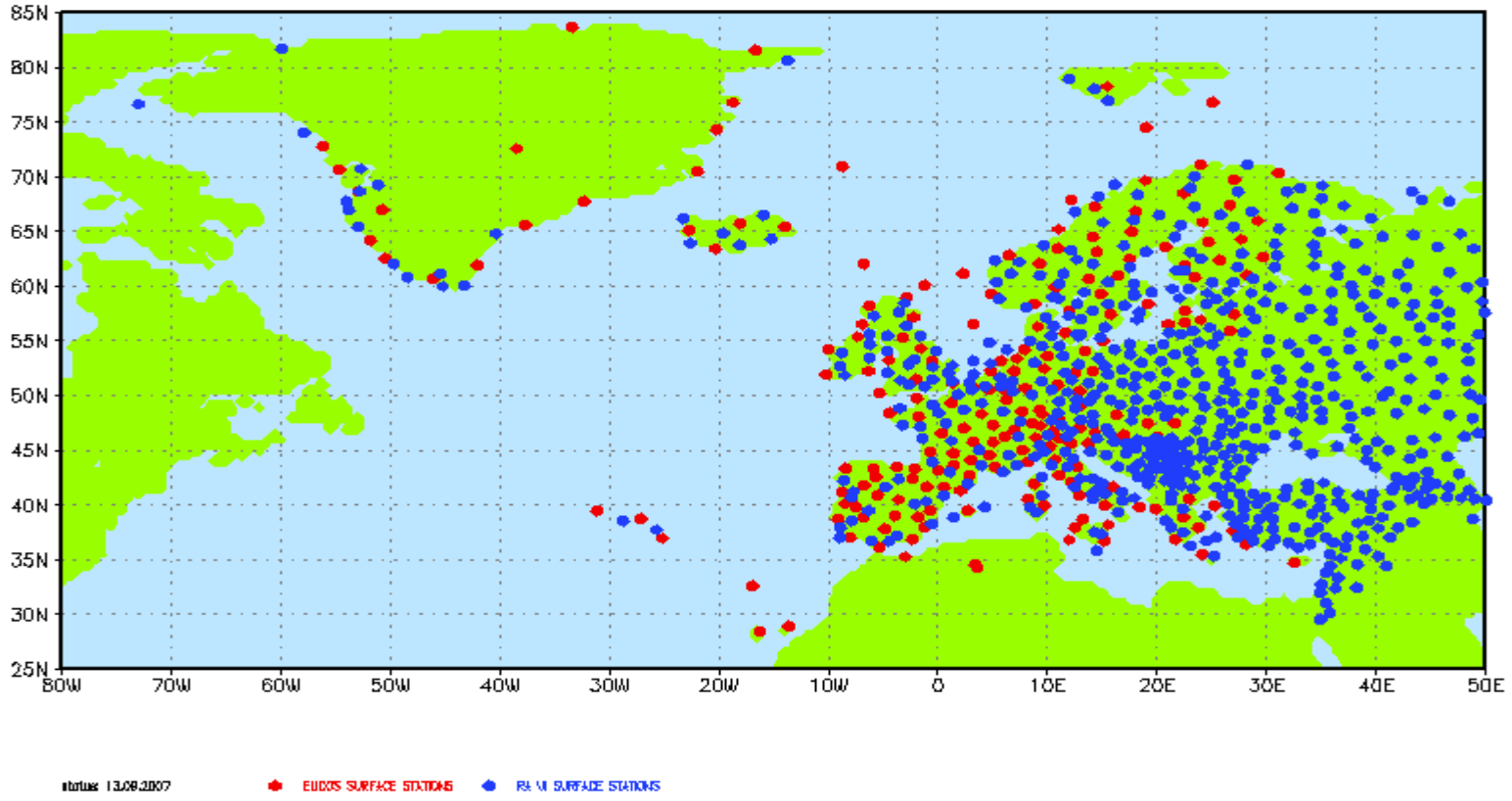
EUCOS surface land stations and RA-VI RSBN



EUCOS quality monitoring service

EUCOS quality monitoring

- Agreed performance standards for all networks;
- Web based Information Service www.eucos.net and Quality Monitoring Portal;
- Quarterly network performance summary**.**

EUMETNET data hubs

- CWINDE (WINPROF): Wind profiler and wind profiles from weather radar data
- OPERA: composite of weather radar data
- E-ADAS (E-AMDAR): data from commercial aircraft
- E-GVAP: water vapour measurements from GPS data

- Plans for a centralized data hub as a DCPC in VGIC under development

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EUCOS Information System (www.eucos.net)

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Referenz für Meteorologie
Deutscher Wetterdienst

EUCOS public
- About EUCOS
- EUCOS networks

EUCOS restricted
- EUCOS HL reports
- E-AMDAR
- E-ASAP
- E-SURFMAR
- WINPROF
- Quality Monitoring
- Studies Programmes
- Meetings
- Documents, Protocols

Related Activities
- WG-INS
- WG-RS
- EUMETNET radiosonde
- RA VI Monitoring

› EUCOS public

EUCOS Information System

The **EUMETNET Composite Observing System (EUCOS)** Operational Programme was established in 2002, based on recommendations resulting from the EUCOS Implementation Programme (1999-2001). It aims to establish and operate a truly European observing network under the auspices of the European Meteorological Network (EUMETNET), to deliver increased efficiency, leading to better-quality numerical and general forecasts, initially on a European scale.

The EUCOS Programme Management 2002-2006 rested with the Met Office, UK. Currently the Deutscher Wetterdienst (DWD) is responsible member of the EUCOS Programme Phase 2007-2011.

This website was established to provide all EUCOS members with necessary background information, documents and quality monitoring results. Due to this most of the topics are restricted by password login. Only general information about EUCOS and its subprogrammes provided under the topics About EUCOS and EUCOS networks are open to public. Please contact the EUCOS Team to receive login details.

News about the EUCOS programme

Last news update: 07.04.2008

› More

Contact Information

Contact the EUCOS Programme Management Team at DWD

› More

Related programmes and organizations

Links to EUMETNET, EUMETSAT, OPERA, ECMWF and others.

› More

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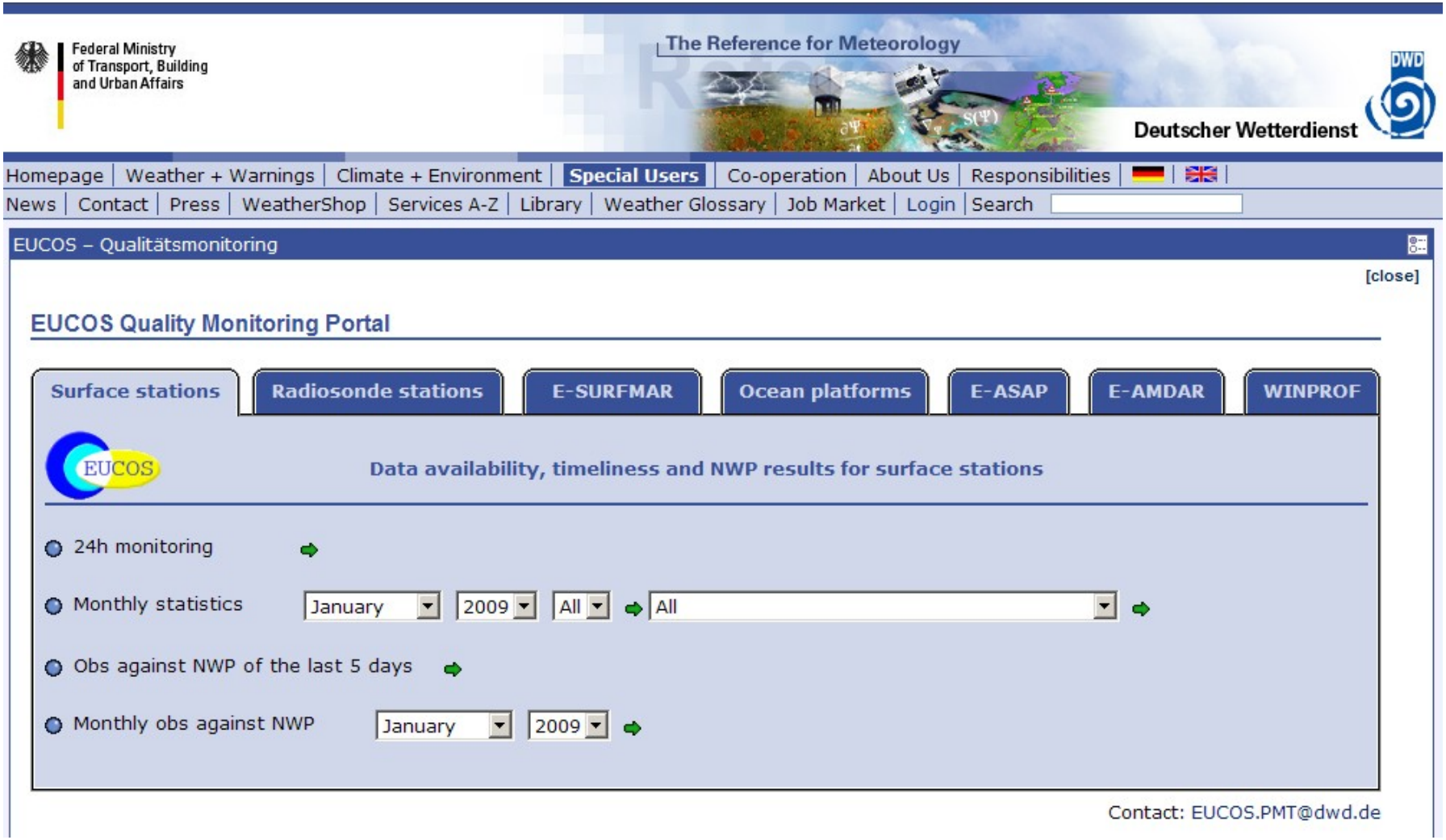
EUCOS Quality Monitoring Portal



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EUCOS network performance 2008 (1)

Q4 2008 Network	Data availability	Timeliness HH+50 (Radiosondes: TEMP AB)	Timeliness HH+100 (Radiosondes: TEMP CD)	Achieving 100 hPa	Achieving 50 hPa
Surface stations	Target: 95% 95%	Target: 90% 97%	Target: 95% 99%	---	---
Radiosonde stations	Target: 95% 91%	New target: 75% 75%	Target: 95% 94%	Target: 97% 96%	Target: 95% 91%
ASAP units	Quarterly target: * 1288 obs 700 obs (equals 54%)	New target: 75% 76%	Target: 95% 91%	Target: 90% 89%	Target: 75% 81%
Ocean platforms	Target: 95%	New target: 75%	Target: 95%	Target: 95%	Target: 90%
Average	93%	94%	97%	97%	94%
LDWR	93%	98%	99%	99%	97%
Ekofisk	93%	87%	94%	95%	90%
E-AMDAR	Quarterly target:** 3 Mio. obs 4,070,580 (equals 136%)	Target: 90% HH+50: 95%	Target: 95% 97%	---	---

Subset of the complete monitoring table

target achieved
<10% below target
=>10% below target

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EUCOS network performance 2008 (2)

Comparing observations against NWP model output of COSMO-EU

2008 Network	Temperature RMSE	Wind Mean Vector	Specific Humidity Error dq/q*	O-B-Geopotential	Pressure RMSE
Surface stations	**Target: 1 K** **1.71 K**	**Target: 2.5 m/s** **2.72 m/s**	**Target: 10%** **8.63%**	---	**Target: 1 hPa** **0.80 hPa**
Radiosonde stations	**Target: 1 K** **1.11 K**	**Target: 2.5 m/s** **4.15 m/s**	**Target: 10%** **11.96%**	**Target: 65 m** **21.56 m**	---
ASAP units	**Target: 1 K** **1.10 K**	**Target: 2.5 m/s** **4.31 m/s**	**Target: 10%** **12.22%**	**Target: 65 m** **18.89 m**	---
Ocean platforms	**Target: 1 K**	**Target: 2.5 m/s**	**Target: 10%**	**Target: 65 m**	
Average	**1.03 K**	**3.78 m/s**	**13.21%**	**24.15 m**	---
LDWR	1.07 K	3.90 m/s	13.25%	23.80 m	
Ekofisk	0.99 K	3.67 m/s	13.16%	24.50 m	
E-AMDAR	**Target: 1.5 K** **1.07 K**	**Target: 2.5 m/s** **4.25 m/s**	**Target: 10%** **not provided yet**	---	---
Moored buoys	**Target: 1 K** **0.97 K**	**Target: 2.5 m/s** **3.34 m/s**	**Target: 10%** **7.79%**	---	**Target: 1 hPa** **0.77 hPa**
Drifting buoys	---	---	---	---	**Target: 1 hPa** **1.06 hPa**
VOS ships	**Target: 2 K**	**Target: 5.0 m/s**	**Target: 15%**		**Target: 1 hPa**
Automated	**1.10 K**	**3.18 m/s**	**7.10%**	---	**0.74 hPa**
Conventional	**1.42 K**	**4.98 m/s**	**9.79%**		**1.44 hPa**

EUCOS target achieved
within WMO target
below WMO target

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EUCOS objectives 2009-2011

- **OSE on EUCOS upper-air network redesign**, to be conducted during 2009 by ECMWF, OMSZ and HIRLAM Group;
- Evaluation of the **EURORISK PREVIEW Data Targeting System** Trial (2009/2010);
- **E-AMDAR humidity** sensor trial and first phase of an operational programme (2009/2010);
- Develop specification for a new **EUMETNET programme with a centralised data hub and quality monitoring function (E-VCOMP**);
- Second combined **EUMETSAT/EUMETNET study to evaluate the impact of METOP** on the ground based observing network;
- **Collaboration with E-GVAP II** on future integration into EUCOS;

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Upper-air network redesign OSE

Scenario no 1: Baseline:
All current satellite observations used in NWP (radiances, cloud-drift winds, scatt winds) + GUAN radiosonde network + GSN + hourly buoys (no ship data);

Scenario no 2: Control run:
All currently available data in the EUCOS area.

Scenario no 3a:
Experiment with horizontal spacing of 100 km for profiles.
Baseline + terrestrial RaSo stations with 100 km horizontal spacing, thereby excluding RaSo stations if 3 hourly AMDAR measurements are available at those locations + AMDAR data, SHIP, BUOY, ASAP, WRWP, WP data

Scenario no 3b:

The same as for 3a but keeping 0 UTC radiosonde ascents at those sites which are excluded in scenario 3a because of the vicinity to an airport

Scenario no 4:
Experiment with horizontal spacing of 250 km for profiles from radiosondes and aircraft.

Scenario no 5:
Experiment with horizontal spacing of 500 km for profiles from radiosondes and aircraft.

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DTS – status December 2008

- DTS-website **can be found on ECMWF's homepage: www.ecmwf.int/research/EU_projects/PREVIEW/DTS/inde**

- During the 2008 trial phase 628 high impact cases were proposed and 548 accepted by the lead user;
- 21 countries participated by making extra observations;88% of requested radiosonde ascents from land stations had been deployed; 54% of requested ASAP soundings; in 181 cases E-AMDAR data were requested;
- The DTS is described in the latest issue of the "ECMWF newsletter";

DTS - outlook

- The trial period ended at 19 December 2008;

- **EUCOS looks for:**
  - a continuation of the DTS (just the technical part) during 2009 – a MoU has been negotiated with ECMWF;
  - A basic evaluation of the trial (e.g. cataloging of cases) – will be done by UK Met Office (first quarter 2009);
  - A systematic evaluation of the impact of additional data on NWP – preferably by data denial studies carried out by E-SAT members during 2009, results are expected for early 2010;

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EUCOS interest in EG-CLIMET activities

- Previous COST actions were taken over as EUMETNET programmes (examples WINPROF, E-GVAP);
- As a result of the current discussion on the EUMETNET strategy the remit of EUCOS might be extended to local scale NWP and climate requirements;
- EUCOS is interested in the planned testbed observing system experiments and long term trials to judge cost efficiency of new observing systems;
- EUCOS could promote through its Science Advisory Team the close cooperation with NWP centres to make optimal use of observing data in assimilation techniques;
- EUCOS is interested in EG-CLIMET network design recommendations

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Thank you for your attention !

PREVIEW Data Targeting System (DTS)

The aim of data targeting is to make additional observations when and where they will be most beneficial to subsequent forecasts. The locations, "sensitive areas", could vary from day to day and the supplementary observations will be most valuable if they help reduce uncertainty in cases of potential high-impact weather

A pre-operational Data Targeting System (DTS) has been developed to assess the feasibility of operational adaptive control of the observing system and as a facility to aid research projects using data targeting Met Office lead, partnering with ECMWF.

50% / 50% funding from EUCOS and EC under the framework of PREVIEW (www.preview-risk.com)

The DTS web tool has been developed at ECMWF and runs at ECMWF.

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Data Targeting – user needs

Better observational response ahead of potentially high-impact weather events

- System to better exploit existing observing systems – currently have rigid schedules
- Observational assets to be more adaptive in real time

Potentially improve forecast products

- Reduce forecast uncertainties when ensemble products show differing predictions
- Aid accurate prediction of high impact weather events over Europe
- Aid early warning - 24 to 72 hours forecasts
- Aid crisis support within regions impacted by severe events

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PREVIEW Data Targeting System (DTS)

The DTS will provide an interactive web-based facility to request additional observations from the operational observing network.

Registered users of the DTS will be able to

- identify potential high-impact weather events, in particular cases with large uncertainty
- request sensitive area calculations for a given case: predictions of regions where additional observations are likely to have most impact in reducing the forecast uncertainty
- identify which additional observations to request
- issue requests for additional targeted observations

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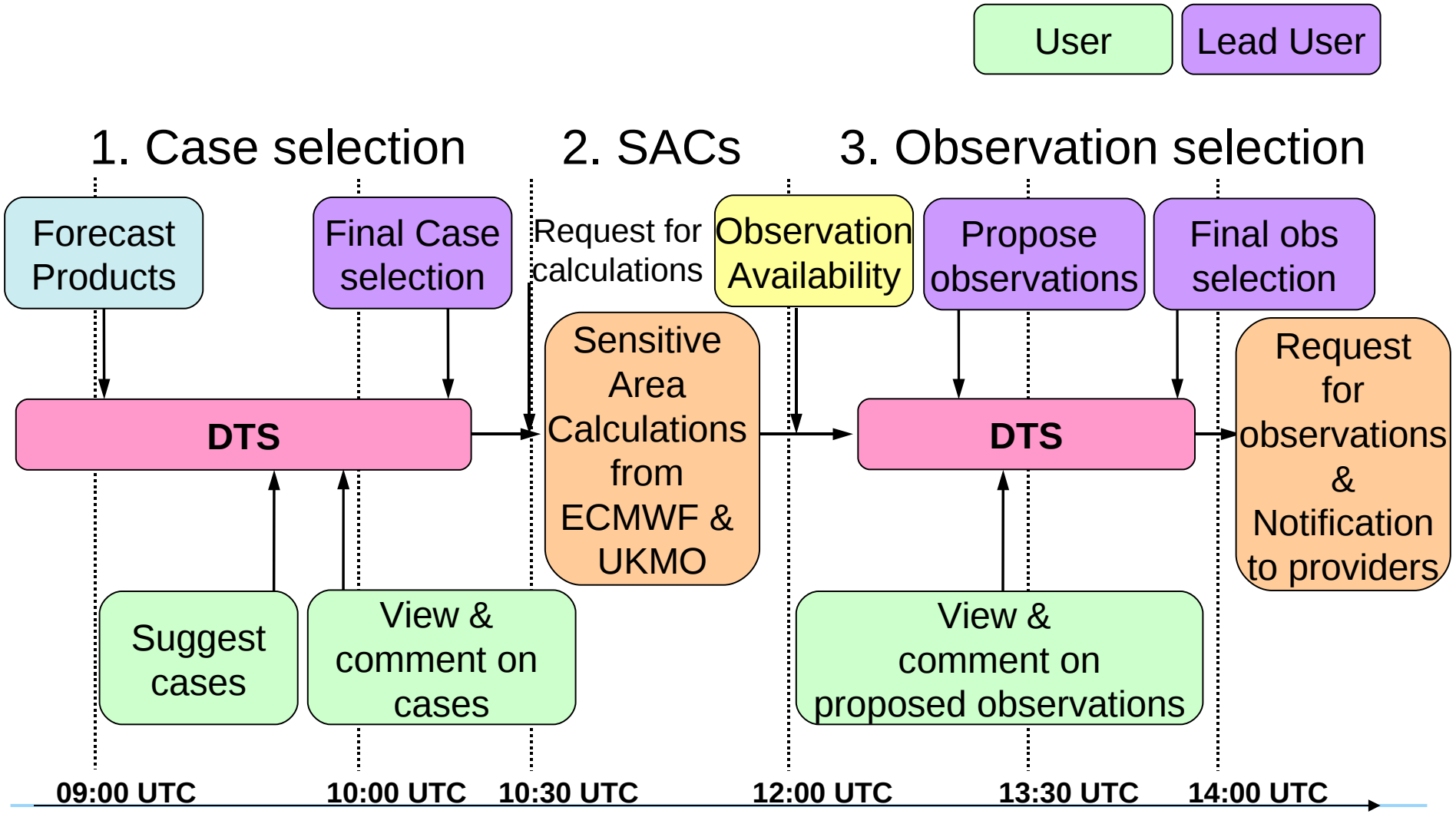
PREVIEW Data Targeting System (DTS)



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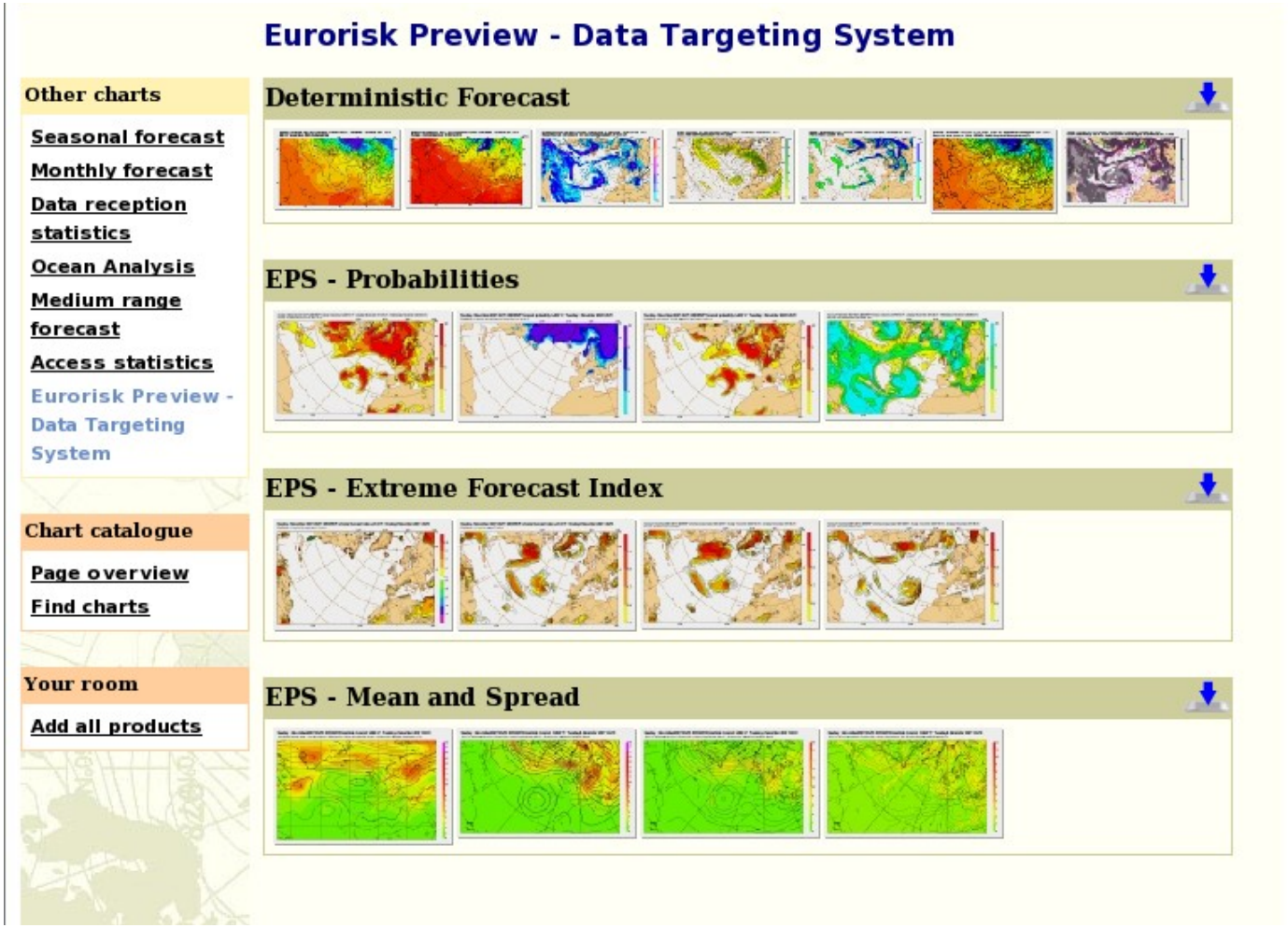
DTS – forecast products display



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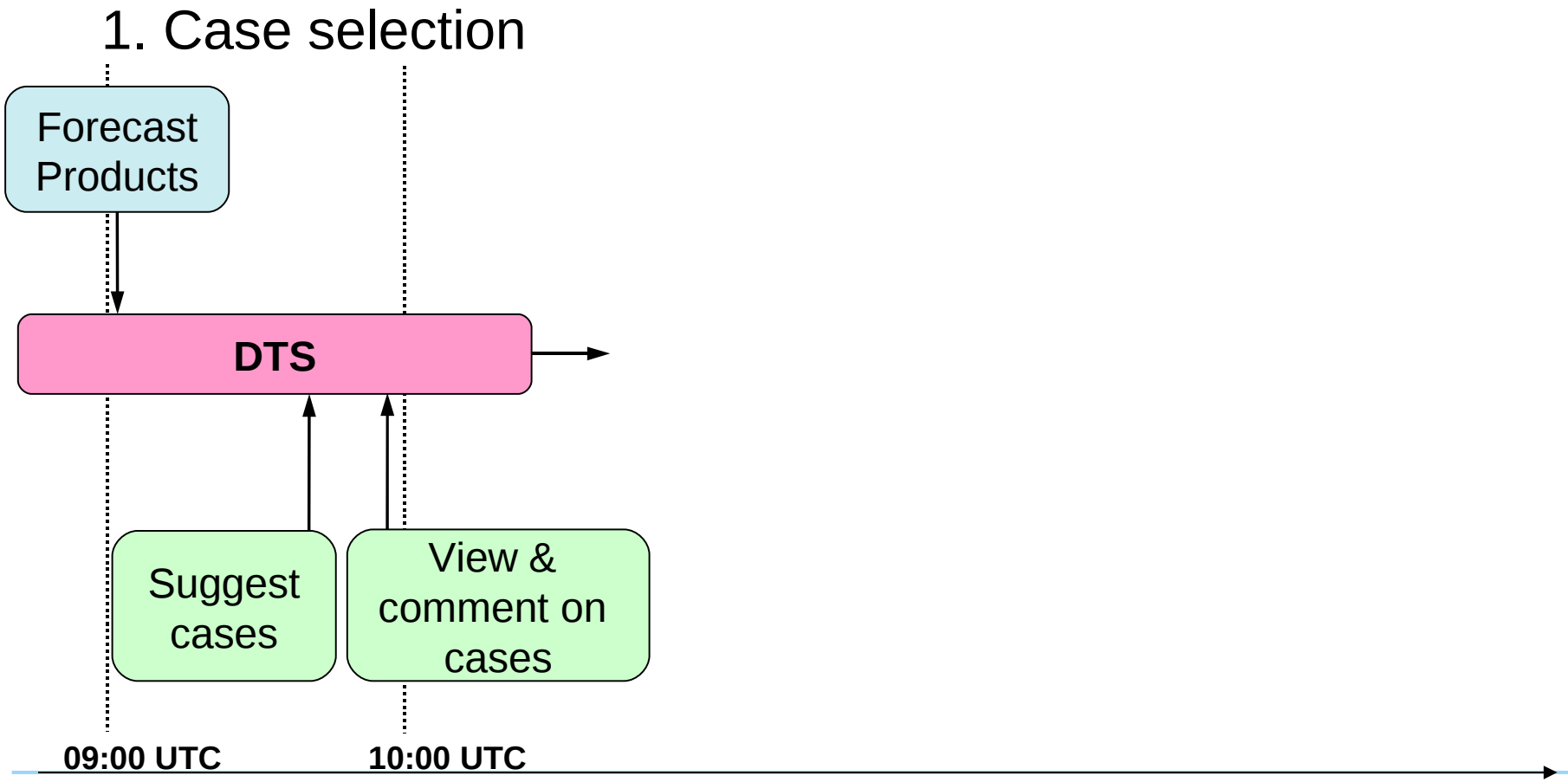
PREVIEW Data Targeting System (DTS)

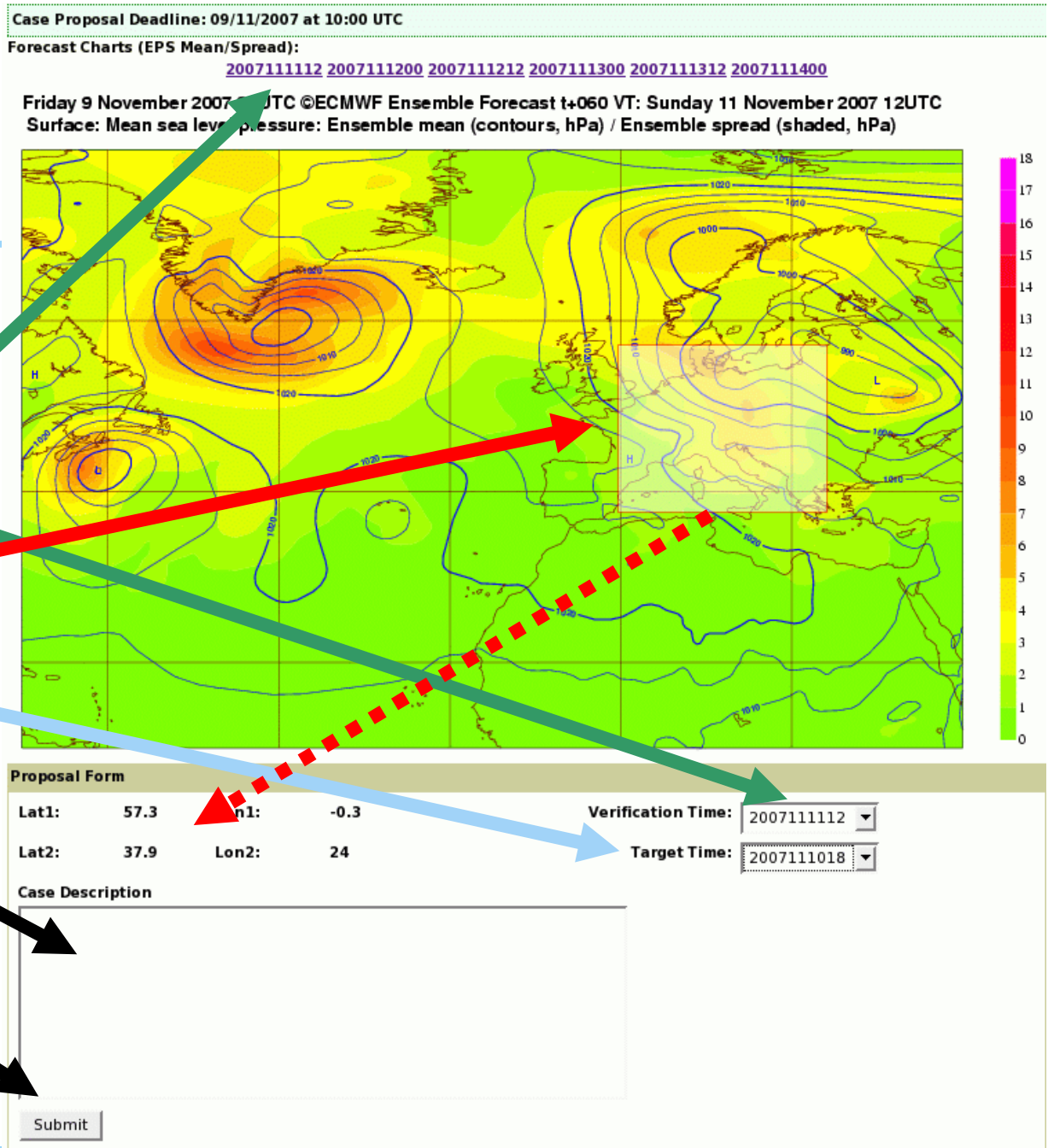
User | Lead User



DTS – case proposals

online form:

1. **Selecting the VT**
2. **Selecting the VA**
3. **Choose the TT**
4. **Add justification**
5. **To Submit**



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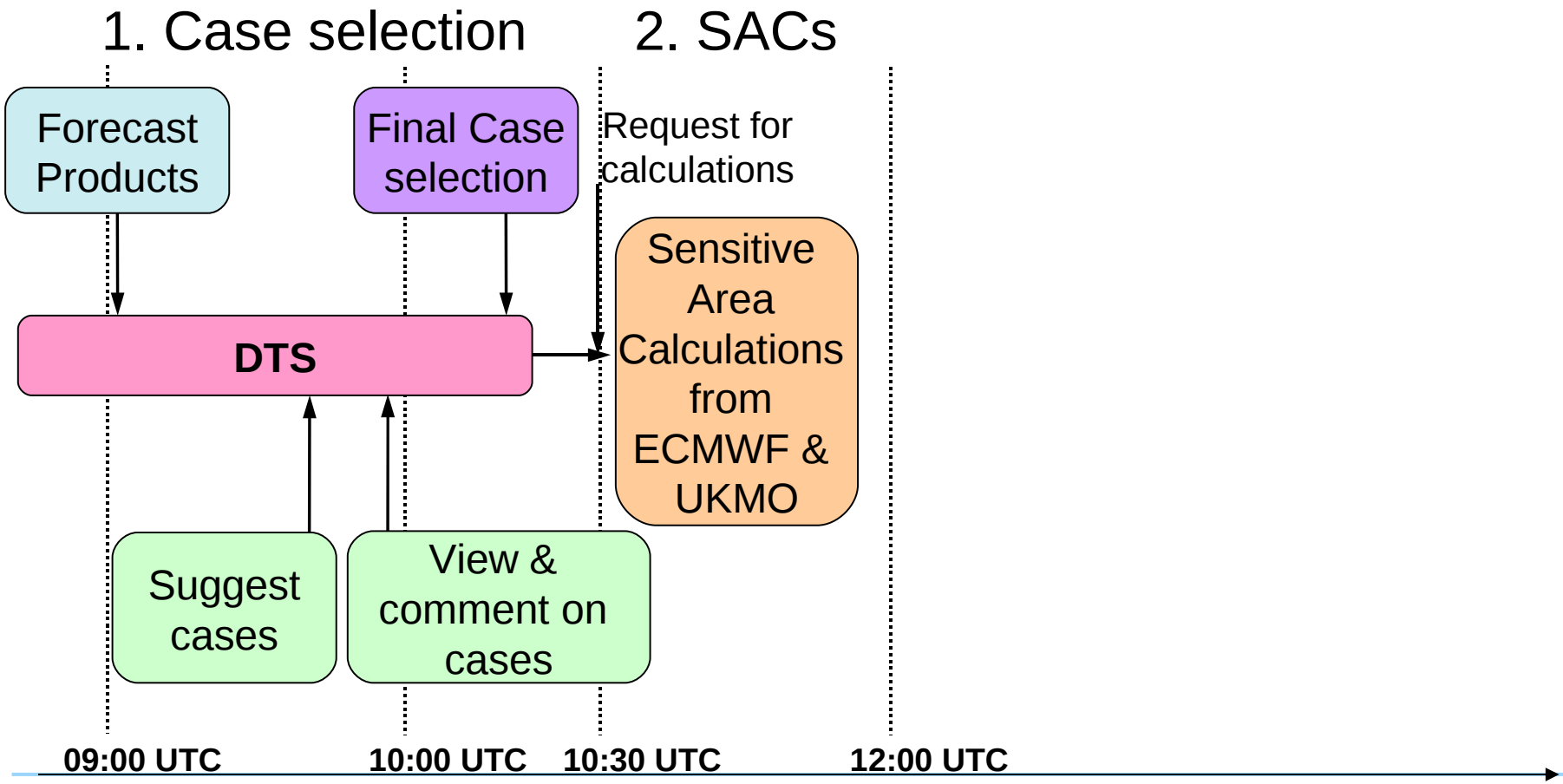
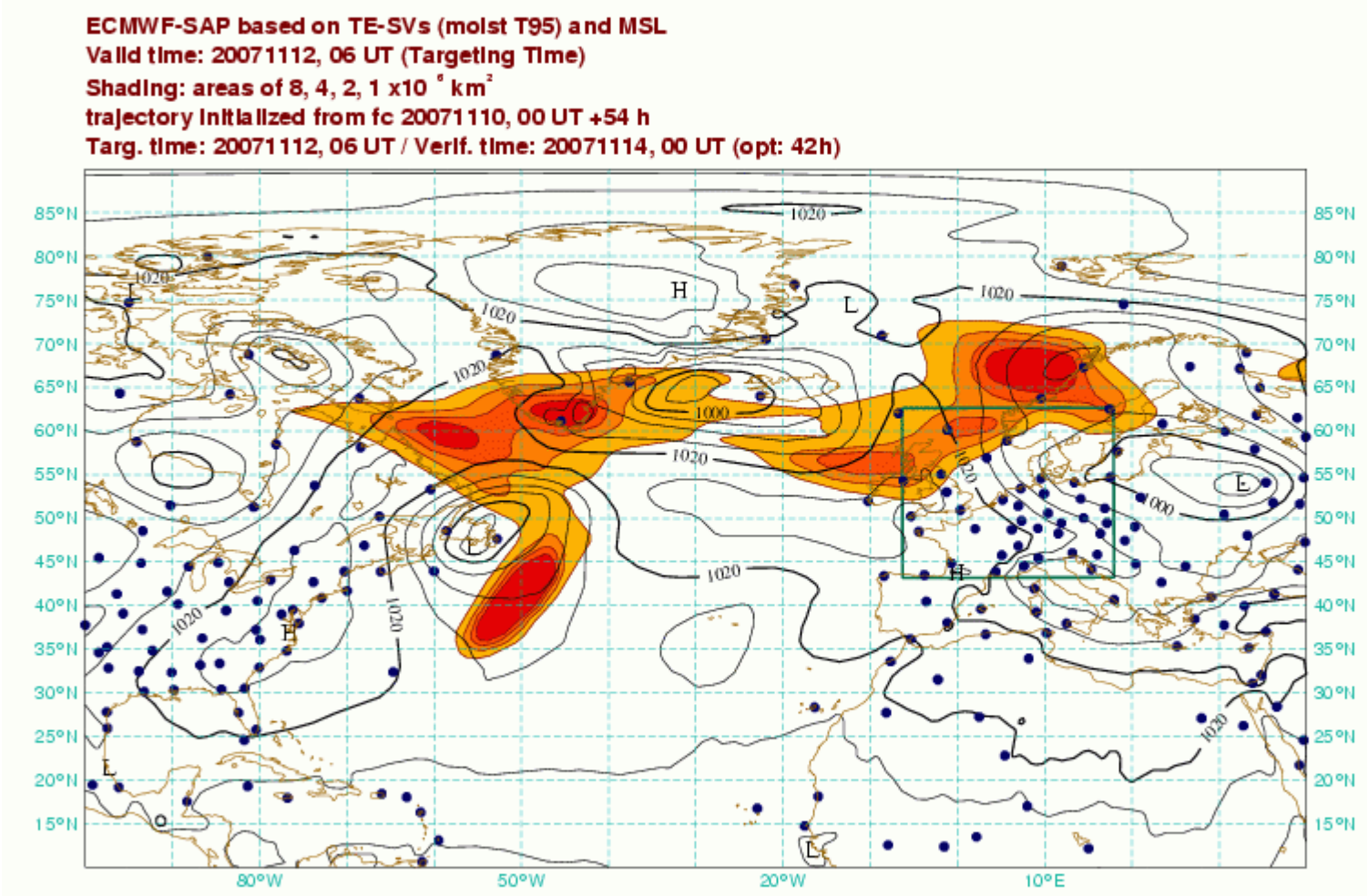
PREVIEW Data Targeting System (DTS)

User | Lead User



DTS – example of an ECMWF sensitive area calculation



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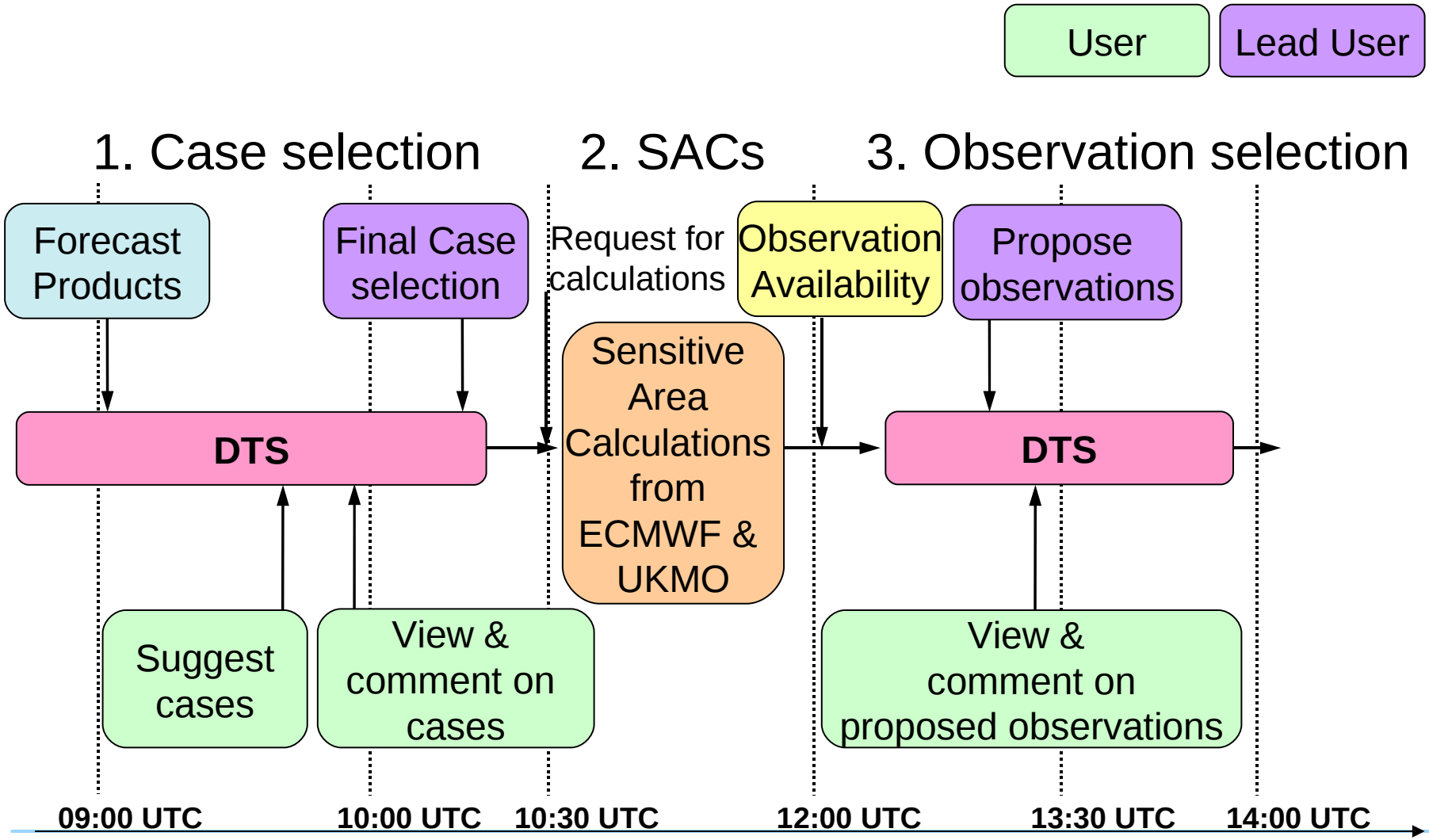
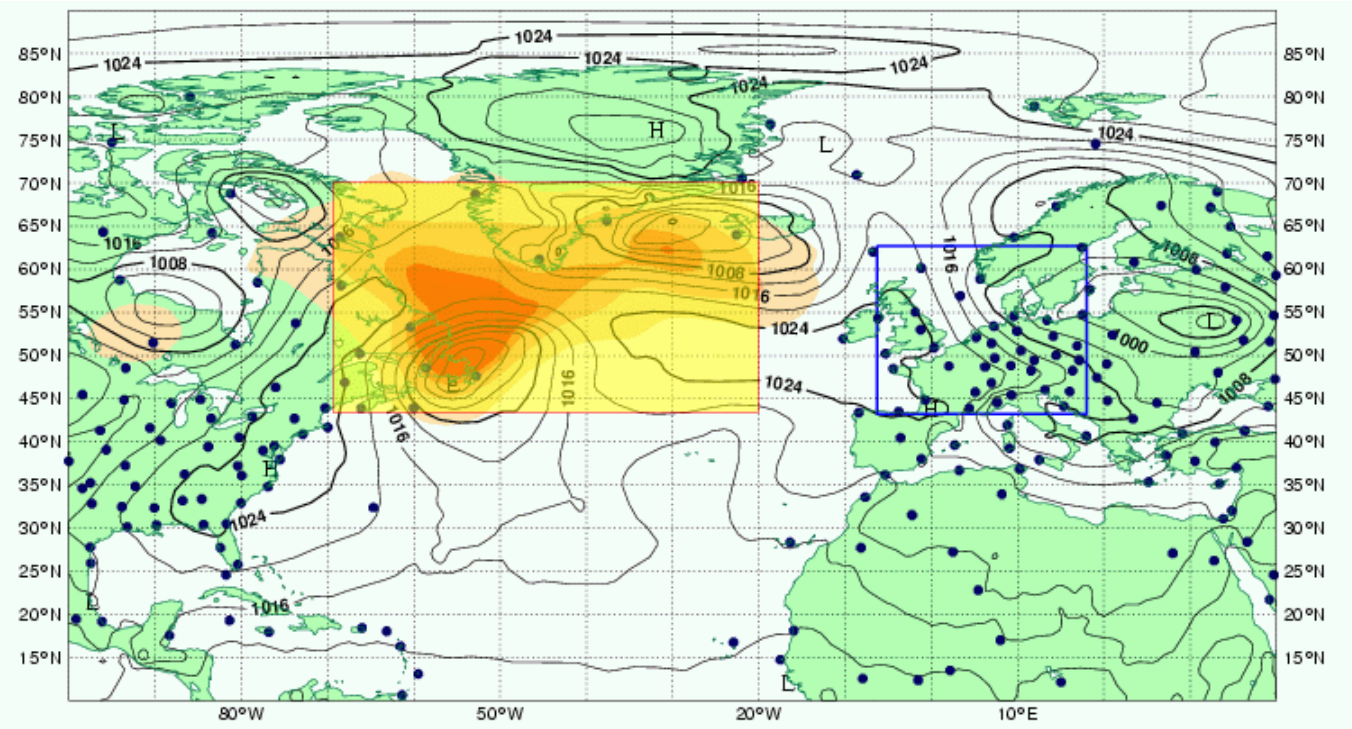
PREVIEW Data Targeting System (DTS)



DTS – observation selection

online form:

observation proposal



Proposed by: moh (10/11/2007 at 12:12 UTC)

Lat1: 70.2	**Lon1: -69.3**	**Verification Time:**	**2007111400**
Lat2: 43.6	**Lon2: -20.2**	**Target Time:**	**2007111206**

Observation List:

Observations on Selected Area
04360: 65.60 -37.63
04270: 61.15 -45.43
71909: 63.75 -68.55
04220: 68.70 -52.85
72712: 46.87 -68.00
71603: 43.87 -66.10
04018: 63.97 -22.60
71811: 50.22 -66.25
71906: 58.12 -68.42
71600: 43.92 -60.00
71801: 47.62 -52.75
71816: 53.30 -60.37
71815: 48.57 -58.57
'---'

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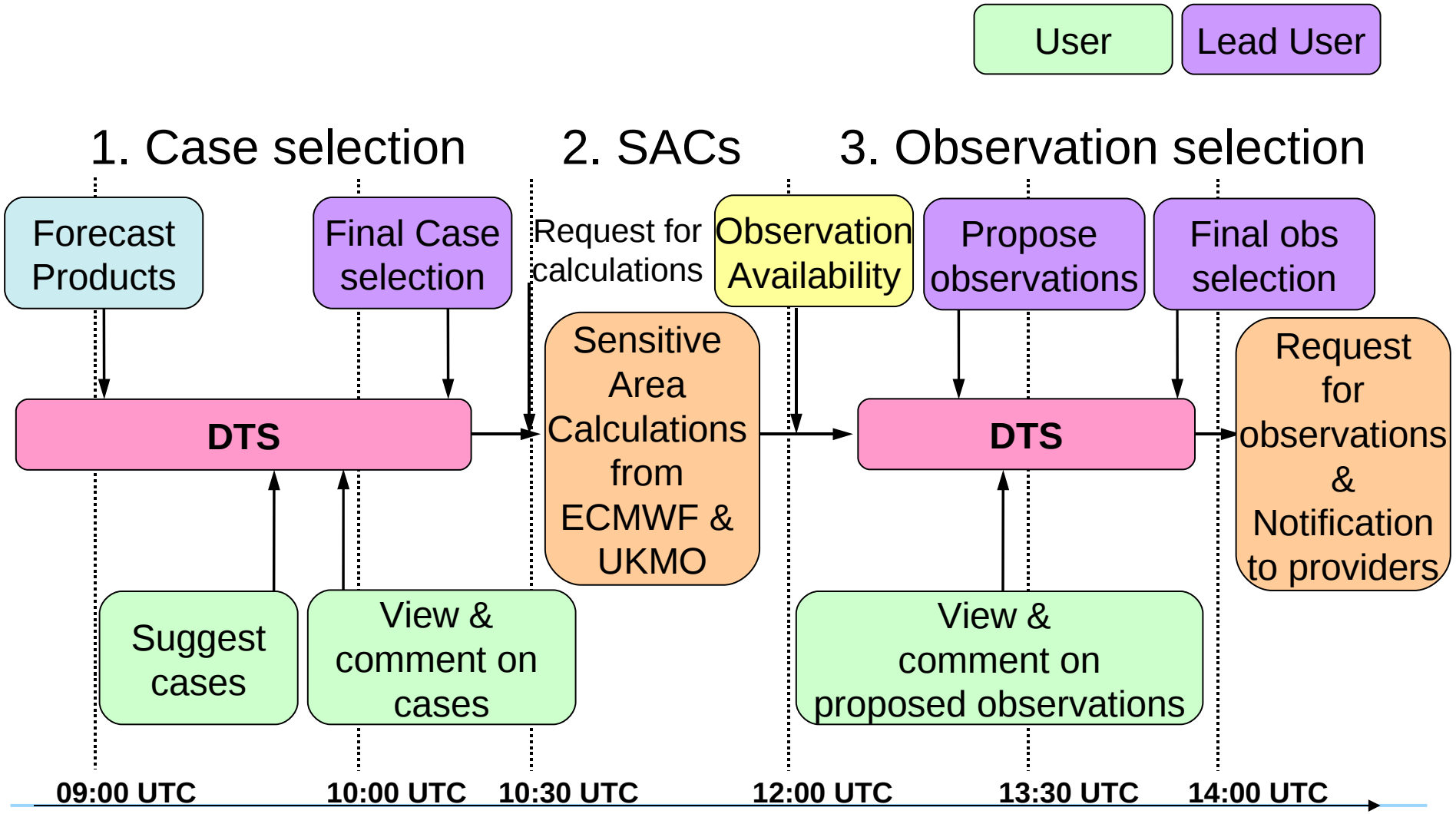
PREVIEW Data Targeting System (DTS)



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DTS – additional obs from:

E-ASAP

E-AMDAR

Radiosondes