Satellite Application Facility on Ocean and Sea Ice (OSI SAF)

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About OSI SAF

- EUMETSAT SAFs: dedicated centres of excellence for processing satellite data
- OSI SAF: answer to requirements, from the meteorological and oceanographic communities, for comprehensive information derived from meteorological satellites at the ocean-atmosphere interface
About OSI SAF

• The OSI SAF develops, processes and distributes, in near real-time, products related to key parameters of the ocean-atmosphere interface.

• The OSI SAF team focuses on
  – Scatterometer winds (and soon microwave winds),
  – Sea Surface Temperature (SST) and sea Ice Surface Temperature (IST),
  – Radiative fluxes : Surface Short wave Irradiance (SSI) and Downward Long wave Irradiance (DLI),
  – Sea ice concentration, edge, type, emissivity, drift.
OSI SAF partners

- METEOR FRANCE
- Royal Netherlands Meteorological Institute
- Ifremer
- Danish Meteorological Institute
- Norwegian Meteorological Institute

Journées scientifiques LEFE/GMMC 2017
Three OSI SAF subsystems

Research, development and production are based on 3 subsystems:

- **Low and Mid Latitude (LML) subsystem**
  - SST and radiative fluxes for LML, NAR and GLB areas

- **High Latitude (HL) subsystem**
  - SST and radiative fluxes for HL areas
  - Sea ice

- **Wind (WIND) subsystem**
  - Scatterometer winds
Scatterometer winds (ASCAT)
Scatterometer winds (ASCAT, SCA)

- ASCAT on Metop-A and -B, later Metop-C
- 2 spatial resolutions: 12.5 km “coastal” and 25 km
- Level 2 “swath”
- Global coverage
- In the future: SCA on Metop-SG
Scatterometer winds (discontinued)

- QuikSCAT on SeaWinds 1999-2009
- OSCAT on Oceansat-2 2009-2014
- RapidScat on ISS 2014-2016
- NRT archived data + Reprocessing (data records)
Satellite missions for OSI SAF NRT wind products

- Metop-A (ASCAT)
- Metop-B (ASCAT)
- Metop-C (ASCAT)
- Metop-SC (SCA+MWI)
- ISS (RapidScat) USA
- ScatSat-1 (OSCAT) India
- Oceansat-2 (OSCAT) India
- Oceansat-3 (OSCAT) India
- CFOSAT (RFSCAT) China/France
- HY-2A (HSCAT) China
- HY-2B (HSCAT) China
- HY-2C (HSCAT) China
- Meteor-M N3 (MSCAT) Russia
- FY-3E (windRAD) China
- FY-3G (windRAD) China

In orbit
Approved
Planned/Pending approval
Scatterometer winds quality assessment

Comparison with ECMWF model wind data

Comparison with buoys
High latitudes products: Sea Ice, Sea Surface Temperature, radiative fluxes
## High latitudes products: Sea Ice, Sea Surface Temperature, radiative fluxes

<table>
<thead>
<tr>
<th>Satellite input</th>
<th>Product</th>
<th>Freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSP/SSMIS GCOM-W/AMSR-2</td>
<td>L3 <em>sea ice concentration</em></td>
<td>daily daily</td>
</tr>
<tr>
<td>DMSP/SSMIS and Metop/ASCAT</td>
<td>L3 <em>sea ice edge, sea ice type</em></td>
<td>daily daily</td>
</tr>
<tr>
<td>DMSP/SSMIS</td>
<td>L3 <em>sea ice emissivity</em></td>
<td>daily</td>
</tr>
<tr>
<td>DMSP/SSMIS, Metop/ASCAT &amp; GCOM-W/AMSR-2 Metop/AVHRR</td>
<td>L3 low resolution <em>sea ice drift</em></td>
<td>daily</td>
</tr>
<tr>
<td></td>
<td>L3 medium resolution sea ice drift</td>
<td>daily, NH</td>
</tr>
<tr>
<td>Metop-A/AVHRR &amp; NOAA/AVHRR</td>
<td>L3 high latitudes <em>sea and sea ice surface temperature</em></td>
<td>12 hourly continuous</td>
</tr>
<tr>
<td>Metop-A/AVHRR</td>
<td>L2 high latitudes sea and sea ice surface temperature</td>
<td></td>
</tr>
<tr>
<td>METOP/AVHRR &amp; NOAA/AVHRR</td>
<td>L3 Atlantic high latitudes <strong>Downward Longwave Irradiance</strong> (DLI)</td>
<td>daily</td>
</tr>
<tr>
<td></td>
<td>L3 Atlantic high latitudes <strong>Surface Solar Irradiance</strong> (SSI)</td>
<td>daily</td>
</tr>
</tbody>
</table>
Sea Ice products
Satellite missions for OSI SAF NRT sea ice products

- Metop-A (AVHRR+ASCAT)
- Metop-C (AVHRR+ASCAT)
- Metop-B (AVHRR+ASCAT)
- Metop-SG (MetImage+SCA+MWI)
- S-NPP (VIIRS) USA
- JPSS-1 (VIIRS) USA
- JPSS-2 (VIIRS) USA
- DMSP-F18 (SSMIS) USA
- DMSP-F20 (SSMIS) USA
- DMSP-F19 (SSMIS) USA
- GCOM-W1 (AMSR-2) Japan/India/USA
- GCOM-W2 (AMSR-2) Japan/India/USA

Legend:
- In orbit
- Approved
- Planned/Pending approval
Sea ice quality assessment

Example:
Comparison between ice concentrations from the Greenland overview charts made by DMI and the OSI SAF concentration product.
Sea Surface Temperature

- LEO and GEO satellites
- Various coverage and various spatial resolution depending on the satellite and sensor
- Level 2 “swath” or L3
- In the future: ABI on GOES-R, FCI on MTG and Metimage on Metop-SG

Illustration of the Sea Surface Temperature and Ice Surface Temperature product (OSI-205) from Metop-A/AVHRR: 21/2/2017.
Satellite missions for OSI SAF NRT SST and radiative fluxes products

Satellite missions for OSI SAF CDOP3 – NRT radiative fluxes products

Same as SST missions (without IASI and IASI-NG)
Sea surface temperature quality assessment

Example:
Metop-B/AVHRR SST

Comparison with buoys (night)

Comparison with buoys (day)
Sea Surface Temperature data record

• Posters Session 3:

74. Stéphane Saux Picart (Météo France):
OSI SAF Sea Surface Temperature reprocessing of MSG/SEVIRI archive.

- Retrival method
- Cloud mask
- Validation againt drifting buoys measurements
Radiative fluxes

- LEO (Atlantic high latitudes) and GEO (GOES-E et Meteosat) satellites
- DLI: Downward Longwave Irradiance
- SSI: Solar Surface Irradiance
- Level 3
- In the future: ABI on GOES-R, FCI on MTG and Metimage on Metop-SG
Solar Surface Irradiance with GOES-13, Meteosat-10 and Meteosat-8
Radiative fluxes quality assessment

Comparison with measurements stations

Comparison GOES-E/Meteosat
Access to OSI SAF data

EUMETCast

EUMETCast is a multi-service dissemination system based on standard Digital Video Broadcast (DVB) technology. It uses commercial telecommunication geostationary satellites to multi-cast files (data and products) to a wide user community. EUMETCast also delivers a range of third-party products.

FTP servers

The OSI SAF production is based on three subsystems so you can find

- wind products on KNMI FTP server
- high latitude sea surface temperature, sea ice and radiative fluxes products on MET Norway FTP server
- other sea surface temperature and radiative fluxes on Ifremer FTP server

GTS

Only wind products are available through the WMO Global Telecommunication System.

EDC

The EUMETSAT Data Centre provides a long-term archive of data and generated products from EUMETSAT, which can be ordered online.

More information on http://www.osi-saf.org

Access to data

Journées scientifiques LEFE/GMMC 2017
Community

- Products documentation, quicklooks, validation results
- Frequent Asked Questions,
- User registration,
- Stories,
- Helpdesk
- Training, workshops and surveys
- Visiting scientists program
- Operational service messages (subscription)

on http://www.osi-saf.org
Le Centre de météorologie spatiale

Le CMS a été créé en 1963, il emploie aujourd'hui 65 personnes. Ses principales missions :
• acquisition, traitement et archivage des données satellitaires ;
• diffusion en temps réel des produits ;
• conception et développement d'algorithmes et de logiciels de traitement satellitaires ;
• expertise, formation, assistance et fourniture de produits d'imagerie extraits de l'archive pour des besoins scientifiques, institutionnels ou commerciaux.
Le centre de météorologie spatiale
SST (Celsius) – quality levels 3, 4, 5
Sea ice concentration usage

Arctic Sea Ice Extent (>=15% SIC) Monthly Time Series

Reference period 1981-2000

March Trend:
-46 thousand km²/year
-2.8%/decade

September Trend:
-92 thousand km²/year
-11.9%/decade

Graph was plotted 15/06/17 08:17 UTC
Source: EUMETSAT OSI SAF (http://osisaf.met.no)