Towards Improved Estimates   
of Ocean Heat Flux

(TIE-OHF)

Status of data available for OHF project

In response to ESA ITT ESRIN/AO/1-7712/13/I\_AM

(***Reference: Improvement and Calculation of Global Long Time Series of Ocean Heat Fluxes from Satellite Remotely Sensed Data***)

Tender Reference: ESA/II/IFREMER/Tender/Tch

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| **Table  :** Characteristics of OHF data (IP, FP, IN, DP state for Input product, Flux product, In-situ, and Delivery product respectively. | | | | | | | | | | | | | | | | |
| **TIE-OHF Ocean Heat Products to be delivered** | **Ref** | **Parameter** | **Resolution** | **Frequency** | **Time Span** | **Coverage Time** | **Coverage Space** | **UncertaintyInformation** | **Error Size** | **Sensor Souces** | **Source** | **Nature Product** | **Level** | **Data Provider** | **File Format** | **Comments** |
| **EO Input Products** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wind stress | IP1 | wind speed | 25km/ 12.5 km | Orbits | Mar 1992 - Feb 2011 | 10 yrs | 80S-80N |  | 1m/s - 2m/s | Scatterometers | QSCAT | EO | L2a | IFREMER; ESA; SAF OSI; JPL/NASA; KNMI; CNES; SAF Clim. | Netcdf 3 or 4 |  |
| Humidity | IP2 | air humidity | 25km | Orbits | Mar 1992 - Feb 2011 | 20 yrs | 80S - 80N |  | 1g/kg | Radiometers and ancillaries (SST; Air Temp.) | F10 - F15 SSM/I ; |  | L2a | IFREMER; ESA; EumetSat/SAF Clim; NOAA/Univ. Colorado | Netcdf 3 |  |
| Sea Surface Temperature | IP3 | SST | 25km | Daily | Mar 1992 - Feb 2011 | 20 yrs | IS THIS CORRECT | covariance matrix | 0.20°C | AATSR; AVHRR; AMSR | Envisat; Metop; NOAA | EO (merged) | L3 and L4 | ESA CCI and NOAA OI. | Netcdf 3 and/or 4 |  |
| Air Temperature | IP4 | Air. Temp. | 0.35° - 0.70° | 6-hourly | Mar 1992 - Feb 2011 | 20 yrs | 80S - 80N |  | 0.20°C | NWP re-analyses (ERA Interim; CFSR) | ECMWF; NCEP | Model | NWP re-analyses (ERA Interim; CFSR) | ECMWF; NCEP | Netcdf 3 |  |
| Pressure | IP5 | Pressure | 0.35° - 0.70° | 6-hourly | Mar 1992 - Feb 2011 | 20 yrs | 80S - 80N |  |  | NWP re-analyses (ERA Interim; CFSR | ECMWF; NCEP |  | NWP re-analyses (ERA Interim; CFSR) | ECMWF; NCEP | Netcdf 3 |  |
| Ocean State | IP6 | Ocean State | 7km - 25km | Orbits/Daily | Mar 1992 - Feb 2011 | 20 yrs | 80S - 80N |  | 0.50m | ESA CCI / Altimters | ESA CCI (GlobWave); ERS-1/2; TP; Envisat; Jason-1/2 | EO (merged) | L2 and L3 | ESA; IFREMER | Netcdf 3 |  |
| Ocean Colour | IP7 | Chlorophyll | 25km | Daily | Mar 1992 - Feb 2011 | 20 yrs | 80S - 80N |  |  | ESA OC CCI | ESA OC CCI |  | L3 and L4 | ESA; PML | Netcdf 4 | The Chlo will be used to see how the SW flux will penetrate the ocean in bubble analysis |
| Surface Current | IP8 | Surface Current | 0km - 50km | Hourly/ Daily | Mar 1992 - Feb 2011 | 20 yrs | in-situ sites / Global |  | 1m | Buoys and/or ocean n numerical models | NDBC; TAO; PIRATA; RAMA; OceanSites; Mercator; ROMS; MARS | In-situ | In-situ / L4 | NOAA; PMEL; IRD; IFREMER; Mercator | Netcdf 3 and/or binary | Correction to quantify OHC |
| **Flux products (Satellite, Ship, and NWP Products)** | **Ref** | **Parameter** | **Resolution** | **Frequency** | **Time Span** | **Coverage Time** | **Coverage Space** | **UncertaintyInformation** | **Error Size** | **Sensor Souces** | **Source** | **Nature Product** | **Level** | **Data Provider** | **File Format** | **Comments** |
| IFREMER data set | FP1 | Wind; Hum; SST; Air Temp; LHF; SHF | 25km | Daily | Oct 1999 - Nov 2009 | 10 yrs | 80S - 80N |  |  |  |  |  | L3 and L4 | IFREMER | Netcdf4 | Version 4 calculated for OHF project. |
| HOAPS data set | FP2 | Wind; Hum; SST; Air Temp; LHF; SHF; LW; SW; RR | 50km | 6-hourly Swaths | Jan 1988 - Dec 2007 | 20 yrs | 80S - 80N |  |  |  |  |  | L3 | DWD | Netcdf3 | Dailiy-avefaged estimates calculated fro OHF project issues |
| SeaFlux data set | FP3 | Wind; Hum; Air Temp.; LHF; SHF | 25km | Daily | Jan 1992 - Dec 2007 | 15 yrs | 80S - 80N |  |  |  |  |  | L4 | WHOI | Binary | Data are reformatted for OHF project. |
| OAFlux | FP4 | Wind; Hum; Air Temp; LHF; SHF | 100km | Daily | Jan 1985 - Dec 2014 | 30 yrs | 80S - 80N |  |  |  |  |  | L4 | WHOI | Netcdf3 |  |
| J-OFURO data set | FP5 | Wind; Hum; SST; Air Temp; LHF; SHF; LW; SW; | 50km | Daily | Jan 1988 - Dec 2007 | 20 yrs | 80S - 80N |  |  |  |  |  | L4 | Univ. Tokai | Netcdf3 |  |
| NOCS2 | FP6 | Wind; Hum; SST; Air Temp; LHF; SHF | 100km | Daily | Jan 1992 - Dec 2010 | 19 yrs | 80S - 80N |  |  |  |  |  | L4 | SOC | Netcdf3 |  |
| ERA Interim | FP7 | Wind; Hum; Air Temp.; LHF; SHF | 0.70° | 6-hourly | Jan 1992 - Dec 2011 | 20 yrs | 90S - 90N |  |  |  |  |  | Reanalyses | ECMWF | Grib | Data reformatted fro OHF project |
| CFSR | FP8 | Wind; Hum; Air Temp.; LHF; SHF | 0.38° | 6-hourly | Jan 1992 - Dec 2011 | 20 yrs | 90S - 90N |  |  |  |  |  | Reanalyses | NCEP | Grib | Data reformatted fro OHF project |
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| **In-Situ data (Validation/ Quality Process)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NDBC | IN1 | Wind; Hum; Air Temp.,SST,  Pressure  wave |  | 10mn / 1 hour | Jan 1992 - Dec 2014 | 22 yrs | 20°N – 67°N |  |  |  |  |  | Moorings | NOADD/NODC | binary | LHF and SHF are calculated for OHF comparison purposes |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TAO/PIRATA/RAMA | IN2 | Wind; Hum; Air Temp.,SST,  pressurecurrent |  | 10mn / 1 hour | Jan 1992 - Dec 2014 | 22 yrs | 20°S – 22°N |  |  |  |  |  | Moorings | PMEL/IRD/INPE | binary | LHF and SHF are calculated for OHF comparison purposes |
| MFUK | IN3 | Wind; Hum; Air Temp.,SST,  Pressure,  wave |  | 1 hour | Jan 1999 - Dec 2014 | 15yrs | 32°N – 65°N |  |  |  |  |  | Moorings | Meteo France / UK Met Office | binary | LHF and SHF are calculated for OHF comparison purposes |
| **Delivered products** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Surface Wind | DP1 | W, U, and V | 25km | Daily | 1999 – 2009 | 10yrs | Global | Error analysis | 1m/s | Scatterometer | QSCAT | EO | L3 | IFREMER | Netcdf4 | Updated version |
| Wind Stress | DP2 | τ, τx, τy | 25km | Daily | 1999 – 2009 | 10yrs | Global | Error analysis | 0.01N/m2 | Scatterometer | QSCAT | EO | L3 | IFREMER | Netcdf4 | Updated version |
| Specific Humidity | DP3 | Qa | 25km | Daily | 1999 – 2009 | 10yrs | Global | Error analysis | 1g/kg | Radiometers | SSM/I F11 – F15. | EO (merged) | L4 | IFREMER | Netcdf4 | Updated version |
| Sensible | DP4 | SH | 25 km | Daily | 1999- 2009 | 10yrs | Global | Error analysis | 10W/m² | Scatterometer and radiometers | QSCAT; SSM/I | EO (merged) | L4 | IFREMER | Netcdf 4 | Updated version |
| Latent | DP5 | LH | 25 km | Daily | 1999- 2009 | 10yrs | Global | Error analysis | 30W/m² | Scatterometer and radiometers | QSCAT; SSM/I | EO (merged) | L4 | IFREMER | Netcdf 4 | Updated version |
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