



ESA Support to Science Element

Ocean Heat Flux (OHF) – Activity Progress Report

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1 INTRODUCTION

This document is the monthly periodic activity report for April to June 2015 for the ESA project “Ocean Heat Flux”, and forms deliverable [D6.4] of the project documents.

1.1 DOCUMENT STRUCTURE

The information within this document is structured as follows:

- Section 1: This introduction.
- Section 2: Provides an overview of the project.
- Section 3: Progress, problems and forthcoming activities for all major work packages.
- Section 4: A summary of the management activities addressing contractual and financial aspects, status of deliverables, milestones and travel expenditure, actions.

The work package sections will concentrate on describing the objectives, achievements, deliverables, and plans for the current and forth coming reporting periods.

1.2 AMENDMENT HISTORY

Version	Date	Change Description	Author
1.0	12 June 2015	Initial version	JF Piollé (IFREMER)

Table 1 : history table

1.3 DISTRIBUTION

Name	Role	Company
Pierre-Philippe Mathieu	ESA Technical Officer	ESA
Abderrahim Bentamy	OHF Scientific Leader	IFREMER
Jean-François Piollé	OHF Project Manager	IFREMER

Table 2 : distribution table

1.4 APPLICABLE DOCUMENTS

The following table lists the applicable documents to this report.

Table 3: Applicable documents

Id	Title	Reference	Issue	Rev.
LET	Letter-Invitation to Tender	Act.Ref.: 13.155.28	15 Nov. 2013	
SOW	Statement of Work	EOP-SA/0261/PPM-ppm	1	1.
SCOT	Special Conditions to Tender	Appendix 3 to AO/1-7712/13/I-AM		
DC	OHF Contract	Appendix 2		

1.5 REFERENCE DOCUMENTS

The following table lists the reference documents to this report.

Table 4: Reference documents

Id	Title	Reference	Issue	Rev.
D1.1	Reference Baseline Document		3 April 2015	1.0

2 PROGRESS OF ACTIVITY

2.1 WP 1 REQUIREMENT BASELINE ANALYSIS

Progress on the definition of the requirement baseline, which now provides further and accurate descriptions of OHF work plan has continued, in particular on the following points.

(1.4 Identification of the product algorithm strengths and limitations)

Investigation of the product algorithm strengths and limitations. Main of flux products, especially those calculated from remotely sensed observations, are determined based on the use of COARE3.0 parameterization. The objective is to assess the impact of such parameterizations on flux errors at various space and time scales. Turbulent fluxes (wind stress, latent heat and sensible heat fluxes) were calculated from bulk variables derived from OceanSites buoy measurements and using COARE3.0 and COARE4 parameterizations. The results will be analyzed by IFREMER and NERSC groups. They will be made available for OHF partners through OHF web site.

(task 1.5 Consolidation the strategy of the flux product evaluation and validation)

Further additions on cage concept by MIO and usage of ocean colour by PML were provided.

A progress report aiming at the description and the quality determination of the standardized flux products was written by Ifremer. It provides the results needed for meeting WP2 and WP3 requirements.

(1.6 Consolidation of the method aiming at the generation of a suitable ensemble of realization of turbulent fluxes)

We investigated the requirements dealing with the generation of a suitable ensemble realization of turbulent fluxes. To meet the requirements, we first developed and tested methods aiming at the determination of “standardized” flux products.

2.2 WP 2 REFERENCE DATASET GENERATION

(task 2.1.1 Collecting and archiving of all existing flux datasets to be intercompared, over the period 1999-2009)

The team organized the collection of the new daily HOAPS flux data.

(task 2.4.2 Construction of an online product catalogue)

All collected data are traced in general OHF product catalogue accessible on OHF web site (<http://www.oceanheatflux.org/index.php/data/catalogue>). Whenever possible the DOI will be referred to (none could be found for the currently collected datasets).

(task 2.2 Homogenization of turbulent flux data)

All the collected data are systematically homogenized to a common format (defined in a dedicated OHF Interface Control Document) and on the same spatial and temporal grid (daily, 0.25° resolution) over the same period 1999 to 2009.

Latest standardized datasets include:

- ERS_interim
- CFSR
- seaflux v1
- j-ofuro v3
- HOAPS v3
- Ifremer v4

(task 2.4 Make data available to project members through (preliminary) portal)

These reference data are all made available on the OHF portal:

- FTP access : ftp://eftp.ifremer.fr/oceanheatflux/data/standardized_fluxes/
- SSH access on Ifremer cloud *Nephelae* :
/home/cercache/project/oceanheatflux/data/standardized_flux_data/

In particular, access has been granted to NERSC to perform the "triplet" diagnostic using the collected in situ data.

3.1 WP 3 PRODUCT GENERATION, INTERCOMPARISON AND UNCERTAINTY ESTIMATION

(task 3.3 Evaluation of data sets and error characteristics)

In addition to moorings (TAO, PIRATA, RAMA, NDBC, MFUK, and OceanSites), in-situ data derived from SeaFlux project and from SAMOS are used. Both have been collected to further investigate the quality of fluxes and to assess the impact of bulk variables and of the parameterization at various scales. The former are high quality data archived at SeaFlux (campaigns data) web site or provided by COAPS team (<https://coaps.fsu.edu/>). They maintain a large database of in-situ named SAMOS. Data are from a number of selected ships providing high resolution (in space and time) measurements including oceanic and atmospheric data. They are available over global oceans including high latitudes where “ground references” are highly undersampled. Campaign and SAMOS data are used to estimate daily fluxes suitable for comparisons with existing and produced OHF flux estimates. In order to compare the ship-observed and daily mean global product fluxes, the best estimate of collocated and cotemporal fluxes were calculated. The ship observations are averaged over the 24 hours corresponding to the product means and the product fluxes are averaged over the spatial extent covered by the ship in that 24 hours.

(task 3.3.9 cage studies)

The work to establish "cages-team" is ongoing: the main focus was to develop a method for the concept of cages, first implemented through a scientific publication. The general idea will be presented during the next OHF teleconference.

The current steps include:

- scientific discussion with DWD and agreed collaboration: DWD for turbulent and radiative flux estimates
- estimate of ocean heat content by MIO
- establish a proposal for a Short Term Scientific Mission in the context of the COST ES1402 "EOS" action in order to establish cage team: perspective to establish scientific discussion between MIO and University of Reading, NOC and ECMWF for the lateral flux estimate needed to develop the "concept of cages"

(task 3.3.10 sensitivity of estimated fluxes and the oceanic heat budget to changes in the optical properties of the water)

Further to previous progress reports, additional sensitivity experiments have now been run using the coupled optical and mixed layer model (GOTM). These investigate how the effects of regional and seasonal variability on heat flux can override or enhance the effects of optical variability established from previous sensitivity experiments. We are in the process of compiling a report summarising the results of these experiments which will contribute to the report in work package 4. A final set of experiments will investigate the effects of non-uniform chlorophyll depth profiles.

In addition to this, the code for applying the optical model to satellite products (CCI chlorophyll concentrations) has now been completed and optimised for application to global data. Output available from this includes modelled surface PAR for clear sky conditions, PAR at the mixed layer depth, and estimates of heat content over the mixed layer due to absorption. Example scenes have now been run. Further development to be done on this includes accounting for cloudy conditions and considering the effects of non uniform chlorophyll profiles.

3.2 WP4 DATA PORTAL DEVELOPMENT

(task 4.2 access to Ifremer cloud)

Access to the platform Nephelae at Ifremer has been set for any OHF project partner (<http://oceanheatflux.cersat.fr/index.php/data/nephelae-platform>). This has been tested with Rick Danielson from NERSC during a visit at Ifremer premises.

(task 4.3 access through ftp and OpenDAP)

The access to the current reference dataset through ftp has been also set. The login/password can be obtained from the following registration page:

3.3 WP 5 STRATEGIC DEVELOPMENT

No activity on this workpackage.

3.4 WP 6 PROJECT MANAGEMENT AND COMMUNICATION

3.4.1 COMMUNICATION WITH PARTNERS AND EXPERTS

The team (through MIO) hold a scientific presentation at DWD, including project "concept of cages".

An internal progress meeting is planned by telecon on 24th June 3:00 PM.

3.4.2 COMMUNICATION WITH USER COMMUNITY

Here is a summary table of OHF publications that will be updated in the next progress reports:

Reference	Authors	Status
TIE-OHF: towards improved estimates of ocean heat flux, Flux News, A. Bentamy and K. von Schuckmann, Issue 7, February 2015	A Bentamy K Von Schuckmann	Published
Towards improved estimates of ocean heat fluxes, Bentamy, A., Von Schuckmann, K., Piollé, J. F. SOLAS Newsletter 17 http://www.solas-int.org/publications/latest-newsletter.html	Bentamy A. Von Schuckmann K. Piollé J. F.	Published
Homogenization of Scatterometer Wind Retrievals	A Bentamy	In review

The team has been working on the organization of the joint CLIVAR RF CONCEPT-HEAT, ESA-OHF, ORA-IP and COST EOS workshop to take place 29.09.-01.10.2015 at MetOffice, Exeter, UK

Here is also a summary of the workshops we plan to present OHF to or where OHF was presented :

Workshop	Attendant	Status
Challenges of the surface energy budget and proposed ways	K Von Schuckmann	Presented

forward, K. von Schuckmann, S. Josey, S. Gulev, K. Trenberth, C.-A. Clayson, P.-P. Mathieu, M. Wild <i>EGU, Vienna, 12-17 April 2015</i>		
<i>EGU (European General Assembly 12 – 17 April 2015, Vienna Austria)</i>	R. Pinker (OHF expert)	Presented
IOVWST (19 - 21 May 2015 Portland USA)	A Bentamy	Presented
Session “The Earth’s energy imbalance and exchanges at the atmosphere-ocean interface: from fundamental research to societal concern” <i>"Our common future under climate change", Paris, 7-10 July 2015, http://www.commonfuture-paris2015.org/</i>	K Von Schuckmann	Accepted
joint CLIVAR RF CONCEPT-HEAT/CLIVAR GSOP/COST ES1402 workshop <i>UK Met Office, Exeter, 28 Sept.-02 Oct.</i>	A Bentamy K Von Schuckmann	Accepted
SOOS - Air-Sea Fluxes for the Southern Ocean: Strategies and Requirements for Detecting Physical and Biogeochemical Exchanges, Frascati, Italy, September 21-23, 2015		
GEWEX (Earth Observation for Water Cycle Science 2015 20th-23rd October 2015 ESA-ESRIN, Italy)		
Oceanflux GHG & Ocean Heat Flux : an open collaborative research framework for ocean fluxes , Open Science 2.0	JF Piollé	Submitted

4 MANAGEMENT

4.1 PROJECT MANAGEMENT PLAN

The project management plan was completely revised, with a new workpackage breakdown, more detailed and matching the breakdown of ESA Statement of Work. It shall provide a better understanding of the partner's respective responsibilities. It is currently circulated among project partners for approval and will be submitted to ESA mid April.

4.2 INVOICES

The following table summarizes the status and dates of the invoices from IFREMER and related payment from ESA.

The first payment request has been submitted to ESA on 12th December 2014 (and resubmitted on 6th March 2015) but is still pending.

Payment Milestone	Date	status of invoice to ESA	Payment Received
Progress payment 1, upon acceptance of deliverable D4.1 (v1)	KO + 3	Submitted for all partners	No
Progress payment 2, upon acceptance of deliverable D1.1 (v1), D2.1 (v1), D5.1 (v1) and successful critical review	KO + 8	Not submitted	
Progress payment 3, upon acceptance of deliverable D4.1 (v2), D3.2 (v1), D3.3 (v1), D3.1 (v1), D6.1 (v1) and successful acceptance review and annual meeting	KO + 12	Not submitted	
Progress payment 4, upon acceptance of deliverable D4.1 (v3,v4), D5.1 (v2) and successful critical review	KO + 18	Not submitted	
Final payment, upon acceptance of all deliverables, incl. D3.1, D3.2, D3.3, D4.1, D6.1, D6.2 and successful final presentation meeting.	KO + 24	Not submitted	

4.3 MEETINGS

Meeting	Venue	Date	Description	Status
KO	ESRIN	KO	Kick-off meeting	Hold on July 2014
PM1	IFREMER	KO+7	Progress meeting 1 (critical review)	Hold on 26 – 27 January 2015
PM2	ESRIN	KO+18	Progress meeting 2 (critical review)	
Final workshop	IFREMER	KO+21	Final project workshop	
FP	ESRIN	KO+24	Final Presentation Meeting – review of products, services, and remaining project deliverables. Analysis of project sustainability.	

4.4 PENDING AND COMPLETED ACTIONS

The Actions Database [D6.5] records actions resulting from milestone meetings with ESA. The extract below lists the actions raised and closed for the past month, and those that remain open.

ID	RESPONSIBLE	DESCRIPTION	OPEN	DUE DATE	STATUS	COMMENT
1	IFREMER/AB	Provide MoM from Paris meeting PM1	26/01/15		Open	Done
2	IFREMER/JFP	Workpackage to be renamed conforming to IT ESA SoW tasks	26/01/15		Open	Done in updated PMP
3	IFREMER/AG	Add MERRA reanalyzes to reference dataset	26/01/15		Open	
5	IFREMER/AB	Double check the product rights and especially ERA Interim	26/01/15		Open	
6	IFREMER/AG	Double check the version of each product and the associated DOI (if exists)	26/01/15		Open	Done
7	IFREMER/AB	Provide the accuracy requirements for LHF and SHF. The latter would be derived from peer review publications and from scientific project reports (e.g. http://lists-ioc-goos.org/goos-strategic-mapping-graphic/)	26/01/15		Open	Ongoing in RB

					ICD document has been written for format. Further discussion needed for resampling methods.
8	IFREMER/AG	Circulate the methods aiming at the homogenization of the flux products	26/01/15	Open	
9	IFREMER/AG	Foster interaction between NERSC and IFREMER aiming at comprehensive use of data and procedures including cloud procedure, Felyx, collocation, statistics	26/01/15	Open	Ongoing
10	IFREMER/AB	Contact Dr Lisan YU for the updated OAFlux	26/01/15	Open	Requested but these data are still under validation and can not be distributed
11	MIO/KVS	Provide report summarizing the main tasks relied on D1.1 (services, methods, ..)	26/01/15	Open	Ongoing in RB
12	NERSC/RD	Provide a note aiming at the clarification of work performing by NERSC in collaboration with IFREMER	26/01/15	Open	Done in updated PMP
13	IFREMER/AG	Assessment of variable names (see CF convention)	26/01/15	Open	
14	IFREMER/AG	Check the use of zenodo	26/01/15	Open	
15	IORAS/SG	Provide method and algorithms for PDF flux analysis	26/01/15	Open	
16	IFREMER/AB	Contact Dr Shawn Smith from FSU for SAMOS data	26/01/15	Open	Done
17	IFREMER/JFP	Change project acronym from TIE-OHF to OHF	26/01/15	Open	Done in updated PMP
18	IFREMER/AB	Provide justification for flux datasets made available for OHF project	26/01/15	Open	Ongoing in RB

4.5 DELIVERABLES

The following table lists the contractual deliverables that have been submitted to ESA during this reporting period and the change in status of documents submitted to ESA in previous months.

Each document will be submitted to ESA for ‘Approval’. Upon confirmation from ESA that the deliverables are satisfactory, the status shall be updated to ‘Accepted’. Updated documents will be marked as ‘Superseded’. A complete list of the documents delivered

to ESA to date is maintained by IFREMER and can be made available upon request.

WP	Doc ref.	Description	Responsible	Due Date	Status
Scientific Requirements Consolidation					
1	D1.1	Requirement Baseline Document	A Bentamy IFREMER	KO+4	V2.1 provided
Reference Dataset Generation					
2	D2.1	Reference Dataset	A Bentamy IFREMER	KO+6	
Product generation, inter-comparison and uncertainty characterisation					
3	D3.1	Flux Assessment Report	K. Von Schuckmann	KO+11 KO+24	
3	D3.2	Product Handbook	A Bentamy IFREMER	KO+10 KO+23	
3	D3.3	Flux Product Dataset	A Bentamy IFREMER	KO+10 KO+21	
Data Portal Development					
4	D4.1	Data Portal initial version at KO+3 for project communication, with presentation content, deliverables, blog,... Updated regularly then.	JF Piollé IFREMER	KO+3 KO+8 KO+14 KO+18 KO+24	v1 provided
Strategic Development					
5	D5.1	Scientific Roadmap	B Chapron IFREMER	KO+6 KO+18	
Outreach and coordination					
6	D6.1	Outreach Material		KO+11 KO+24	
6	D6.2	Final Workshop Report	A Bentamy IFREMER	KO+24	

6	D6.6	Biannual newsletter	R Danielson NERSC	Every 6 months	
6	D6.7	Project brochures	R Danielson NERSC	Every 6 months	
Project management					
6	D6.3	Project Management Plan (PMP)	JF Piollé IFREMER	KO+1	
6	D6.4	Executive Monthly Progress Report (MR)	JF Piollé IFREMER	KO+1, every month then	
6	D6.5	Actions database (ADB)	JF Piollé IFREMER	KO+1, every month then	

4.6 MILESTONES

Milestone meetings are planned at critical points throughout the project lifetime. The status of these meetings to date is as follows.

Meeting	Venue	Date	Description	Status
KO	IFREMER	KO	Kick-off meeting	Completed
PM1	IFREMER	KO+7	Progress meeting 1	Completed
PM2	ESRIN	KO+18	Progress meeting 2	
Final workshop	IFREMER	KO + 21	Final project workshop	
FP	ESRIN	KO+24	Final Presentation Meeting – review of products, services, and remaining project deliverables. Analysis of project sustainability.	