



## Deliverable D-22

### Monthly Progress Report

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## AMENDMENT HISTORY

Version	Date	Change Description	Author
1.0	27/05/2010	Report Apr. 2010 to ESA	Øyvind Sætra

## DISTRIBUTION

Name	Role	Company
Craig Donlon	Scientific Officer	ESA

## **EXECUTIVE SUMMARY**

This is the project summary covering the progress in April 2010. During this period the work on Version v1 of the Scientific Analysis Plan (SAP D-3) has been uploaded to the STARS web page. The SAP addresses the various points given in the SoW.

Downloading of most of the satellite data for the first version of STARS-DAT v0 is completed.

The in situ and sea surface anomaly data sets also needs to be downloaded and gridded, but these are smaller data sets and will be quicker to deal with. These data sets will be worked on during week 18 in cooperation with David Poulter (NOC), who is visiting met.no.

The work on the meta data has not been started yet.

Task 3 is delayed, and we expect the data base to be ready by 1. June

Work on Task 4, identifying polar lows in the STARS data set has started. First version of the list with positions is ready.

# Contents

<u>Contents.....</u>	<u>4</u>
<u>INTRODUCTION.....</u>	<u>5</u>
<u>Purpose and Scope.....</u>	<u>5</u>
<u>Document Structure.....</u>	<u>5</u>
<u>Referenced Documents.....</u>	<u>5</u>
<u>PROJECT OVERVIEW.....</u>	<u>6</u>
<u>PROGRESS ON MAJOR TASKS AND PERIOD.....</u>	<u>7</u>
<u>Task 1: Management.....</u>	<u>7</u>
<u>Task 2: Preliminary Analysis.....</u>	<u>7</u>
<u>Task 3: STARS data set.....</u>	<u>7</u>
<u>MANAGEMENT.....</u>	<u>8</u>
<u>Invoices.....</u>	<u>8</u>
<u>Action Database.....</u>	<u>8</u>
<u>Status of Deliverables.....</u>	<u>9</u>
<u>Status of Milestones.....</u>	<u>9</u>
<u>Status of Travel Expenditure.....</u>	<u>10</u>
<u>Risk Analysis.....</u>	<u>10</u>

# INTRODUCTION

## ***Purpose and Scope***

This is the Progress Report for the STARS project and forms deliverable D-22 of the project documents. The purpose of the report is to provide a monthly update of the project activities and progress over each elapsed reporting period and a project plan of the activities for the following month.

This STARS progress report the elapsed period from 1 to 30 April 2010. The plan summarises the nine tasks described in the Project Management Plan (D-21), management activities, status of deliverables, milestones and travel, risk analysis, problem areas and activities to be performed in the coming months.

The next progress report is planned for 1 June 2010.

## ***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 and risks

## ***Referenced Documents***

<b>ID</b>	<b>Title</b>	<b>Reference</b>	<b>Version</b>	<b>Date</b>
SOW	Sea Surface Temperature and Altimeter Synergy	EOP-SM/1900/CD-cd	1.0 Rev 2	23/02/2009
D-21	STARS Project Management Plan			
D-1	STARS web portal		1.0	29/09/2009
D-23	STARS Action Database			03/09/2009
D-2	STARS Literature review		1.0	14/04/2009
D-3	STARS Scientific analysis Plan			
D-4	STARS-DAT v10			

## PROJECT OVERVIEW

The main objective of the STARS project is to investigate possible ocean surface warming by strong winds from polar lows using an extensive satellite data set. In the first phase of the project, the STARS data set will be built and used to investigate each polar low event over a five year period and use the satellite data to detect any possible ocean atmosphere interaction incidents. In addition, a coupled atmosphere-ocean model will be designed. The purpose of the coupled system is to simulate polar low events and to investigate how the ocean and atmosphere interacts.

In the second phase, the coupled model system will be implemented and used for polar low simulations. A verification study of the coupled system behaviour will then be carried out. Basically, the scientific investigation will consist of two categories of simulations. First, short term forecasts will be conducted over selected polar low events to investigate the impact on the atmospheric circulation, such as the polar low intensity. The second part consists of long term ocean circulation simulations to investigate the longer term ocean response to polar low events.

The oceanic response to hurricanes has long been recognised (Price, 1983; Sanford et al., 1987; Brink, 1989). Strong turbulent mixing entrainment of cold waters from deep layers leads to a cooling of the sea-surface. This rapid surface cooling reduces the surface fluxes and inhibits further hurricane intensification. When hurricanes moves over deep cores of warm waters, such as the Loop Current in the Gulf of Mexico, or warm core rings this surface cooling is strongly reduced. The warm water will then act to insulate the entrainment of cold waters from even deeper layers (Hong et al., 2000; Shay et al., 2000). In such cases, strong hurricane intensification has been observed. In 2005, Katrina intensified into a category 5 hurricane as it entered the warm Gulf of Mexico (Kafatos et al., 2006).

The ocean surface warming reported by Saetra et al. (2008) has only been observed by microwave satellite data. During cold air outbreaks the ubiquitous cumulus convection prevents the sea-surface to be observed by infrared sensors (IR) such as AATSR, AVHRR and MODIS. However, verification of such ocean response to polar lows is urgent. Here, we propose to use altimeter combined with SST products from both microwave and infrared sensors to investigate possible surface warming in connection with polar lows. As the altimeter measures the surface anomaly (SLA) this can be related to the ocean heat content.

The main scientific questions to be addressed are:

- Can satellite IR observations in combination with altimeter be used to detect possible sea-surface warming caused by strong winds under polar low events?
- Can we identify a Polar Low Indicator based on satellite data that could be a useful tool for polar low forecasting?
- Can the forecasting of polar lows be improved by introducing coupled atmosphere ocean models?
- Does the strong turbulent mixing induced by polar lows have an anomalously strong impact on the cooling of the North Atlantic Current?

# **PROGRESS ON MAJOR TASKS AND PERIOD**

## ***Task 1: Management***

STARS Progress Meeting 2 (PM-2) is planned for 27 May 2010. The meeting will take place as a teleconference between ESA and met.no.

## ***Task 2: Preliminary Analysis***

Version v01 of the literature review has been uploaded to the STARS web page. The review contains a historical overview of polar low research, the state of the art on various subjects within polar low research and addresses the various points given in the SoW.

Version v01 of Scientific analysis Plan (SAP) has been uploaded to the STARS web page.

## ***Task 3: STARS data set***

Downloading of most of the GHRSSST SST data for 2006-2010 has been completed. Some data for OSI SAF METOP L2P files are still to be downloaded. This is very slow, since we are downloading through a tape robot at Ifremer.

The gridding of the L2P SST data files to a common grid has started, and AMSR + AATSR is finished.

The AVHRR data are ready to be used for the manual search for polar lows, so that task 4 can start from 1. May as planned.

The in situ and sea surface anomaly data sets also need to be downloaded and gridded, but these are smaller data sets and will be quicker to deal with. These data sets will be worked on during week 18 in cooperation with David Poulter (NOC), who is visiting met.no.

The work on the meta data has not been started yet.

Task 3 is delayed, and we expect the data base to be ready by 1. June

## ***Task 4: Identify polar lows in the STARS data set***

Based on the infrared satellite images of the STARS data set, a list of dates and positions of polar lows during the period covered by the STARS data set (winter seasons from 2006-2010) has been established. Also, a rough preliminary estimate of the storm intensity has also been estimated for each event. Currently, the satellite images are for

these events are inspected by an experienced forecaster at met.no. Further discussions may lead to addition or removal of some cases if it is agreed that they do/do not comply to the polar low definition given in the STARS technical proposal.



# MANAGEMENT

## *Invoices*

Milestone	Schedule date			
		Payment	Invoice to ESA	Payment Reviewed
<b>ADVANCE PAYMENT: upon signature of the Contract by both Parties</b>	September 2009	24.000	yes	yes
<b>PROGRESS PAYMENT: Upon successful completion of phase 1 and acceptance of all related deliverables by the Agency</b>	December 2010	96.000	no	no
<b>ADVANCE PAYMENT: Upon written authorization to proceed with phase 2</b>	January 2011	16.000	no	no
<b>PROGRESS PAYMENT: Upon the acceptance by the agency of</b>  <b>D-12 NS-MODEL-SAD</b> <b>D-13 NS-MODEL-OM</b> <b>D-14 TEST DATA SET</b>	October 2011	20.000	no	no
<b>FINAL SETTLEMENT: Upon satisfactory completion of all obligations, including the ones relating to Appendix 5 on statement of inventions and inventory, and acceptance by ESA of all deliverables</b>	May 2011	144.000	no	no
<b>Totals</b>		300.000	no	no

## *Action Database*

Action Ref	Action	Actionee	Actioner	Target Date	Status	Date Closed
	Invoice ESA	ØS				03.10.09
	Make web page visible to technical officers	SE				03.10.09




### ***Status of Travel Expenditure***

There have been no travel activities during this reporting phase.

### ***Risk Analysis***

The table below shows the most probable risks and issues identified to date.

ID	Type	Risk title and Description	Probability	Impact	Duration	Mitigation Strategy