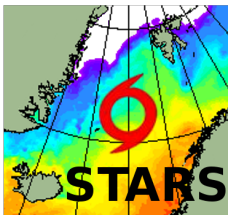

Deliverable D-22

Monthly Progress Report

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Author	:	Met.no
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Prepared by (met.no)	:	Yvonne Gusdal	
Accepted by (ESA)	:	Technical Officer	no

AMENDMENT HISTORY

Version	Date	Change Description	Author
1.0	07/03/12	Report February 2012 to ESA	Yvonne Gusdal

DISTRIBUTION

Name	Role	Company
Craig Donlon	Scientific Officer	ESA

EXECUTIVE SUMMARY

Contents

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 covers the elapsed period from 1 to 29 February 2012. The plan summarises task of STARS Phase II (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 11th of April 2012 (due to Easter Holliday).

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

ID	Title	Reference	Version	Date
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 Phase II		2.2	
D-1	STARS web portal			
D-23	STARS Action Database			
D-2	STARS Literature review		1.0	14/04/2009
D-3	STARS Scientific analysis Plan		6	
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 STARS project a data set will be built and used to investigate each polar low event over a ten year period.

In the original plan for phase II of STARS, 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. However, due to an installation of a new super computer facility in Norway in 2011, it is considerable uncertain that the required resources are available to the STARS project in 2011/2012. The shift in computer infrastructure also ties up expert resources on the proposed atmosphere model. It will therefore be difficult to allocate the expert competence assumed available in the proposed implementation plan. The original plan for phase II of STARS is therefore altered to not implement and use the coupled STARS-MODEL.

In the second phase, we will conduct an ocean hindcast simulation with a resolution of ~800 m. The objective is to investigate with observations and numerical modelling the adjustment processes that lead to ocean re-stratification after PL events. A process that influence the net heat loss to the atmosphere.

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 form 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 could 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?

- What are the dominant time and space scale of the ocean advection processes that govern the adjustments after PL event ?

In the second phase of STARS, an International Workshop on Polar Lows will be arranged in Oslo in 2012. The workshop aims at bringing together scientists and weather forecasters to present the results of the recent activity on polar low research, to share new knowledge and to encourage discussions on improved forecasting and understanding of polar lows

PROGRESS ON MAJOR TASKS PHASE II

Task 1: Management (Ongoing through the whole project)

Results of Reporting Period:

- Telephone conferance with Gunnar Noer in Tromsø, 3th of February, about improvements of the PLI
- Team video meeting 16th of February with BF, HS, ØS and YG, about progress of Task 8.2 (Including SAR data and scatterometer products)
- Progress meeting (PM 8) in Tromsø 20th - 21th of February with ESA
- Minutes and presentations from PM8 is uploaded on the wiki page for STARS

Plans for Comming Reporting Period:

- Team meeting in Oslo March 28, discussing the SAR images.
- Progress meeting PEI and CD in week 11, about Task 9 on Ocean adjustment:

Task 7: Maintain and improve STARS web portal

Results of Reporting Period

- Have set-up an internal DokIT page only available for the team at metno
- Cleaned the website for errors that have been reported
- A suggestion of a template for a further description of the polar lows in the quicklook on the STARS web site, is presented on the internal DokIT page

Plans for Comming Reporting Period

- Add a link on the web site to the internal part of the wiki-page and the internal DokIT page
- Update the website with new cases to the historical or contemporary archive
- Make it possible for Gunnar to edit the web site directly
- Update the web site about the workshop!!

Task 8: Extend STARS-DAT data set

Results of Reporting Period:

- In task 8.1 on extend STARS-DAT:
  - Have included humidity on 500, 700, 850, 925 and 1000 hPa in the NWP fileds. Have also included precipitation, SST and surface roughness. NWP fields are only gridded every 3h to minimaze the file size .
  - The polar low tracking list is made available in readable observation format in Diana
- In task 8.2 on including SAR in STARS-DAT:
  - 300 ASAR WSM and Global mode scenes ordered and received, covering the period 2006-2010 over Norwegian areas. Several Polar lows are detected. The perl-script to grid hourly HIRLAM data is implemented. Routine to grid SAR onto the STARS grid and save as netCDF is finished.
- In task 8.2 on including scatterometer products
  - Calculation of autocorrelation in ASCAT Coastal-. 12km and 25km-products.

Plans for Comming Reporting Period

- In task 8.1 on extending STARS-DAT:
  - Extend the image-based data set for the extended period and make it available through the PHP (http://projects.met.no/stars/view_stars-dat.php)
  - Make a demonstration on how to use netCDF in DIANA
- In task 8.2 on including SAR in STARS-DAT:
  - Putting all parts of SAR processing into a master-script. Ordering of the remaining SAR data. Start processing of all received SAR images.
- In task 8.2 on including scatterometer products
  - Develop code for calculating the ASCAT autocorrelation in Polar Low areas

Task 9: Impact assessment of Polar Lows

Results of Reporting Period

- In task 9 on Ocean adjustment:
  - Further literature review of altimetry in practice. A focus has been on determining the practical limitations of the along-track product, particularly relating to the noise level in the high-wavenumber range. The review has revealed that SLA data are contaminated by signals from non-balanced motions (e.g. tidal aliasing in the sun-syncronous orbit of Envisat) and other noise at scales lower than about 100 km. Since eddy scales in the Nordic Seas are expected to be 100 km or smaller (they are larger in lower latitudes), this noise may severely affect our possibility of assessing such scales.
  - Spin-up of the model has begun. We have encountered unexpected stability problems and are still working on completing the first model month.

- In task 9 on implement the Polar Low Indicator (PLI) for operational use at met.no:

  - The spring study 2012 on a possible index for polar lows. The factors that go into an evaluation for polar lows will have to be based on a set of subjective judgement of certain weather patterns that are very difficult to automatize or describe from existing model fields. Further work on the index is therefore put on hold, to prioritize other goals in the project.

Plans for Comming Reporting Period

- In task 9 on Ocean adjustment (PEI):
  - We will continue to assess whether SLA data may give information about variability during and after PL events, but we will concentrate on overall variance estimates rather than scale estimates (due to the high-wavenumber noise mentioned above). We have used monomission products so far, but will now also investigate ths use of the DUACS products. These have somewhat lower spatial resolution (~20 km), but we have learnt that the monomission products have no useful information at the very finest scales (~6.5 km).
  - We will start a study on whether PL events are captured in the OSTIA SST analaysis (as increased variance during and after events).
  - The super computing facilities used in this project (hexagon.bccs.uib.no) will undergo a 1-2 week maintenance in March. We therefore foresee very little progress on model integration to take place then. Instead we will go through our choice of forcing fields and parameter choices, and work towards optimizing these. In particular, we will replace atm. forcing fields at

10 km resoltuion (a hindcast based on ECMWF ERA40) with operational analysis at 8 km resolution (based on ECMWF operational analysis and local met.no assimilation).

- In task 9 on implement the Polar Low Indicator (PLI) for operational use at met.no (Gunnar Noer):
    - A case study on the use of SAR winds and polar lows
    - Start work on a paper on forecasting of polar lows, to be presentable, but not finished at the EPLWG in Oslo in may

Task 10: Polar Low Scientific Community Development

Results of Reporting Period

- Abstracts has been collected from scientists including contributions from Japan, USA, and Canada. The workshop program has been iterated inside the organizing committee.
- Have invited Paris Vachon to the Conference, he declined.

Plans for Comming Reporting Period

- Decide on the final version of the workshop programme and distribute it to all participants.

Progress team meetings

Name	Date	Purpose
PTM1	05/07/11	Progress team meeting 1 - SAR
IKO	21/09/11	Internal Kick-off meeting for STARS phase II
PTM2	03/02/12	Progress team meeting 2 - PLI
PTM3	16/02/12	Progress team meeting 3 – SAR + ASCAT

MANAGEMENT

Invoices

Milestone	Schedule date	Payment	Invoice to ESA	Payment Received
ADVANCE PAYMENT: upon signature of the Contract by both Parties	September 2009	24.000	yes	yes
PROGRESS PAYMENT: Upon successful completion of phase 1 and acceptance of all related deliverables by the Agency	June 2011	96.000	yes	yes
ADVANCE PAYMENT: Upon written authorization to proceed with phase 2	June 2011	16.000	yes	yes
PROGRESS PAYMENT: Upon the acceptance by the agency of **P2D-1 STARS-web** **P2D-2 STARS-DAT-V3** **P2D-3 STARS-DAT-DB-V3** **P2D-4 STARS-DAT-UM-V3** **P2D-5 REP-4**	March 2012	20.000	yes	no
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	11/01/12	144.000	yes	no
Totals		300.000		

Action Database

Action Ref	Action	Actioner	Target Date	Status	Date Closed
Mid Term Review MTR-5	Investigate the inclusion of animation of AVHRR images as part of STARS-DAT – update Phase II plan to include this task	SE			
MTR-7	Review the potential for RFI contamination of AMSRE data in Thorpex event	ØS			
MTR-9	CD to organize an ESA	CD			

	web story on Polar Lows with STARS team in preparation for 2011/2012 PL season				
MTR-13	Update phase-II plan to include steering of PL by mesoscale ocean structure	SE/ØS			
MTR-18	Discuss with KNMI access and use of OceanSat-II data for STARS-DAT.	SE			
MTR-19	Include an assessment of SOPRANO data sets for use in STARS project and plan to use in STARS-DAT if appropriate	SE			
Internal Kick-off IKO-5	The SAR winds should be ready 1.January 2012	JR	1.Jan	Ongoing	
Progress meeting ESA (PM)					
PM-2	Include information/pictures of the first forecasted polar low this season on the web page	GN/YG		Ongoing	
PM-4	Workshop: Include information about Accommodation	ØS		Ongoing	
PM-6	Workshop: Make a more detailed agenda	ØS		Ongoing	
Progress meeting Tromsø (PM8)					
PM8-1	Write down what is needed of SAR-data for polar low forecasting, should be part of the reporting that Birgitte is writing, so that this can influence Sentinel-1 operations	BF		May	
PM8-2	Is it possible to make a link through the MetLex on Yr which gives a link to STARS? So when a polar low occurs, we have a link to the public.	GN		-	
PM8-3	Make it possible for Gunnar to edit the website directly	YG		March	
PM8-4	GN to talk to SE and YG about which plots he wants in the metadata database.	SE,YG,GN		March	

PM8-5	GN and SE to agree on a template for adding the forecasters view on each polar low, in the metadata database (as a table?)	GN		Ongoing	
PM8-6	YG & ØS to organize a teleconference. with Gunnar to define the interface on how to add information in the Quick look (Dates, table, more pictures.....)	ØS, YG		28.March in Oslo	
PM8-7	Check AMSRE TCWV fields from RSS to be included in STARS-DAT	SE			
PM8-8	Set up a teleconference with Pål Erik for him to report to Craig on the progress of his work.	ØS, CD,PEI		Closed	
PM8-9	Birgitte to invite Paris Vachon to the Conference	BF		Closed	
PM8-10	Øyvind to contact Øystein Hov about contacting RosHydroMet	ØS			
PM8-11	Birgitte contacts DMI to get forecasters attending	BF			
PM8-12	CD to contact UKMO for options for a forecaster presentation on Polar Lows.				
PM8-13	spread the news about the workshop to get more attendants	All		Ongoing to May	
PM8-14	ESA presentation on S1 and S3 by Craig	CD		Workshop May	
PM8-15	Final agenda from Øyvind to post on the web and circulate to interested attendees. Other people are invited to attend and submit Posters.	ØS		ASAP	
PM8-16	Øyvind and Yvonne to ensure ESA and STSE logos are on the Workshop agenda	ØS,YG		-	
PM8-17	SE to look at using OSCAT in the inter-comparison mix, if possible - **cannot commit to this though!!**	SE		-	
PM8-18	Can we find out how many people have accessed the	SE			

	STARS-DAT?				
PM8-19	Need to have a discussion within STARS to actually provide PL track data in the right way for further use. Currently hourly interpolated ASCII file of time and positions. Aim to put a short publication/note.	All			
PM8-20	Yvonne to provide the polar low list in Diana readable observation format.	YG		Closed	
PM8-21	SE to put into the STARS DAT image browser details on how users can access data (Also info on where to get the PL tracking list directly).	SE			
PM8-22	ØS and team - to contact university professors and ensure that students are aware that STARS-DAT can be used for a project. And figure out what period of the data set should be given to the users!!	ØS			
PM8-23	NWP fields should include humidity on 500,700, 850, 925, 1000 hPa. (e.g. Calculations of equiv. Pot. Temp)	YG		Closed	
PM8-24	Need to provide guidance in STARS-DAT-UM on basic use of NWP fields (e.g. calculations of equiv. Pot. Temp)	YG			
PM8-25	Steinar/Gunnar: put comments in User Manual that the polar low list is our interpretation of the situations, and acknowledge that we might have missed some cases. We also only track the strongest PL in multiple PL cases				
PM8-26	YG demonstrate how to use netCDF in DIANA to Birgitte to help in using ASAR data with NWP	YG		Ongoing	

	fields.				
PM8-27	Birgitte to order ASAR data	BF		Ongoing	
PM8-28	Remember to mention in the finale report the use of EOLI software if we are missing anything, or positive feedbacks	BF		December	
PM8-29	Gunnar: circulate his slides to the rest of us	GN		Closed	
PM8-30	Øyvind circulate links about the capsize of "Gaul"	ØS		Closed	

Status of Deliverables

The following contractual deliverables of Phase II have been submitted to ESA.

Doc Ref	Doc Title	Delivery Date	Status

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.

Status of Milestones

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

Name	Date	Venue	Purpose	Status
MTR Phase I	07/06/11	ESA	Mid Term Review	Completed
KO Phase II	07/06/11	ESA	Kick-off meeting Phase II	Completed

PM	23/11/11	Met.no	Progress meeting	Completed
PM	22/03/12	Tromsø	Progress meeting	Completed
PM	01/10/12	Met.no	Progress meeting	Not Completed
FM	05/12/12	ESA	Final Meeting	Not Completed

Status of Travel Expenditure

Ø. Sætra, Y.Gusdal, S.Eastwood and B.Furevik went to Tromsø for the 8th progress meeting with ESA, 20th to 21th of February.

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