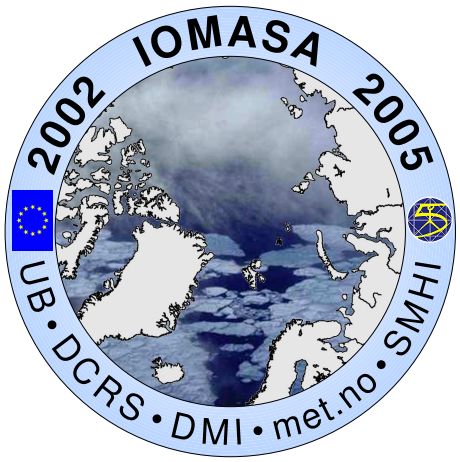
Management Report

IOMASA



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http://www.uni-bremen.de/~pharos/iomasa

Contents

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IUP: Institut für Umweltphysik; UB: University of Bremen; DTU: Technical University of Denmark; DMI: Danish Meteorological Institute, met.no: The Norwegian Meteorological Institute; SMHI: Swedish Meteorological and Hydrological Institute

SECTION 1

Management and Resource Usage Summary

1.1 Objectives of the reporting period

The major part of the reporting period is in phase 2 of the project, the development phase that ended in March 2005 (project month 29), while the last two months (project month 29 and 30) were in phase 3 of the project, the production experiment phase (project month 29 – project month 32).

1.2 Scientific/Technical progress made in different work packages according to the planned time schedule

Until the end of the reporting period (project month 30), work packages 1.2, 2.2, and 4.2, have been finished, work package 3.3 has been continued, and work packages 1.3, 2.3, 4.3, and 5.3 have been started. Table 1.1 gives an overview of the situation. The triple vertical line marks the end of the reporting period. Table 1.2 shows a comparison between approximate planned and used manpower and financial resources in project months 25–30. Note that work package 2.4 has already been started by Project Partner 4 during the reporting period, slightly ahead of the plan.

1.2.1 Partner 1: IUP

WP 1.2 Work to extend the total water vapour (TWV) range where the retrieval algorithm works has produced first results that were presented on the European Geophysical Union General Assembly in Vienna in April 2005. The algorithm to retrieve emissivity at temperature sounding frequencies has been completed, results have been compared with data from IOMASA partners.
The cloud liquid water (CLW) investigations are slightly delayed because of a shortcoming of the sensor AMSR-E. It produces additional low-frequency noise in the along flight direction of about 1 K. The relative noise contribution strongly increases if polarziation differences are considered, as it is the case for the CLW product. Noise reducing processing steps are currently added to the CLW procedure in order to compensate for the noise at the least possible loss of horizontal resolution.

WP 1.3 TWV fields for most of the investigation period have been calculated from AMSU data.

Table 1.1: **IOMASA Project Planning and Time Table.** The triple vertical line marks the end of the reporting period.

Project Month	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35
Meeting months	⇓ 1		⇓ 6			⇓ 12			⇓ 18					⇓ 28		⇓ 32		⇓ 36
Management																		
Part 1: Remote sensing of atmospheric parameters (Partner 1)																		
1.1: Data and day 0 algorithms																		
1.2: Atmospheric algorithms																		
1.3: Produce retrieved fields																		
1.4: Validation																		
Part 2: Improving numerical weather prediction models (Partners 4,5)																		
2.1: Prepare NWP activities																		
2.2: Improve Arctic high-res. NWP																		
2.3: Prepare real time assimilation																		
2.4: NWP Production and validation																		
Part 3: Empirical model for emissivity and backscatter of sea ice (Partner 2)																		
3.1: Prepare sea ice modelling																		
3.2: Sea ice forward models																		
3.3: Influence of snow																		
3.4: Validate sea ice forward models																		
Part 4: Sea ice concentration retrieval (Partner 3)																		
4.1: Prepare sea ice retrieval																		
4.2: Sea ice retrieval algorithm																		
4.3: Produce sea ice fields																		
4.4: Validate sea ice algorithm																		
Part 5: Real time processing and user interface (Partner 2)																		
5.1: Define interfaces and formats																		
5.2: —																		
5.3: Setup of production and interface																		
5.4: Validate production and interface																		

1.2.2 Partner 2: DTU

WP 3.3 A sea ice emissivity model for the AMSU-A and AMSU-B microwave frequencies has been implemented and is being used by IOMASA partners. A joint poster with Partner 4 (met.no) has been presented at the 14th International TOVS Study Conference in China. Co-location files of HIRLAM atmospheric profiles and AMSU-A radiances have been received from met.no, and the RTTOV8.5 radiative transfer model has been implemented at DTU. The data and model are being used to derive refined AMSU-A emissivities.

WP 5.3 The near real time data distribution system at DTU presents IOMASA results to interested parties. The server can be accessed through the IOMASA web portal at DTU: http://www.seaice.dk/iomasa. The database includes a multitude of AMSR products being produced in near-real-time by the IOMASA processor. In addition, ENVISAT ASAR Global Mapping Mode data are being received and archived since April 2004.

Table 1.2: Comparison between planned and used manpower and financial resources by Work Packages (WP) and partners

WP	Partner	Person-Months		Financial Resources [€]	
		planned	used	planned	used
0	IUP	0.5	0.5	2,572	2,390
1.2	IUP	6	7	30,865 + 3,000[a]	33,458+2,757[a]
1.3	IUP	2.5	3	12,860	14,339
	met.no	1	1	12,832	12,832
2.2	SMHI	8.1	4.7	70,332+1,500[a]	40,810+1,207[a]
2.3	met.no	4	5	54,328[b]	66,305[b]
	SMHI	2	2	17,366	17,366
2.4	met.no	0	2	0	25,664
3.3	DTU	2	2	13,500	13,500
4.2 and 4.3	DMI	6	6.3	230,563 DKK[b]	242,091 DKK[b]
5.3	DTU	2	2	13,500	13,500
	met.no	1	1	12,832	12,832

[a] travel
[b] including travel

1.2.3 Partner 3: DMI

WP 4.2 and 4.3 Work has progressed along the lines of implementing a thermodynamic and mass model to derive constraints for the configurations of snow and ice layers used in emissivity models. A report describing this is in progress. The IOMASA sea ice developments were presented at the OSI SAF users workshop at Perros-Guirec, France in March 2005. Derivation of validation material is progressing well and the analysis of SAR data is expected to be complete by May 2005. A chapter for the book 'Radiative transfer models for microwave radiometry', edited by C. Mätzler has been accepted.

1.2.4 Partner 4: met.no

WP 1.3 The implementation of an R-factor-based cloud liquid water product in operational meteorological visualization program is being prepared.

WP 2.3 The HIRLAM 3D-VAR assimilation system has been adapted to use AMSU-A brightness temperatures over ice. An algorithm for calculation of sea ice surface emissivity using sea ice input from OSI SAF has been implemented. A system for bias correction has been set up and the error statistics of the system has been tuned. Theoretical methodology for performing data quality control has been developed and tuning of quality control algorithms has been performed.

WP 2.4 Parallel runs of the HIRLAM NWP system with and without using AMSU-A information over sea ice have been performed. The results of the impact studies have been examined in terms of statistics and case studies, and seem to show a positive impact of including AMSU-A over sea ice. These studies have given rise to further corrections and modifications in the algorithms developed.

WP 5.3 Preparations of NWP system for near-real-time production are ongoing.

1.2.5 Partner 5: SMHI

WP 2.2 This WP is slightly behind schedule. We now have the improved surface flux treatment and a new surface scheme using OSI SAF ice concentrations implemented in HIRLAM. Methods for quality control and bias correction of AMSU-B data over open and ice-covered sea have been developed. The 3D-Var assimilation package HIRVDA is ready to use TWV retrievals as well as raw AMSU-B radiances. It is also possible to have the surface skin temperature and emissivity included in the control vector during the minimization. However, the latter two implementations are only available in separate versions of HIRVDA and need to merged into a common code. Our intention is to do this during the remaining part of the project.

WP 2.3 This WP is on schedule. A system for assimilation of TWV retrievals from our Partner 1 (IUP, UB) has been set up. Production runs using this data are now carried out. These are to be used for the validation in work package 2.4. The SMHI part concerning humidity in the deliverable 2.3 - *Report on real time assimilation system for TWV and improved temperature assimilation* will be ready in June.

1.3 Milestones and deliverables obtained

Deliverable 1.2.2 has been delayed because of a shortcoming of the sensor AMSR-E (additional noise). Work to compensate this is under way (see section 1.2.1 and 1.4).

Table 1.3: Overview of Deliverables Obtained. All dates are in project months.

Deliverable	**Date**	
	planned	**actual**
1.2.3	29	29
2.2.1	29	29
2.2.2	29	29
2.2.3	29	29
4.2	29	29

Table 1.4: Overview of Milestones Reached. DL denotes “Deliverable”; all dates are in project months.

Milestone	**Date**	
	planned	**actual**
DL 1.2.3	29	29
DL 2.2.1, 2.2.2, 2.2.3	29	29
DL 4.2	29	29

1.4 Deviations from the work plan or/and time schedule and their impact on the project

1.4.1 IUP

As already mentioned above (section 1.2.1), the cloud liquid water (CLW) investigations are slightly delayed because of a shortcoming of the sensor AMSR-E (additional noise). Noise reducing processing steps are currently added to the CLW procedure in order to compensate for the noise at the least possible loss of horizontal resolution.

1.5 Co-ordination of the information between partners, communication activities

IOMASA project meetings

Progress Meeting 3-δ, 6-7 December, 2004, DMI, Copenhagen, Denmark: project partners.

Progress Meeting 3, 3-4 March, 2005, DTU, Lyngby, Denmark: project partners and user advisory group.

Conferences/Workshops attended

OSI SAF Users Workshop, 15-17 March, 2005, Perros-Guirec, France: S. Andersen (DMI) has presented the sea ice activities and developments in IOMASA.

14th International TOVS Study Conference, 25-30 May 2005, Beijing, China: V. Thyness (met.no) presented a poster with the title "Assimilating AMSU-A over Sea Ice in HIRLAM 3D-Var".

EGU General Assembly, 25-28 April, 2005, Vienna, Austria: C. Melsheimer (IUP) presented his work on the TWV retrieval algorithm under the title "Retrieval of Total Water Vapour Over Polar Regions From Spacebourne Microwave Radiometer Data".

Co-operation with other projects/networks

SMHI: Cooperation with the HIRLAM project concerning the work on including new variables in the control vector during the data assimilation and on an improved snow formulation.

SMHI: Cooperation with the EU project CLOUDMAP2 concerning the use of a new humidity variable in the assimilation process.

SMHI: AMSU-A and AMSU-B data received at SMHI via the EARS service (Eumetsat ATOVS Retransmission Service)

SMHI: Ice concentration estimates are provided by the OSI SAF.

Abbreviations/Acronyms

AMSR	Advanced Microwave Scanning Radiometer; on satellite ADEOS-2 (Midori)
AMSU	Advanced Microwave Sounding Unit; on NOAA satellites
ASAR	Advanced Synthetic Aperture Radar, on satellite ENVISAT
CLW	cloud liquid water
DMI	Danish Meteorological Institute
DTU-DCRS	Technical University of Denmark
HIRLAM	High Resolution Limited Area Model
HIRVDA	HIRLAM variational data assimilation
IUP	Institut für Umweltphysik (Institute of Environmental Physics), University of Bremen
met.no	The Norwegian Meteorological Institute
NOAA	National Oceanic and Atmospheric Administration (U.S.A.)
NWP	numerical weather prediction
NWP SAF	Satellite Application Facility (SAF) on Numerical Weather Prediction
OSI SAF	Satellite Application Facility (SAF) on Ocean and Sea Ice
SAR	synthetic aperture radar
SMHI	Swedish Meteorological and Hydrological Institute
TOVS	TIROS operational vertical sounder
TWV	total water vapour
DTU	Technical University of Denmark
DMI	Danish Meteorological Institute