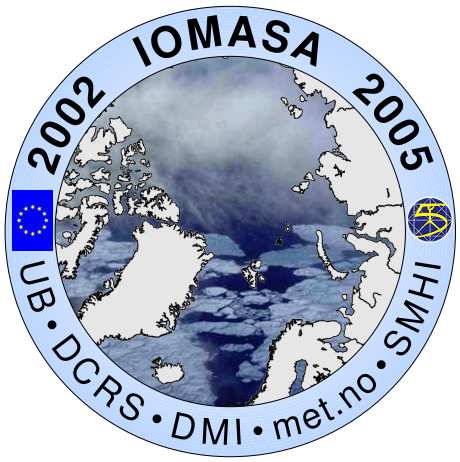
Management Report

IOMASA



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Reporting Period:

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Coordinator: Georg Heygster

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

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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 reporting period is entirely in phase 2 of the project, the development phase that ends in March 2005 (project month 28).

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 18), all work packages, i.e., work packages 1.2, 2.2, 3.2, and 4.2, have been on schedule. 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 13–18.

1.2.1 Partner 1: IUP

WP 1.2 The adaptation and calibration of the TWV retrieval algorithm to AMSU-B data has been completed and daily TWV maps as well as TWV swath data can now be produced. Comparison with NCEP/NCAR reanalysis data (http://www.cdc.noaa.gov/cdc/data.ncep.reanalysis.html) looks reasonable.
Elizaveta Zabolotskikh from NIERSC (Nansen International Environmental and Remote Sensing Center), St. Petersburg, Russia, was visiting scientist at IUP in January and February 2004. She has worked on the insertion of liquid water profiles information into radiosonde profiles, based on the humidity and temperature information already contained in the radiosonde data.
The work on determining the sea ice emissivity at temperature sounding frequencies has yielded first preliminary results.

1.2.2 Partner 2: DTU

WP 3.2 Forward models relating relevant geophysical parameters for the atmosphere, ocean and sea ice to measured brightness temperatures for the new AMSR microwave radiometer are being refined. An on-line database of 25 years of SMMR and SSM/I data has been established. An on-line database

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																		

of AMSR swath data covering more than a year's data has been established and is continously being expanded as new data become available. These data are automatically transferred to partner 3 (DMI). An on-line database of all 20 channels of AMSU-A and AMSU-B is being established. Time series of data at selected locations are being extracted for further analysis, and for model comparison.
In anticipation of work package 3.4, ENVISAT ASAR data for the validation experiments have been ordered under DTU's ENVISAT AO. The database (http://www.seaice.dk/iomasa) set up in work package 5.1 has been expanded by 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.

1.2.3 Partner 3: DMI

WP 4.2 The routine analysis of SAR data has been initiated by skilled ice analysts at the DMI Ice Service; some investigations are on-going in order to optimise the selection and computation of features. The MEMLS (Microwave Emission Model of Layered Snowpacks) radiative transfer model for snow has been augmented with a sea ice module and in spite of a lack of sufficient validation data the model is consist-

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	1	1	5,019	5,019
1.2	IUP	8	7	44,402[a]	39,318[a]
2.2	met.no	5.35	5.5	67,461[b]	69,324[b]
	SMHI	5	5.7	42,494+2,500[c]	48,443
3.2	DTU	9	9	39,287[d]	39,287[d]
4.2	DMI	6	7.5	230,563 DKK	288,204 DKK
	met.no	2.5	3	31,045	37,254

[a] incl. travel and consumables
[b] incl. travel
[c] travel and consumables
[d] incl. consumables

ent with the qualitative behaviour of snow and ice layers. Ifremer (Institut Français de Recherche pour l'Exploitation de la Mer) ice drift data have been analysed in order to test their consistency. Integration over an ice season gave a consistent age and thickness distribution and consequently this data source will be taken into account in the continued development and testing of ice concentration algorithms.

1.2.4 Partner 4: met.no

WP 2.2 An SSM/I processing chain for daily sea ice input for sounding channel emissivity estimation has been set up. Data formats have been defined as well as the design of the interface from this to the HIRLAM data assimilation system and to data from AMSU-A footprints in order to build a co-location data set also containing HIRLAM profile data.

WP 4.2 An experimental version of the OSI SAF chain for production of daily sea ice analyses using SSM/I has been set up. A new method is implemented in this chain for taking correlated observations into account in building the ice analysis and for estimating the uncertainty.

1.2.5 Partner 5: SMHI

WP 2.2 Being in the middle of this main work package 2.2, SMHI have now developed the tools needed to start doing the real work. Per Dahlgren spent two weeks early in 2004 at the Met Office (U.K.) where the work on assimilation of AMSU-B over sea is state of the art. In order to make things work over ice, a set of cloud free cases has to be found that can be used to determine the bias correction. Once this is done a variational quality control can be used for filtering out cloud-contaminated and erroneous observations. A stand-alone experimental assimilation system for 1D-Var has been set up and this will be used to test out ideas for bias correction and quality control. The control vector in this system as well as in the 3D HIRVDA has been extended to include the emissivity and the skin temperature. Only technical tests have been conducted so far. The HIRLAM surface scheme has been extended to include snow on ice which means that it should now be possible to test the effect of the improved flux treatment over both snow and ice areas.

1.3 Milestones and deliverables obtained

No deliverables and milestones are due in the reporting period (project month 13–18).

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

1.4.1 SMHI

According to the original DOW, the SMHI part of work package 2.2 should be finished by project month 20 (June 2004). We suggest that this is changed so that SMHI has the same deadline as met.no in work package 2.2 (Progress Meeting 3, project month 29, March 2005) since SMHI's work on AMSU-B depends on and is interrelated with met.no's work on AMSU-A.

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

IOMASA project brochure

A small information brochure describing the aims, scope and anticipated results and benefits of IOMASA to the science community was produced. It is meant for distribution at the IOMASA partner's institutions and/or universities and at conferences attended by one of the IOMASA project participants.

Conferences/Workshops attended

ADEOS-2 PI Workshop, 1-3 March, 2004, Tokyo, Japan: G. Heygster (IUP) presented "Sea ice remote sensing using AMSR 89 GHz data."

EurOCEAN 2004, 10-13 May, 2004, Galway, Ireland: Since the date coincided with the Mid-term Review, this conference could not be attended. However, a poster and abstract were contributed; moreover, the above-mentioned IOMASA brochure was sent there for distribution to interested parties.

EGS-AGU-EUG Joint Assembly, April, 2004, Nice, France: V. Perov presented his work on surface heat flux modelling under the title "Application of a new spectral theory of turbulence to a stably stratified atmospheric boundary layer".

Co-operation with other projects/networks

IUP: Elizaveta Zabolotskikh from NIERSC (Nansen International Environmental and Remote Sensing Center), St. Petersburg, Russia, was visiting scientist at IUP in January and February 2004, working on liquid water profiles and radiosonde data (see above, IUP, work package 1.2)

DMI have sent the draft report *Tonboe & Andersen* (2004)[1] to the AMSR sea ice validation team (T. Markus) requesting validation data and suggesting cooperation and to Christian Mätzler requesting support and and cooperation in connection with a field experiment to be proposed to the Danish authorities.

SMHI: Per Dahlgren spent two weeks at the MetOffice (U.K.) in early 2004 where the work on assimilation of AMSU-B over sea is state of the art.

[1] Tonboe, R., S. Andersen (2004). Modelled radiometer algorithm ice concentration sensitivity to emissivity variations of the Arctic sea ice snow cover. Target: Danish Meteorological Institute Scientific Report

1.6 Difficulties encountered at management and co-ordination level and proposed/applied solutions

At Mid-term Review, all partners agreed on the usefulness of an additional meeting before the next Progress Meeting which is scheduled for February 2005. The best time for an additional meeting would be early December, the place either Bremen or Copenhagen; the latter would minimize the travel expenses. After checking the availability of funds for travel, a decision will be taken by the month of July.

Abbreviations/Acronyms

AMSR	Advanced Microwave Scanning Radiometer; on satellite ADEOS-2 (Midori)
AMSU	Advanced Microwave Sounding Unit; on NOAA satellites
AO	Announcement of Opportunity
DMI	Danish Meteorological Institute
DMSP	Defence Meteorological Satellite Program
DTU-DCRS	Technical University of Denmark
HIRLAM	High Resolution Limited Area Model
HIRVDA	HIRLAM variational data assimilation
Ifremer	Institut Français de Recherche pour l'Exploitation de la Mer
IUP	Institut für Umweltphysik (Institute of Environmental Physics)
met.no	The Norwegian Meteorological Institute
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
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
SSM/I	Special Sensor Microwave/Imager on DMSP satellites
SMMR	Scanning Multi-channel Microwave Radiometer
TWV	total water vapour
DTU	Technical University of Denmark
DMI	Danish Meteorological Institute
UB	University of Bremen