OVERSEAS VISIT REPORT - Ian Barton, Nov-Dec 2002

Meetings: High-Level WSSD Follow-up Meeting – ESRIN, Frascati, Italy, 19 November
CEOS 16th Plenary, ESRIN, 20-21 November
Meeting with UK DEFRA, London, 25 November
AATSR meetings, RAL, 26-27 November
Visit to Leicester University, 28-29 November
3rd GHRSST Meeting, ESRIN, Frascati, Italy, 2-4 December
ENVISAT Validation Workshop, Frascati, Italy, 9-13 December

High-Level WSSD Follow-up Meeting – ESRIN, Frascati, Italy, 19 November

The meeting was opened by Jose Achache, CEOS Chairman. He talked about the space contributions to the WSSD meeting and how there were many references to RS and EO in the outputs from WSSD. There were also IPCC statements to the WSSD meeting that formed a base for some of the discussions,.

There were 2 main outputs from WSSD –

- 1. A political statement which was not really agreed by the participants, and
- 2. A plan of implementation which had widespread support.

Three presentations were planned and are listed in the agenda. The first presentation from the World Bank was not given as the presenter only arrived towards the end of the meeting.

The second presentation by Dr Souleye Wade described an example of building an indigenous capability in Africa for EO satellite applications.

The third presentation described the RANET system which was providing African farmers with up to date information from satellite and other observations via a radio network.

Following these two presentations Achache and Withee described possible WSSD follow-up actions by CEOS Members and Associates. Furuhama was also included in these presentations as the previous CEOS Chair.

A round-table discussion followed which included the World Bank representative before a wind up of the meeting.

FULL MINUTES OF THIS MEETING WILL BE AVAILABLE IN DUE COURSE

CEOS 16th Plenary, ESRIN, 20-21 November

Agenda Item (AI) (The agenda is included below as ATTACHMENT A)

NOTES:

1. Most of the information presented at the Plenary Meeting is included in the meeting papers that are available at http://www.ceos.org **and on a CD-ROM which is available on request.**

2. Another three CD-ROMs are available: The CEOS Earth Observation Handbook, Material prepared by WGISS for the WSSD meeting, and the final report from the Disaster Management Support Group.

3. Full minutes of the meeting will be available in due course.

AI. 1. Welcome
Welcome by the CEOS Chair, Jose Achache
AI. 2.
Logistics presented by Josef Aschbacher
AI. 3.
The agenda was adopted with some minor changes in order of presentation
AI. 4.
The Action Items from the last Plenary were reviewed and the minutes of the meeting adopted with one minor change.
AI. 5.
The Chair presented his report which consisted of 4 main actions during the year, a) Planning, b) WSSD, c) CEOS Handbook, and d) many meetings of the Secretariat.
AI. 6.
Membership issues were discussed. MACRES is waiting one more year before application for membership. UNESCO had applied for associate membership and gave a presentation of their activities. The meeting accepted UNESCO as an associate member. UNESCO has a new program In Africa in remote sensing that includes oceanography, science education, and capacity building.
AI. 7.
The CRT-2 report was presented by Stephen Briggs (ESRIN). There were some concerns expressed by the meeting regarding the lack of milestones in the report. The report also called for a better interaction between CEOS Plenary and the WGs.
AI. 8.
8.1 IGOS report of the meeting in at ICSU/UNESCO in Paris 15 June 2002. Report accepted.
8.2 SIT report. The oceans theme had received a good response from data suppliers.
AI. 9.
The report on the WSSD meeting was accepted by the meeting. However, the proposal for follow-up actions was not accepted by the meeting and it was suggested that a task force be set up by the incoming CEOS Chair that would receive inputs on this subject from interested Members and Associates. These would be required by mid-January so that a concrete proposal could be finalised within 3 months. Inputs to go to Brent Smith of NOAA.
A proposal was put forward that CEOS should seek formal membership of the Committee for Sustainable Development (CSD). This was passed unanimously.
AI. 10.
Working Group reports from WGISS, WGCV, DMSG, and WGEdu.
This was the final report from the DMSG (Disaster Management) and a CD was supplied containing the report.
UN/OOSA (Sergio Camacho) was taking over as Chair of WGEdu
AI. 11.
Reports from other agencies
11.1 A report on the Space Policy summit was presented by Roy Gibson.
11.2 A report on the UN Framework Convention on Climate Change was presented. Concern was expressed that there was not sufficient time for CEOS Members to have any input to the document. Although the time available was very short draft copies would be provided to interested parties for immediate response and input.
11.3 GCOS reported on their latest activities.
11.4 The Space Frequency Coordination Group reported that some frequency bands were under threat by automobile anti-collision devices. The band is that used for microwave sounding for moisture.
11.5 COPOUS/Unispace-III reported to the meeting.
AI. 12.

Member reports of significant events
NASDA reported that they have 3 priorities for future EO missions – a) Greenhouse gas observations, b) water cycle observations, and c) climate change observations.
CSA Radarsat II has been approved with a 3m resolution SAR
ISPRS reported on recent activities
WCRP reported
CSIRO reported on the impending launch of FEDSAT along with ADEOS-II.
BNSC reported on the UK NERC Centres of Excellence and their small satellite program. Full details would be presented to the next CEOS Plenary.
AI. 13.
Next Plenary Meeting 18-20 November, 2003, at Broadmoor, Colorado Springs and to be hosted by NOAA.
China to host the 2004 Plenary, and a call for expressions of interest for 2005 was made.
AI. 14.
There was no other business.
AI. 15.
Review of Action Items. Th only urgent one was for members to contact NOAA with proposals for involvement in the WSSD follow-on program. Proposals due by 15/12.
AI. 16.
The Chair was officially handed over to Greg Withee (NOAA).

END OF MEETING

Meeting with UK DEFRA, London, 25 November
A meeting was arranged with Dr Cathy Johnson of DEFRA to discuss AATSR issues and the possibility of arranging a Mini-SAG meeting in Australia during 2003.
1. Possible Mini-SAG in Australia. Johnson stated that DEFRA were currently under severe financial pressure due to the under-funding of a merger with another government department.. Thus it was unlikely that such a Mini-SAG could be supported. I outlined the benefits for both sides and said that there were several areas in which the Australian ATSR activities could benefit the application of AATSR data in climate research as carried out in the UK Hadley Centre. Johnson then said that DEFRA could only support attendance by UK personnel at the meeting if the benefits to the UK and the Hadley Centre could be clearly set out. A case would need to be presented to DEFRA by the end of January so funding could be identified in the budget for the next financial year starting April 1. Possible subject matter for such a case would include the water vapour work, GODAE SST, LST, and surface energy budgets.
2. AATSR-next. David Warrilow from DEFRA had explored such an opportunity some 3 years ago through a survey, but had come up with no enthusiasm for a replacement instrument. Johnson stated that DEFRA would certainly not be interested in being a major partner, but could contribute some fixed funding in the future. Elio Grohovaz should have a copy of the survey.
3. DEFRA were supportive of the Australian contribution to AAATSR validation, especially the ongoing campaigns in Perth and Townsville.
4. The Hadley Centre was to move to Exeter with the UK Met Office in the next year or two.
5. The availability of NRT data through the internet was discussed. Details should be sought from ESA.

AATSR meetings, RAL, 26-27 November
Meetings with Brian Maddison, Chris Mutlow, and Andrew Birks about AATSR data access and processing, and ATSR-2 data supply for water vapour analyses. A data tape was obtained that

included all the clear sky, over-ocean, ABT data for the ATSR-2 mission. Discussions also covered recent changes that had been implemented in the RAL transmission model.

Visit to Leicester University, 28-29 November

Discussions with Prof. Llewellyn-Jones and Marianne Edwards about the AATSR validation program. Some data analysis on the validation data collected during the Australian cruises on the Lady Basten were carried out. Results were incorporated into the paper to be presented to the ESA ENVISAT Validation Workshop and the 3rd GODAE SST meeting during December.

3rd GHRSST Meeting, ESRIN, Frascati, Italy, 2-4 December

Meeting notes are given below as ATTACHMENT B.

Two presentations were given to the meeting.
The first described applications of satellite-derived SST fields in Australian agriculture, aquaculture, and fisheries. Powerpoint slides were provided by Peter MacIntosh and Vincent Lyne. The second presentation described the validation activities of Australian scientists in the validation of satellite-derived surface temperatures using AATSR data.

Copies of these presentations are available on request.

Executive summary of the GHRSST meeting.

The project continues to develop at a fast rate. The 3 regional RDACs at NASDA, ESRIN, and Monterey are all under development. ESRIN are funding the MESPIRATION project within Europe and this will be the main contribution to the GHRSST in that region. Funding for a GHRSST office will also be provided.

The GDAC at Monterey is still in the specification stage. Funding will be required to purchase a processor plus _ EFT to operate the GDAC.

Data blending method are under development at RSS and NASDA.

A GHRSST AO response was submitted to ESA to gain access to AATSR data. The submission was accepted and now all GHRSST personnel have access to AATSR data.

The work of the ISDI-TAG team was presented and accepted although there is still much work to be done. The TAG team will need to provide an up-dated plan for submission to ESA before the end of January 2003.

ENVISAT Validation Workshop, Frascati, Italy, 9-13 December

This workshop consisted of a preliminary session on the first day, a two-day MERIS workshop, a one-day AATSR workshop, and a wrap-up session on the last day.
Meeting notes for the two workshops are included below as ATTACHMENTS C and D.

Two Powerpoint presentations were made describing the Australian validation activities for MERIS and AATSR. Copies of these presentations are available on request.

All papers and presentations will be collated onto a CD as a meeting report. This will be available in due course.

MERIS WORKSHOP – EXECUTIVE Summary

The instrument is working well and is providing good data in all cameras. Some minor changes to the processing are required to take account of the SMILE effect (I think this arises because each camera looks forward with a linear detector array and the curvature of the earth needs to be taken into account. Reprocessing should occur when these changes are made.
The detector response is degrading slowly as expected, but the degradation rate is less than expected.
Only limited amounts of data have been released to date.
The "blind" orbits which are not directly received at Kiruna have not been processed yet. These data include all daytime passes over Australian waters. This is only the case for data recorded before the start of November. All orbits are now processed – but it will take some time to get the early data.
It is suggested that future validation activities for ocean colour products should concentrate on the anti-solar side of the swath. Camera 4 is best but cameras 3 and 5 could also provide useful calibration data. The other cameras are affected by sun-glint and the data may not be useful for validation.
AATSR and MERIS data agree well with each other but there is evidence that they both give radiances that are more than 10% higher than other instruments including SeaWiFS.

AATSR WORKSHOP – EXECUTIVE Summary

A general release of AATSR data products was recommended but there should a warning stating that the data have not yet been fully validated. The analysis of the UKMO suggested that the SST values may be high by 0.2 degrees. Other validation data were required to confirm this offset.
A reprocessing of the data was recommended once the known processing anomalies have been addressed. These include the 5 pixel offset in the collocation of nadir and forward views. There are also issues with the averaged products and the known 4 and 6-channel differences.
High priority should be given to the processing of the data to be used for geophysical validation – especially those obtained during the first 6 months of the mission.

ATTACHMENT A

CEOS Plenary Agenda

Topic	Lead Speaker
1. Welcome addresses and logistics information	ESA
2. Review and adoption of the Agenda	ESA
3. Record of the 15th Plenary	ESA
4. Report of the Chairman	ESA/Achache
5. Membership Issues	ESA
6. CEOS Review Team Report	ESA/Briggs
6.1. Chairman's Recommendations	
6.2. Way ahead	
7. IGOS-P and SIT	
7.1. IGOS-P Co-Chair's Report	ESA/Achache
7.2. SIT Report	EUMETSAT/Mohr
8. Working Group Recommendations	
8.1 WGISS	CCRS/Fisher
8.2 WGCV	ESA/Desnos
8.3 Ad-hoc DMS group	NOAA/Wood
8.4 Ad-hoc EO-Edu group	ISRO/Rao
9. WSSD	
9.1 WSSD 2002	ESA/Aschbacher
9.2 WSSD Follow-up	ESA/Achache
10. Other relevant activities	
10.1 UNFCCC (inc IPCC, GCOS)	NASDA/NOAA
10.2 COPUOS/UNISPACE III	COPUOS/Camacho
11. Updates on Significant Events by Members and Associates	Members+Associates
12. CEOS Planning	
12.1. Next Plenaries	NOAA+CHINA+TBD
13. Other Business	ESA
14. Review of Action Items	ESA
15. Chair handover to NOAA	ESA & NOAA
16. Adjourn	ESA

ATTACHMENT B

GHRSST Meeting Notes, ESA/ESRIN, 2-4 December 2002

Steve Briggs (ESA/ESRIN):

Introduction and welcome

Craig Donlon:
Workshop plan and objectives

David Llewellyn-Jones: SST and Climate Change
SST is an indicator of climate change
Differences between Satellite and in-situ data sets
Natural variability an global trends. Exploratory study. AATSR aims at providing a long-term(15 years) data set of SST.
Described Myles Allen work on the length of data required for detecting climate change..

Pierre Bahurel: Applications of GHRSST in MERCATOR
Use data from several data centres including SST data.

Howard Cattle: CLIVAR uses of GHRSST.
CLIVAR includes TOGA, WOCE,GEWEX, SPARC, ACSYS, CliC. All these projects need SST. Objectives are climate predictability and variability, and to extend the record of climate variability data sets.. To extend the range and accuracy of prediction. To understand the response of climate to anthropogenic forces.
CLIVAR requirements for SST data –

- Climate change detection
- Validation of coupled models
- Input to seasonal and inter-annual models
- Exploring decadal changes
- Development of surface flux data sets

Pierre-Yves LeTraon: Applications of GHRSST in MERSEA.
MERSEA – To provide a global demonstration of oceanographic data – The European contribution to GODAE.
Use of SST data in models. Need to account for flux feedback from the atmosphere. Use a flux correction method or a bulk-forcing method.
Impact of SST and SLA data on determination of sub-surface temps.. Can use simple regression methods. Important to use the altimeter data along with the SST. Currently use 1 degree Reynolds SST. Tests of new systems underway moving from Reynolds to high-resolution SST from CMS. Use EMCWF heat fluxes and resolution.
Today's requirements are daily SST with 10km resolution. Analysed products. Merged products probably the best with cloud-filled data sets. Use of diurnal variation not yet clear. Use of bulk SST preferred at the moment – but in the future may look at bulk-skin differences.

Rosalie Santoleri: EuroGOOS Mediterranean Task Team.
A pilot project 1998-2001
Second phase 2001-2005. MFSTEP - 15 nations and 48 laboratories. Implement an observing and forecasting system,.
Satellite observing system providing NRT products. Real time release of forecast via the WWW on a daily basis..
Third phase 2005-2008. Will go to 1/16 degree resolution.

Bill Emery: MCC currents. Differences between AVHRR and TMI – may be useful for GHRSST.

Hiroshi Kawamura: The Coastal Ocean Observing Panel (COOP). Open ocean – ARGO and GODAE. But what about the coasts? 3 components a). Coastal marine services. b). ecosystem health and living marine resources, c). public health.
Develop a cloud-free NRT high quality SST for Near-GOOS region with 1 km resolution, 3-hourly, with China, Korea, and Russia

Matthias Drusch: Requirements of future SST data sets by ECMWF.
3 ECMWF objectives - Medium range forecasts, seasonal forecasting, and re-analysis.
Have carried out a "warm-layer" experiment – didn't make much difference!

Sylvie Pouliquen: CORIOLIS – a French project to collect and qualify in situ data for oceanography. GOSUD/IODE project – provide easy access to underway ship data. This program also processes data from UK, German, Dutch, Chinese, and Indian floats.

Uwe Send: In situ observations into GHRSST. GHRSST needs in situ data for products, diagnostic data set, and resolving the diurnal cycle. Calibrated in situ information for skin SST, sub-skin SST and bulk SST.

Adrian Hines: Applications of GHRSST in FOAM. Forecasting Ocean Assimilation Model. Daily forecast of ocean parameters out to 5 days ahead. Driven by 6-houly data Global model with a nested north Atlantic model. Observations are QC against forecast fields. Do develop high resolution models for special applications,. – can be 1/9 and 1/27 th degree resolution. Assimilate both in situ and satellite SSTs.

Eric Chassignet: Application of GHRSST products in GODAE.

DAY TWO

Hiroshi Kawamura: Second version of New Generation SST
Combination of infrared, microwave, and in situ SST. All satellite instruments on ADEOS-II. Will be launched in December. Japan fisheries and Safety agency need SST daily, 1-degree. First priority is Bulk SST, but then will move to skin, and other research products. Tested using merged AVHRR and TMI SSTs.
Gary Wick: PEMSA Production of an Enhanced Multi-channel SST Analysis. A proposal to NASA.
Objectives: Production of new SST
Higher accuracy, responsive to user needs, consistent, and timely
Merged, analysed, and applications.
Merged products: Microwave, IR. 6-hourly with no diurnal compensation, 1/12 degree
Analysed: Skin and 1-metre. Daily minimum values. Include diurnal info.
Applications: Responsive to user needs. Numerical weather prediction for Navy, civilian. Climate applications
Input data: Satellite – all. In situ – buoys, radiometers, ships etc,. Ancillary, wind, sun, etc. Data go into GODAE server, then to a processor, and distribution through the server or PODAAC (in the long term).
Product re-processing: RT retrievals, cloud detection. Diagnostic data sets required.
Skin Layer: Use Donlon et al (2000), Fairall et al (1996)
Diurnal warming – use empirical and numerical models.
Analysed products include optimal interpolation and other methods.
Validation using NOPP, Buoys, UAVs (Emery).
Data archival: GODAE server, and ultimately PODAAC.
Olivier Arino: Towards a European RDAC. Medspiration. ESA will contribute to GHRSST full access to AATSR data.
Develop an operational system for SST processing.
This will be the European RDAC. Demonstration of an operational NRT service.
Ian Robinson: Continuation from Olivier: Medspiration – a European RDAC. To enable Europe to make a contribution to GHRSST.
Tasks: 1.) Define user requirements. 2.)Data product generation, 3.) Development of processing system, 4.) validation, 5.) Completion.
Timetable: 2 years. 5 work packages as above.
Nick Rayner: GHRSST and Climate data sets. Quality and homogeneity of data sets required.
Craig Donlon: For GODAE Distributed Data Sharing Pilot Project. A framework for sharing and inter-comparing data is **essential** to the success of GODAE.
Ed Armstrong: The GHRSST-PP Master Metadata Repository (MDR). 2 types of records - 1.) Data set record, and 2.) File record.
Jorge Vasquez: Towards the GHRSST-PP User Information Services. The DAAC, and Data Product (UIS-DP) server.
4 main access points: Email, Phone, WWW, & EOS Data Gateway (EDG).
Jorge Vasquez: The GHRSST Diagnostic Data Set. Described PODAAC.
Craig Donlon: The HR Diagnostic Data Set Implementation Plan.
Andy Harris: The GDAC computational facility - **a shared resource**.
What tasks are required? –

- Develop SST retrievals and their errors
- Develop and apply parameterisation for surface effects
- Assimilation/analysis - Approach 1. Use an ocean model. Does this fit in with GHRSST project? Approach 2. No model. Approach 3. A simple model.
- A hypothesis – we should try everything!!

GDAC Hardware resources required. 16-node Linux cluster. 1-2 TB communal disk space. Fast inter-connect. Need to perform routine processing of satellite data.
Software resources. To access data streams; to run processes; to validate and share code.
Gave an example: AATSR Skin to Bulk processing.
Feedback from users (including GHRSST Team) is required.
Maintenance will be required – NRLMRY have offered (Jim Cummings)

Hiroshi Kawamura: Japanese plans for the GHRSST satellite-in situ network. For GHRSST Japan will first develop BULK-SST. Then go to other products.
Re-analysing MUBEX data. With Dr Tanba. Also looking at instruments on a Triton buoy/platform including an IR radiometer.

Gary Wick: In Situ and Satellite Data Integration. First report of the Technical Advisory Group (ISDI-TAG). TORs
Develop consensus methodologies.
Products: Skin, sub-skin, and constant temperature layer.

Merged and analysed
Did not consider re-analysis
Merged products. Better than 10 km at 6-hour intervals.
Analysed products: Fill in gaps, daily values I n absence of diurnal wrming. Added diurnal warming.
Skin: IR measurements used.
Sub-skin: MW measurement with IR converted to sub-skin where appropriate.
Constant Temp Layer: Use all data sources with appropriate treatment
Confidence statistics.
Skin to sub-skin
Merged products: Single value per sensor, per grid point, per time interval.
Analysed products: Initial analysis to use OI. Incorporate sensor bias
Validation: Use independent direct observations as much as possible. Avoid use of relationships between different depth products.
Doug May: NAVOCEAN data and GHRSST.
Daily GAC MCSST coverage. 8 km resolution.
Now do some LAC coverage – 2 km over selected areas
GOES MCSST coverage as well. 12 km resolution.
Plans for the GODAE server – will supply all the above data sets. Can also supply a 10km grid every 24 hours. Simple data analysis with no OI or other analysis.
Rms values are about 0.45 K for clear SSTs, 0.75 for probably clear.
Last 30 days of match-ups used to track data quality.
Today Navy only uses AVHRR roducts in their models. Is looking to get data from the other satellites including AATSR, GLI, MODIS, AMSR, etc.
Michel Petit: SEASnet. Objectives – Scientific and technical coordination of receiving stations. Common experiences, know-how, and data transfer. 4 stations - Canary, Reunion, New Caledonia, & French Guyana. These all get NOAA and SeaWiFS data.
Hiroshi Kawamura: The NASDA GHRSST-PP Data Server.
ADEOS-II algorithm development. Data flow from GLI and AMSR.
AMSR-E products available to anybody in May2003. Data accessed via PI's password.
Craig Donlon: The ESA Data Server. Data into the European RDAC. Get AATSR data out to users in NRT. A proposal was submitted to ESA, and has been approved. Thus all GHRSST people have access to AATSR data.
Following the ENVISAT meeting next week we should then have good AATSR data. Want to use these data in GHRSST and in Medspiration.
AATSR will be a "reference" data set. Altimeter will also provide a nadir wind measurement for assistance with data analysis and merging. Somehow need to develop a system to get the data into the GDAC in Monterey.

DAY THREE

Chelle Gentemann: Cal/val of AMSR-E
Peter Minnett: Use of MAERI for SST validation.
Ian Barton: Validation of the SST from ATSR-2 and AATSR
Bob Evans: The SST provided by TERRA and AQUA
Adrian Hines: (for Lisa Horrocks) UKMO validation of AATSR SST.
Gary Wick: (for Andy Jessup) Collection of SST validation data using the RV Ron Brown.
Dick Reynolds: OOPC SST Working Group and Buoy need requirements
Jorge Vasquez: Comparing ATSR-2 and AVHRR SST (MPFSST-ASST).
Chris Mutlow: ATSR programs – Use of SST data as a reference standard.
Pierre Le Borgne: Merged SST data at Meteo France. Objective: To supply MERCATOR program with a daily SST product for the Atlantic ocean at 0000 UTC.
Hiroshi Kawamura: Status of AMSR-E and ADEOS-II.
Chelle Gentemann: Developments in fusion of AVHRR/AMSR-E/TMI/VIRS SST measurements. Blending gives improved cloud clearing and accuracy. Useful for taking account of post-volcanic cooling.
Ken Casey: Development of a re-analysis plan for GHRSST. Example re-analysis projects – Pathfinder projects, SeaWiFS, MODIS Terra. Important to provide ancillary data to users. Need to create realistic schedules and budgets.
Andy Harris: Accounting for clouds and aerosols. Dust , volcanic, and Saharan dust.
Chelle Gentemann: Diurnal signals in SST.
Chris Merchant: Radiative transfer modeling.
Craig Donlon: Wind-up discussions. A reminder that GODAE is a demonstration project. Need to demonstrate in the 2004-2005 time frame. TAG will re-work their TORs. Need a timeline on when data sets will be available.

ATTACHMENT C

MERIS WORKSHOP ESA/ESRIN 10-11 December 2002 – Meeting Notes

EXECUTIVE SUMMARY

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AIMS OF WORKSHOP

Demonstrate that MERIS works, is calibrated , is validated.
Demonstrate that Level 1b products are perfect.
Approve the release of Level 2 products.

J-P Huot. Introduction
Does MERIS work?

Steve Delwart: **Described MERIS instrument**

Calibration Spectral & Radiometric leading to a recommendation
L. Bourg: Calibration results
Spectral – an Erbium doped diffuser @ 410 and 520 nm.
Spectral observation campaigns O2 line at 760 nm A neural net method (FUB) and pressure homogenisation (LISE)
Fraunhofer lines @ 395, 485,855 nm (FUB)
Results of spectral calibration - Better than 1-2 nm in all channels
Second Spectral Calibration - late in November. Used O2 and Fraunhofer extra lines @ 656 and 866 nm
Conclusions: Parameters will be reviewed as more wavelengths become available
Further work needed to explain some anomalies.
Steve Delwart:
Diffuser 1 and diffuser 2 give almost identical results.
CCD temp very stable
VEU temperature drift of 6 degrees. Offset control loop converges well
0.6mV – 1.5 V dynamic range
Radiometric Calibrations -
- Instrument degradation: Worst channel be less than 1% over first 3500 orbits.
Diffuser aging: 2 diffusers used – one often and one occasionally. This will allow an assessment of the effect of the aging of the diffusers.
MERIS & AATSR Inter-comparison. Aggregate MERIS pixels in an AATSR pixel. A 4% difference over a complete orbit.
Recommendations will be made later in the Workshop.
G Bazalgette: MERIS diffuser characterisation.
BRDF measurements of the diffusers in 1996, 2000, and 2002
3 different set-ups.
Designed to measure absolute BRDF to 0.5%
Used system at NASA-GSFC.

First done in 1996. Re-done in 2000. No difference except for 1 line in the UV.
In 2002 there was some minor degradation. Main effect in the UV
Conclusions: Further in-orbit work needed.
R. Santer: Uncertainties in the Radiative Transfer codes
Outline: MERIS calibrations, modeling of atmosphere-surface effects
Vicarious calibration. Reflectance-based method.
Can forget the SMILE effect. Then just get only one coefficient per band. Solar radiance doesn't vary.
Atmospheric absorption. Showed a table of absorbers in each band.
Conclusions. No cal for O2 and H2O bands. Perhaps Level 1c data after gaseous absorption correction!!
Listed different radiative transfer codes and compared phase functions for each.
Olivier Hagolle: Calibration of MERIS using natural targets
MERIS on-board calibration is the nominal method.
Rayleigh cal. Main error sources. Ocean surface reflectance & aerosols
Uncertainty 3-sigma 4%
Sun-glitter cal. Main error sources are ocean surface and aerosols
Uncertainty 3-sigma to 5%
Calibration over desert sites – 20 sites in N. Africa.
Big difference between cal results
MERIS cal data anal is not complete
More data needed. A second validation meeting should be held in the next year.
David Smith: To use desert sites to verify cal of MERIS and AATSR. Used Sudan and Mexico sites. Orbit 2136 comparison. Showed nadir pixel for a scan through the Sudan site.. Good agreement at 655 nm. ATSR-2 data as well. AATSR agrees very well with MERIS – but not with other instruments. A lot of work still required.
David Smith: Inter- and absolute calibration of AATSR MERIS over clouds.
M. Schaepman: MERIS vical over Railroad Valley Playa. Results – better than 6 % with the MERIS cal results. This excludes two of the channels (11 and 15) These two channels need better atmospheric correction for the O2 and H2O effects in the bands.
J. Nielke: Satellite sensor inter-cal using selected snow and sea sites (MERIS, GLI, AATSR).
Ocean site in East China Sea
Snow site in Alaska and Antarctica (Syowa)
Comparison with MERIS, SeaWiFS and AVHRR are within the expected errors.

Y. Govaerts: **Vicarious calibration desert sites. MERIS seems to be 5% higher than SeaWiFS.**

C Trees: **Use of SIMBAD to calibrate MERIS Use LOA/CNES radiative transfer model. Measures 3 hours from overpass and over open ocean.**

Very good agreement for the preliminary results. More MEERIS data are required
SIMBAD network very valuable. Work will continue
Steve Delwart: Recommendations
1. Repeat spectral characterisations every six months
2. Instrument degradation Include a pixel-wise degradation model
3. Run a diffuser aging calibration exercise in SciLa configuration
4. Inter-compare radiative transfer codes used for vicarious calibrations.
5. Cal Plan systematic acquisition of data over designated targets
6. Hold regular cal/val workshops.

AFTERNOON SESSION

C. Brockmann: Verification of MERIS L2 Processing system.
Software versions: Breadboards, prototype, and Integrated Processing Facility (IPF)
40 LUTs in 10 auxiliary files
V. Fournier-Sicre: Trouble-shooting the L2 processor. Objective – to ensure that the MERIS L1B/L2 prototypes and IPF are in line. Different codes (C and C++), different architecture, different platforms, etc.
Conclusions: Cloud ID works Land reclassification better than a pixel
Ocean products Surface reflectances ready for validation. DDV works
Rectified reflectances are ready for validation.

NOTE: For MERIS validation we should concentrate on collecting data in the anti-solar (western) side of the pass. Sun-glint IS a problem.

J. Fisher et al.: Cloud albedo and optical thickness, water vapour. Over land water vapour is correlated with terrain height. Compare MODIS and MERIS derived water vapour over land. MODIS always higher.
MERIS water vapour over ocean and land.
Showed MERIS cloud products – optical thickness. Compared with MODIS. Also cloud-top pressure.
Conclusions: WV over ocean not yet validated – problems with lack of reflected signal. Over land to 15% but usually too low. Need more experiments.
Rene Preusker: Cloud-top pressure using MERIS.
Comparisons with radiosondes, and MODIS MOD06 products. Both have the same limitations.
Cross-validation with water vapour products. Problems with time differences between radiosonde and overpass time.
P. Albert: Water vapour over land sea and clouds. Algorithm based on reflected/back-scattered solar irradiance.
WV over land compared to MODIS product. Again MODIS is higher.
Comparison with radiosondes – need to identify cloud-free radiosondes.
Same conclusions as previous speaker.
P. Chiotti: An experiment over Italy. Instruments: Radiometers, sondes, all usual weather lot.
Integrated Precipitable Water Vapour (IPWV) measurements by GPS. Also by MERIS.
Results for Elba very poor. Over Pomezia (inland) look a lot better.
Future work: Use a Kriging interpolation. Compare with IPWV over sea from SSMI.
D Ramon et al.: Pressure over land. Use oxygen A-band channels. One MERIS channel in band – another two channels on each side are just out of band. 760, 753, 625.
Conclusion 1. In-flight spectral cal is better than expected.
The pressure computation. 21 Polynomials for spectral shift in the range. Shift 0.1 nm resolution. Use 443, 753 for cloud flagging (present status).
Accuracy ??
R. Santer: Retrieval of aerosols over land. Inverse problem – how to get surface props from TOA radiances. More to do for validation of the aerosol product.
R. Santer et al.: Uncertainties in radiative transfer codes. Consequences for MERIS L2 products. UPRAD from LISE, MOMO
900/885 for H2O estimation. Also needed for 709.
There is a need to generate LUTs for each RTC.
F. Baret et al.: Validation of MERIS products based on VALERI sites: first results. Compare with other satellite products (MODIS & VEGETATION) and ground measurements. Compare MGVI and NDVI. Big differences between MERIS and MODIS and Vegetation.
Ground measurements. 3x3 km site. MERIS is low, MODIS is high, and Vegetation looks the best (slightly high).
N. Gobron et al.: MERIS Land Algorithm – preliminary validation. Need maximum sensitivity to FAPAR. Compares MERIS with SeaWiFS products. Remapped MERIS onto SeaWiFS orbit.

Conclusions – a complex task. Comparison with SeaWiFS shows promise. Additional MERIS data required.

M. Rast: MERIS classification of forests. Presentation on behalf of Canadian colleagues (Zwick and Miller). Only just got data so not implemented yet.

DAY TWO

J-P Huot: Introduction
OBJECTIVES FOR THE DAY
- Review methods for validation measurements.
- Establish error bars on validation measurements.
- Show early validation results.

D Antoine: Early results at the Boussole site – between France and Corsica. Development and deployment of an optical buoy . Displayed the full data set collected at the buoy site.
Work at sea: Monthly campaigns. 3-days 21 days during Envisat mission – 10 days with MERIS overpass.
Buoy deployment: 12 days with 5 overpasses.
V. Fournier-Sicre: Inter-comparison of MERIS and SeaWiFS marine products.
Objectives. To compare L2 products from each instrument. Case 1 waters only. Compare nLw values. Conclusions.
Shapes and ranges are comparable. Need more images. Extend the comparisons to PAR.
P-Y Deschamps: Radiometric measurements above open ocean waters. SIMBADA measurements. Deployed on ships.
90 potential match-ups – 22 obtained.
MERIS aerosol optical thickness under estimated by 20%. MERIS Chla OK by factor of 2.. SIMBADA radiometers network useful for validation of marine reflectance and aerosol products.

Jim Aiken: BENCAL. MERIS-MODIS-SeaWiFS inter-calibration cruise, FRS Africana, 4-18 October 2002. 41 stations with heaps of measurements- got 2 MERIS match-ups.
R. Doerffer: MERIS Case II marine products. Described range of dissolved and suspended matter in coastal waters. Use of a bio-optical model. Uses a neural network. Model works OK.
G. Tiltstone: Inter-comparison of phytoplankton and CDOM absorption. Use in situ observations to validate the satellite data. Discussed NASA data collection protocols.
CDOM analyses should be done on fresh samples whenever possible. Phytoplankton absorption protocols discussed as well. Comparison between different labs and different analysis techniques. Recommended some changes in sampling protocols.
K. Sorensen: Inter-comparison of Chlorophyll HPLC spectrographic measurements. To arrange an inter-comparison MAVT protocols are the basis for the measurements. One comparison in June, and another in October. About 20 labs took part in the inter-comparison.
G. Moore (presented by J. Aiken): Inter-calibration of optical instruments at Plymouth. PlymCal1 and PlymCal2. First against standard labs. Trios radiance instruments look the worst – 8% off. However – after full corrections applied the agreement was within 1%. Tested a range of lamps as transfer standards. Some aging effects evident.
P. Viskum Jorgensen: Inter-comparison of Bb measurements. Outline – PlymCal2 & REVAMP cruises. 4 different Hydroscats. Deployed at sea from a ship. All instruments on the same boom and lowered in the water to depth of 3 m. Showed measurements for Case-I and Case-II waters. Tested on a transect across the English Channel.
J-P Huot: Summary of the morning's talks.

AFTERNOON – 11th December.

Alison Weeks and Ian Robinson: Early validation results for MERIS marine products. 34 sets of measurements for Blanes in Mediterranean Sea near Barcelona. 10 match-ups at Mascarene Ridge.
K. Sorensen: Early results for Kattegat/Skagerrak. Used ferry from Oslo to Hirtshals for day and night measurements. Listed instruments and collection techniques.
Lasse Pettersson: MERIS validation in Norwegian Seas. Chl-a, total suspended matter, yellow substance. Complementary information – hydrography, ocean currents, model results.
Ian Barton: Presentation of Australian MERIS validation activities.
H. Siegal: Early results from Baltic Sea.

MISSED TALKS HERE DUE TO AATSR MEETING.

G. Zibordi: Results at AAOT.
Marcel Babin: Gironde Estuary. One 3-day validation cruise only.
G. Borstad: Validation at the West Canada Ferry site. MODIS and MEROIS. Talk about MODIS as no MERIS data available. Have coined the phrase fluorescent deficit. Measurements are a lot less than expected. May be some variation with salinity! Will look for the same effect with MERIS data.
J-P Huot: Early conclusions regarding validation of MERIS products. Very few validation points available due to lack of Level 0 data.
When agreement with marine reflectances is good Case-II waters inversions gives good results.
One question still open is the treatment of absorbing aerosols over absorbing waters

RECOMMENDATIONS

1. CRITICAL - Need to find the Level 0 for the validation match ups
ESA should process these data and distribute to validation PIs.
2. A REQUEST – Please filter data requests so that only useful data are processed.
3. Review and validate the glint correction.
Try and collect validation data in anti-sun side of swath to avoid sun glint. (Cameras 4 and 5 best). Atmospheric correction in Camera 3 appears to not be good!
REVISE PCDs and flags. ? white-cap correction (a flag for high wind speeds)
4. Implement improved glint correction

THE WAY FORWARD

To release products following the Smile correction,
To continue validation exercises,
To implement recommendations 1-3,
To validate at a MAVT meeting mid-2003,
To re-process the archive, and
To organise a Second MERIS Validation Workshop by the end of 2002.

ATTACHMENT D

AATSR WORKSHOP ESA/ESRIN 12 December 2002 – Meeting Notes

Marianne Edwards:

Outlined aims and objectives of the Workshop

D. Llewellyn-Jones: Highlights- comprehensive validation plan in place. Validation scientists have collected data and are awaiting the AATSR data.
Program desperately needs May-August data from ESA.

Marianne Edwards: AATSR Validation Plan is on the WWW site. 2 types of validation.
Initial validation and ongoing validation.
To make a detailed assessment of the AATSR products.
Validation strategy- algorithm verification
Val of VIS/NIR L1B data
Validation team led by Leicester Uni on behalf of DEFRA.
Team meetings held regularly
Large number of of validation data collected and a small number of match-ups.

Hannah Tait: AATSR Cal/Val data distribution.
L1B - Ordered by the cal/val data coordinator. Use PERL scripts to the USF. Currently a single server. Child products delivered. Problems in September . Responsibility moved to UK PAC.. In many cases the search returns a ZERO. Usually because the product has not arrived at the UK PAC.

Missing data will have to be re-run. A few products have found to be empty (values all set to –8).

L2 data - Systematic distribution started. A gap between end September and early October. Data are placed on an ESA server for 4 days after reception.

Meteo data are being regularly distributed. However there are some interruptions. Strategy for the missing METEO products has not been devised.
Andrew Birks: Update on L1B issues from commissioning phase.
Open issues: VISCAL algorithm didn't work. New algorithm developed and loaded onto PP in July. OP update pending.
A list of minor S/W problems have been fixed.
Problem: Forward view out by 5 km. Fixed early in November – but data before that have this error. ??? implications for LST
L2 algorithm verification: Some problems with L2 data have been addressed and fixed. Problems with quality flags on 30 arcmin products.
METEO product. A copy of the 10 arcmin SST product. No discrepancies found except with the confidence word.
Comparisons with ATSR-2 data. Planned for 4 orbits. Orbits selected – waiting on ATSR-2 data delivery. Hope to complete before end of year.

GENERAL DISCUSSION on OUTCOMES

The meeting then put together a presentation for the next day outlining our concerns, recommendations, and conclusions from the Workshop. A general release of AATSR data products was recommended but there should a warning stating that the data have not yet been fully validated. The analysis of the UKMO suggested that the SST values may be high by 0.2 degrees. Other validation data were required to confirm this offset.
A reprocessing of the data was recommended once the known processing anomalies have been addressed. These include the 5 pixel offset in the collocation of nadir and forward views. There are also issues with the averaged products and the known 4 and 6-channel differences.
High priority should be given to the processing of the data to be used for geophysical validation – especially those obtained during the first 6 months of the mission.