

SCIRoCCo Kick-Off

Presentation to

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Wolfgang Lengert (ESA-ESRIN)

Presented by

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Alberto Bigazzi (Serco)

Anis Elyouncha (RMA)

Christoph Reimer (TU Wien)

Giovanna De Chiara (ECMWF)

Jos de Kloe (KNMI)

Raffaele Crapolicchio (Serco)

Wolfgang Wagner (TU Wien)

Xavier Neyet (RMA)



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scatterometer instrument
competence centre



Agenda

| Agenda | | | |
|--------|-------------|--|--|
| Item | Time | Who | Topic |
| 1 | 10:30-10:35 | Alberto Bigazzi / Raffaele Crapolichio (SERCO, PM) | Welcome |
| 2 | 10:35-10:50 | All | Presentation of the Consortium members. Round table summarise professional background and role in the project. |
| 3 | 10:50-11:20 | Alberto Bigazzi (SERCO) | Overall Overview of the project: main objectives, workplan, schedule, deliverables. Payment plan, missions and grants. |
| 4 | 11:20-11:30 | A. Bigazzi (SERCO) | WP Activity Description |
| 5 | 11:30-11:50 | RMA | WP Activity Description |
| 6 | 11:50-12:10 | TU Wien | WP Activity Description |
| 7 | 12:10-12:30 | KNMI | WP Activity Description |
| 8 | 12:30-12:50 | ECMWF | WP Activity Description |
| 9 | 12:50-13:20 | ESA | Points for discussion |
| 10 | 13:20-13:30 | All | AoB |



Welcome

- We welcome all the participants and we thank all of you for your availability for the SCIRoCCo Kick off meeting.
- To enhance the team spirit in the project we have set up a logo that shows our key interest: the ERS Scatterometer mission and its main area of applications: Oceanography (Ocean Winds), Land (Soil Moisture) and Cryosphere (sea-ice)
- The following are other logo's proposal (already part of the project history!)





Presentation of consortium members



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- Raffaele Crapolicchio (Serco S.p.A)
 - master in engineering degree from “La Sapienza” University of Rome
 - researcher within the Department of Electronics Engineering of “La Sapienza” University in the field of polarimetric SAR signal processing and in the retrieval of geophysical parameters from SAR
 - engineer in the ESA Sensor Performance, Products and Algorithms Assurance (SPPA) office working on the ERS Scatterometer and SMOS missions.
 - Since 2008 he is a science referee for the Italian Journal of Remote Sensing and he was tutor of several PhD works in the fields of Scatterometry
 - Contract and science expert for SCIRoCCo



■ Alberto Bigazzi (Serco S.p.A)

- Engineering and Management Support @ESA (EO, GS Division) for the past 5 years. ESA Earth Explorers (GOCE, SWARM)
- Project Manager, ESA/SEOM-IAS (Atmospheric spectroscopic Databases, DLR/LiPhy/LISA/URCA)
- Outreach: Lecturer, Master's courses in Space Technologies; Science Teaching in Schools. ESA outreach to Schools, students the general public.
- Science background: PhD, Physics, NRC postdoctoral fellow at JPL; Co-I on Solar Missions (ASI/ADAHELI, NASA Safari, ESA Adaheli+ proposal). System Team Leader, Adaheli (ASI, Solar Mission)
- Industry background: consultant for, Thales Alenia Space, Gavazzi, Telespazio, ASI, ESA. Ground Segment and Operations. Verification and Validation. Software Quality Assurance.
- → Technical project manager for SCIRoCCo





ECMWF

ECMWF

- The European Centre for Medium-Range Weather Forecast is an independent intergovernmental organization supported by 34 States.
- ECMWF is both a research institute and a 24/7 operational service, producing and disseminating numerical weather predictions to its Member States.
- ECMWF has been collaborating with the European Space Agency (ESA) since the beginning of ERS-1 mission performing the global validation and long-term performance monitoring of wind and wave products.
- ECMWF has been assimilating Scatterometer data since January 1996 with ERS-1 and then ERS-2. Also data from Ku-band scatterometer were assimilated (QuikSCAT and OSCAT). Currently data from METOP-A and METOP-B ASCAT sensors are actively assimilated.
- ECMWF participates at SCIRoCCO activities on a best-effort approach focusing on the validation of ASPS wind products into the IFS 4D-Var system.



ECMWF - SCIROCCO personnel

Giovanna De Chiara responsible for the ECMWF WPs

■ Education

- 2001: Traineeship at ESA-Esrin on the project “Tracking a Tropical Cyclone with ERS-SCAT: a CMOD4 model review”
- 2002: 5-year degree in Marine Environmental Sciences at University of Napoli
- 2010: PhD in Civil and Environmental Engineering at University of Salerno (Research project on ASPS products and soil moisture applications).

■ Work Experiences

- 2003-2006: CNR- Institute of BioMeteorology (Florence) and CUGRI (Salerno) working on climate changes, meteorological and flood risk analysis.
- 2007-2010: Remote sensing engineer at Serco Spa on QC of ERS-2 Scatterometer data (IDEAS contract)
- 2011 joined ECMWF (Research department) responsible for the monitoring and assimilation of Scatterometer wind data.



- Xavier Neyt -- Associate Professor
 - Signal Processing, Remote Sensing, Radar Digital Signal Processing
- Anis El Youcha – Research Engineer
 - Scatterometry, Radar Signal Processing
- Main involvement
 - ERS L0 to L1 processor (= ASPS processor)
 - ▶ Following the ERS-2 gyroscope anomaly
 - ▶ Extended to process ASCAT data
 - Calibration tools for ERS-2 (=TOSCA)
 - ▶ ERS-2 in itself
 - ▶ Cross-calibration tools (ERS-1 / ERS-2 / Metop-A / Metop-B)
 - Quality control tools (= QC tools)





TU Wien



VIENNA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF GEODESY
AND GEOINFORMATION
RESEARCH GROUPS
PHOTOGRAMMETRY & REMOTE SENSING

- Focus on soil moisture retrieval and monitoring of land-surface hydrologic processes (SCAT, SAR)
- ~30 employees within the Remote Sensing research group
- Past and current Projects:
 - ESA Climate Change Initiative
 - GEOLAND I & II (FP 6 & 7 project)
 - EUMETSAT Satellite Application Facility on Support to Operational Hydrology & Water Management H-SAF
 - ...

- Affiliation: Department of Geodesy and Geoinformation (GEO)
Vienna University of Technology (TU Wien)
- Head of Department
- Relevant Notes:
 - Dipl.-Ing. (MSc) degree in physics in 1995
 - Dr.techn. (PhD) degree in remote sensing in 1999
 - Prof. for remote sensing at TU Wien since 2001
 - Member of advisory groups for ASCAT, SMOS and Sentinel-1
 - Co-founder of the



- Affiliation: Department of Geodesy and Geoinformation (GEO)
Vienna University of Technology (TU Wien)
- Relevant Notes:
 - BSc degree in Geodesy (Geoinformatics) in 2011
 - Currently finalizing his MSc degree
 - ▶ Calibration of space-borne Scatterometers
 - Project Assistant at GEO since 2009
 - Expertise in various programming languages
 - Research interest: calibration of scatterometers and Level 1 data processing to monitor geodynamics





Long-term Interest in ERS SCAT

- Thanks to ASCAT and SCA the improvement of soil moisture retrieval scheme will continue to be one of our key research topics
- ERS SCAT an important base data set not just for climate change research but for many other applications as well (e.g. drought monitoring, agriculture, etc.)
- EODC shall ensure the continuity of our soil moisture services
 - Thematic Exploitation Platform (TEP) for Hydrology?
 - Place for (long-term) hosting of ERS SCAT Data?
 - Involve science community through going Open Source?



Introduction to KNMI

Who we are:

■ KNMI is the Dutch Met.Office

- Scientifically responsible for the wind retrieval algorithm of the Advanced SCATterometer embarked on the METOP satellite
- Provides routine wind retrieval results for ASCAT through it's own website, EUMETSAT, EU Copernicus MyOcean and NASA JPL PODAAC
- Leading in all scatterometers: ERS, NSCAT, QSCAT, ASCAT, OSCAT, HY2A
- Provides scatterometer data, processing software and tools to 100s of users
- For more details see: <http://www.knmi.nl/scatterometer/>

■ KNMI SCIRoCCo project members

- Ad Stoffelen (project leader) and Jos de Kloe (co-worker)

■ Specific expertise

- Wind and sea ice retrieval, ocean calibration, cone analysis, triple collocation error analysis, spatial (spectral) wind verification, user requirements, training



Overall Overview of the project: main objectives, workplan, schedule, deliverables



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Main project objectives

- Collection, completion, and reorganization of the documentation related to scatterometry. Definition of a ToC and production of Scatterometry Overview volume (All)
- Support the inclusion of scatterometry among the standard recognized by the WMO (KNMI, TU Wien will support)
- Support current ESA reprocessing activity. Inter-calibration between ERS-1 and ERS-2. Recalibration of ERS-2 aft beam anomaly (cycles 69-74). (RMA. TU Wien KNMI will support)
- Maintenance and evolution of TOSCA - Tool for Scatterometer Calibration – & QC tools and its associated documentation (RMA)
- Definition of ERS-ASPS netCDF product (All)



Main project objectives

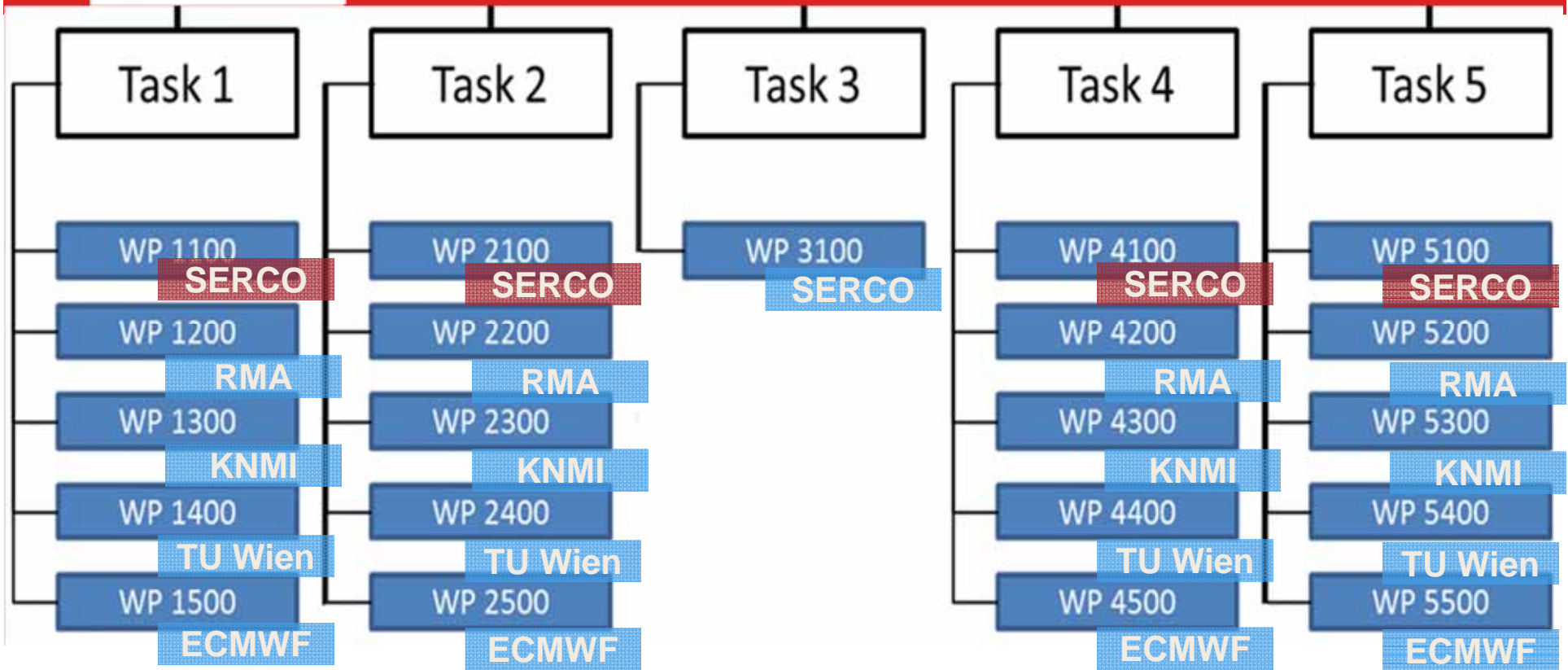
- Set-up of the educational network, including courses, seminars, presentations, e-book, a student exchange programme, and a series of grants and prizes (All)
- Set-up of the SCIRoCCo's web-portal as a stand-alone component and its system and content maintenance throughout the project duration (Serco)
- Definition of new products, study of improvements of processing algorithms for level 1, improvement of the retrieval procedures for level 2 data, refinement of the forward models. (All)
- Generation of ERS-ASPS netCDF products (Serco)
- Generation of L2 SM data set & QC (TU Wien)



Main project objectives

- Generation of L2 Ocean Wind Vectors & QC (KNMI)
- ASPS QC on sigma nought (ECMWF on best effort)
- ASPS Ocean Wind Vectors validation by NWP (ECMWF on best effort)
- Generation of ASPS ad-hoc data set for educational and research activities (RMA, Serco)
- Recommendations for a possible next ERS mission reprocessing (All)

Roles and responsibilities

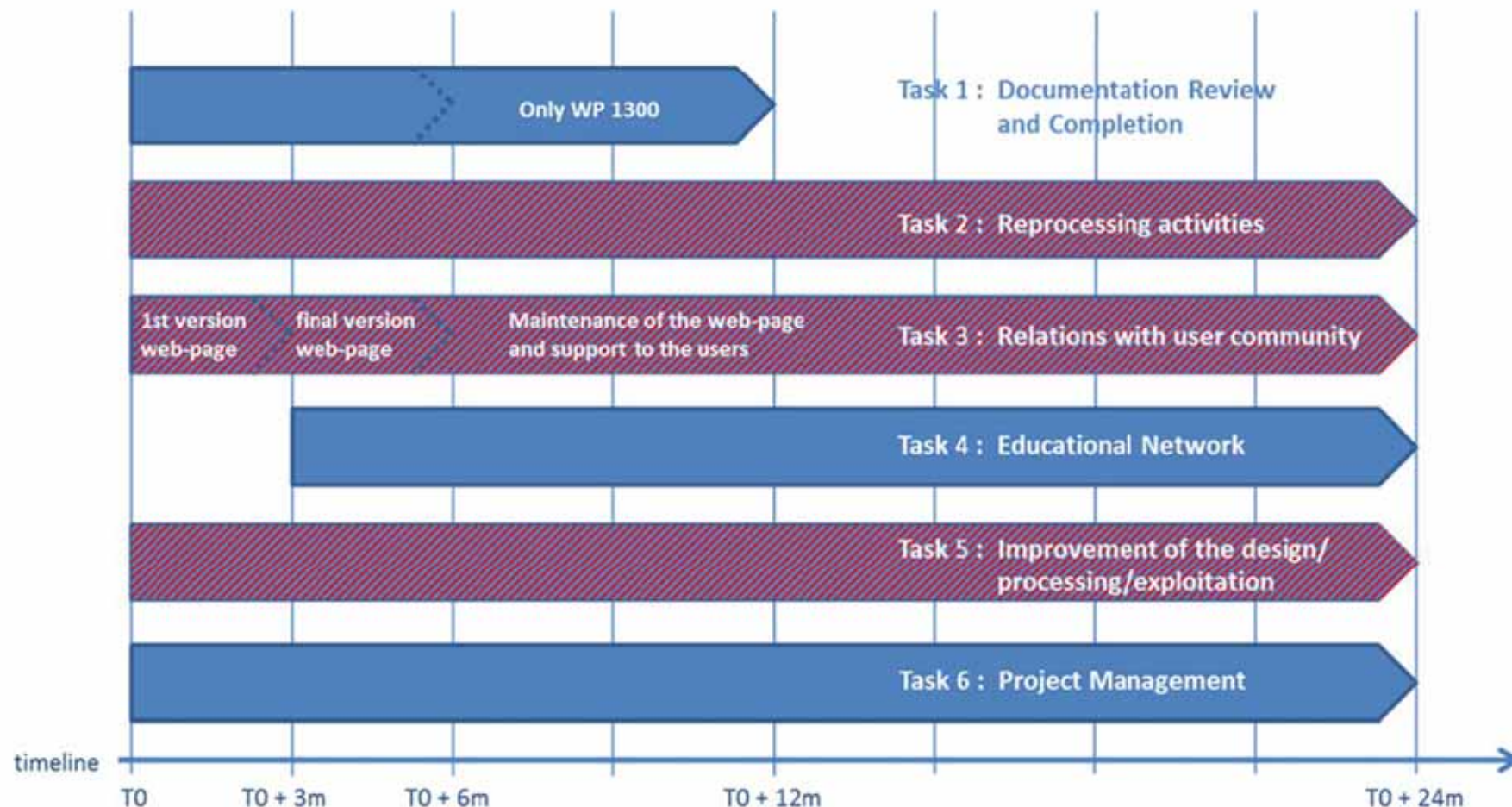


- Each WP has a manager, responsible for WP schedule and deliverables
- For each Task, WP managers coordinate with the PM (WP 6000) to make sure the overall schedule is met and criticalities are highlighted in due time and solved.

Tasks' WPs Overview

| WP number | WP title | Company | Scheduling |
|------------------------------|---|--------------|--|
| <i>Nominal Work Packages</i> | | | |
| WP 1100 | Task 1 – Part Serco S.p.A. | Serco S.p.A. | [Kick Off – Kick Off + 6 months] |
| WP 1200 | Task 1 – Part RMA | RMA | [Kick Off – Kick Off + 6 months] |
| WP 1300 | Task 1 – Part KNMI | KNMI | [Kick Off – Kick Off + 12 months] |
| WP 1400 | Task 1 – Part TU Wien | TU Wien | [Kick Off – Kick Off + 6 months] |
| WP 1500 | Task 1 – Part ECMWF | ECMWF | [Kick Off – Kick Off + 6 months] |
| WP 2100 | Task 2 – Part Serco S.p.A. | Serco S.p.A. | [Kick Off – Kick Off + 24 months] |
| WP 2200 | Task 2 – Part RMA | RMA | [Kick Off – Kick Off + 24 months] |
| WP 2300 | Task 2 – Part KNMI | KNMI | [Kick Off – Kick Off + 24 months] |
| WP 2400 | Task 2 – Part TU Wien | TU Wien | [Kick Off – Kick Off + 24 months] |
| WP 2500 | Task 2 – Part ECMWF | ECMWF | [Kick Off – Kick Off + 24 months] |
| WP 3100 (WP 3101) | Task 3 – Relation with the user community and set up and maintenance of the SCIRoCCo's web-portal | Serco S.p.A. | [Kick Off – Kick Off + 24 months] |
| WP 4100 | Task 4 – Part Serco S.p.A. | Serco S.p.A. | [Kick Off + 3 months – Kick Off + 24 months] |
| WP 4200 | Task 4 – Part RMA | RMA | [Kick Off + 3 months – Kick Off + 24 months] |
| WP 4300 | Task 4 – Part KNMI | KNMI | [Kick Off + 3 months – Kick Off + 24 months] |
| WP 4400 | Task 4 – Part TU Wien | TU Wien | [Kick Off + 3 months – Kick Off + 24 months] |
| WP 4500 | Task 4 – Part ECMWF | ECMWF | [Kick Off + 3 months – Kick Off + 24 months] |
| WP 5100 | Task 5 – Part Serco S.p.A. | Serco S.p.A. | [Kick Off – Kick Off + 24 months] |
| WP 5200 | Task 5 – Part RMA | RMA | [Kick Off – Kick Off + 24 months] |
| WP 5300 | Task 5 – Part KNMI | KNMI | [Kick Off – Kick Off + 24 months] |
| WP 5400 | Task 5 – Part TU Wien | TU Wien | [Kick Off – Kick Off + 24 months] |
| WP 5500 | Task 5 – Part ECMWF | ECMWF | [Kick Off – Kick Off + 24 months] |

Schedule and activities



Most activities have a T0-T0+24m span:

→ Planning for intermediate checks on documents and activities progress

From T0+6 (PM#1) to T0+12 (MTR)

- *All activities in WP's who have a T0+12 deadline will need to be planned for*
 - → Setup a Teleconference in one month time for the planning of T0+12 activities.
 - → Establish a regular (monthly?) teleconference to assess progress and the workplan.
- All activities in WP's who have 24 months duration, shall have to be phased so that at T0+6 (Pm#1) and T0+12 (MTR) assessment on the status and outlook for the progress can be made
 - Teleconference in one month time will also discuss on the phasing of T0+24 activities.



Milestones and main documents

| Meeting | Time | Deliverables |
|---------|-------------|---|
| KO | T0 24/06/14 | |
| PM#1 | T0+6mo | <ul style="list-style-type: none"> • Scatterometry_Overview v2 • <i>First SCIRoCCo bi-monthly Progress Report (T0+2)</i> • <i>Scatterometry_Glossary (T0+3)</i> • <i>Scatterometry_Overview v1 (T0+3)</i> • <i>First 4-monthly Outreach Activities Report (T0+4)</i> |
| MTR | T0+12mo | <ul style="list-style-type: none"> • Proposal_for_Scatterometry_standard • Scatterometry_Improvements_Report (12-month version) |
| FR | T0+24mo | <ul style="list-style-type: none"> • ERS-1 and -2 Scatterometer overall calibration and configuration overview • Scatterometry_Improvements_Report (24-month version) • Scatterometer-SM Product Performance Evaluation Report • Scatterometer-Wind Product Performance Evaluation Report • Final Report –SCIRoCCo |



All output project Documents

- WP's 1xxx and 2xxx

| Document identifier in the SoW | Document Name in the Consortium | Due Date |
|--------------------------------|--|---|
| D1100 | SCI-GLS-14-0001-v01-Scatterometry_Glossary | T0 + 3 months |
| D1200 draft | SCI-SPU-14-0001-v01-Scatterometry_Overview | T0 + 3 months |
| D1200 final | SCI-SPU-14-0001-v02-Scatterometry_Overview | T0 + 6 months |
| | SCI-SPU-14-0002-v01-WMO_proposal_for_Scatterometry_standard (provisional title) | T0 + 12 months |
| D2100 | SCI-QCR-14-0XXX-v01-ERS Reprocessed Cycle XXX Quality Report | Only in case of L1 SCIRoCCo Data Reprocessing – Based on available QC Tools |
| D2200 | SCI-TN_-14-0001-v01- ERS-1 and -2 Scatterometer overall calibration and configuration overview | T0 + 24 months |



All output project Documents

| Document identifier in the SoW | Document Name in the Consortium | Due Date |
|--------------------------------|---|----------------|
| D4100 | SCI-RPT-14-0001-v01-First 4-monthly Outreach Activities Report | T0 + 4 months |
| | SCI-RPT-14-0002-v01-Second 4-monthly Outreach Activities Report | T0 + 8 months |
| | SCI-RPT-14-0003-v01-Third 4-monthly Outreach Activities Report | T0 + 12 months |
| | SCI-RPT-15-0001-v01-Fourth 4-monthly Outreach Activities Report | T0 + 16 months |
| | SCI-RPT-15-0002-v01-Fifth 4-monthly Outreach Activities Report | T0 + 20 months |
| | SCI-RPT-15-0003-v01-Sixth 4-monthly Outreach Activities Report | T0 + 24 months |
| D4200 | Educational Material | when available |
| | Document related to prizes and grants: SCI-PRO-14-0001-v01-Scirocco guidelines for applicants to (prize or grant) SCI-PRO-14-0002-v01-Scirocco guidelines for reviewer of (prize or grant) SCI-CAL-xx-xxxx-v01-Call for (prize or grant) | when available |



All output project Documents

| Document identifier in the SoW | Document Name in the Consortium | Due Date |
|--------------------------------|--|--|
| D5000 | SCI-RPT-14-0001-v01-Scatterometry_Improvements_Report (12-month version) | T0 + 12 months |
| | SCI-RPT-15-0001-v01-Scatterometry_Improvements_Report (24-month version) | T0 + 24 months |
| | Consequent update of | |
| | SCI-GLS-14-0001-v01-Scatterometry_Glossary and SCI-SPU-14-0001-v02-Scatterometry_Overview | T0 + 24 months T0 + 24 months |
| D56xx | RMA-SIC-020220 Scatterometer Algorithm Review Architectural Design Document | If needed as part of the WSP prototype algorithm evolution |
| | RMA-SIC-020104 Scatterometer Algorithm Review Detail Design Document | |
| | RMA-SIC-020103 Scatterometer Algorithm Review Interface Control Document | |
| | RMA-SIC-011109 Scatterometer Algorithm Review algorithm state of the art document | |
| | ERSE-GSEV-EOPG-RS-06-0002 ASPS product format | |
| | RMA-TN-ESL-WP2 ASPS products handbook | |
| | TOSCA, WSP, QC-Tools SW User manuals | |
| D57xx | RMA-SIC-081101 ERS-2 / METOP-A Scatterometer cross-calibration strategy | If needed as part of the WSP prototype algorithm evolution |
| | ASCAT Processor Test Plan | |



All output project Documents

| Document identifier in the SoW | Document Name in the Consortium | Due Date |
|--------------------------------|---|--|
| D6100 | SCI-MOM-xx-xxxx-v01-Minutes of the Meeting | every meeting |
| D6200 | SCI-RPT-14-0004-v01-First SCIRoCCo bi-monthly Progress Report SCI-RPT-14-0005-v01-Second SCIRoCCo bi-monthly Progress Report SCI-RPT-14-0006-v01-Third SCIRoCCo bi-monthly Progress Report SCI-RPT-14-0007-v01-Fourth SCIRoCCo bi-monthly Progress Report SCI-RPT-14-0008-v01-Fifth SCIRoCCo bi-monthly Progress Report SCI-RPT-14-0009-v01-Sixth SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0004-v01-Seventh SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0005-v01-Eight SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0006-v01-Nineth SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0007-v01-Tenth SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0008-v01-Eleventh SCIRoCCo bi-monthly Progress Report SCI-RPT-15-0009-v01-Twelveth SCIRoCCo bi-monthly Progress Report | T0 + 2 months T0 + 4 months T0 + 6 months T0 + 8 months T0 + 10 months T0 + 12 months T0 + 14 months T0 + 16 months T0 + 18 months T0 + 20 months T0 + 22 months T0 + 24 months |
| D6300 | SCI-PRE-14-0001-v01-Mid-Term Review Presentation of the Results | T0 + 12 months |
| D6400 | SCI-PRE-15-0001-v01-Final Review Presentation of the Results SCI-RPT-15-0010-v01-Final Report about SCIRoCCo | T0 + 24 months T0 + 24 months |
| | SCI-QCR-15-0001-v01-ERS Scatterometer-SM Product Performance Evaluation Report SCI-QCR-15-0002-v01-ERS Scatterometer-Wind Product Performance Evaluation Report | T0 + 24 months |



From KO to T0+6 (PM#1)

Documents:

- *First SCIRoCCo bi-monthly Progress Report (T0+2) WP 6000 → Input from ALL WP's*
- *Scatterometry_Glossary (T0+3) WP 1100 → Input from ALL 1xxx WP's*
- *Scatterometry_Overview v1 (T0+3 TOC) WP 1100 → Input from ALL 1xxx WP's*
 - Input for the report on the calibration and quality control guidelines and SoA document (WP 1200-RMA)
 - SCI-SPU-13-0002-v01-WMO_proposal_for_Scatterometry_standard (WP 1300-KNMI)
 - Ocean Wind retrieval ATBD (WP 1300-KNMI)
 - Soil moisture retrieval ATBD; Quality control procedure (WP 1400 –TUW);
 - Review of Calibration Requirements, Calibration Guidelines, and Quality Assurance and Quality Control procedures. (WP 1500- ECMWF)
- *First 4-monthly Outreach Activities Report (T0+4) → Input from ALL 4xxx WP's*
- *Scatterometry_Overview v2 (T0+6 final version) → Input from ALL 1xxx WP's*
- *Report on the calibration and quality control guidelines WP 20xx → SCI-TN_-14-0001-v01- ERS-1 and -2 Scatterometer overall calibration and configuration overview*

In progress:

- *Proposal_for_Scatterometry_standard (T0+12)*
- *Scatterometry_Improvements_Report v1 (T0+12)*

Software deliverables

- Existing software will be updated according to the results of Task 5

| Document identifier in the SoW | Software/Dataset Name | Due Date |
|--------------------------------|--|----------------|
| SW-4000 | Small sw items developed to support educational programme (i.e. data readers, small algorithm to analyse and process the data, small application based on Scatterometer data, new algorithms processor prototypes) | T0 + 24 months |
| SW-5610 | TOSCA Calibration Tool – update if necessary | T0 + 24 months |
| SW-5620 | WSP Processor prototype- update if necessary | T0 + 24 months |
| SW-5630 | QC-Tools- update if necessary | T0 + 24 months |
| SW-5640 | ASPS/NetCDF product converter | T0 + 3 months |
| | ERS Scatterometer mission nominal and high resolution reprocessed data set for educational and research purposes | T0 + 24 months |
| | Calibration parameters for the ERS-1 and ERS-2 Scatterometer mission | T0 + 24 months |
| | Research and educational data set generated ad-hoc after the Agency or user request | T0 + 24 months |

Table 5: Summary of the Deliverable Software and Datasets



Risk Register 1/2

| Risk Scenario | Risk description | S/L* | Consequences | Risk reduction measures | S/L incl. risk reduction |
|--|--|------------|--|---|--------------------------|
| Unavailability of Key Personnel | One of the two Key Personnel is unavailable | Sig/Low | Progress might be delayed. | The other Key Personnel takes the work over. | Neg/Low |
| General: HW failure | HW failure of computer infrastructure | Major/Low | Generation of derived ASPS product is delayed | Consortium computer infrastructure is highly redundant, backups are taken nightly. | Neg/Low |
| Partial unavailability of ERS 1 raw data (EWIC) from ESA archive | Partial ERS-1 mission data available, with ERS-1 data not overlapping with ERS-2 | Major /Low | Impact on ERS-1 calibration and full ERS-1 mission reprocessing | Risk is external to project. | Major/Low |
| Partial unavailability of ERS 1 raw data (EWIC) from ESA archive | Partial ERS-1 mission data available, | Sign /Low | Some instrument or processing anomalies may go undetected | Risk is external to project. | Sign/Low |
| Partial availability of ERS 1 mission level 1 ASPS data | Partial ERS-1 mission, level 1 data is available to the project | Major/Low | Impact Task 5 (inter-calibration activities), and impact on Task 2 | Data intercomparison and inter-calibration results available only in a reduced area of interest or time frame | Sign/Low |

| Risk Scenario | Risk description | S/L* | Consequences | Risk reduction measures | S/L incl. risk reduction |
|---------------------------------|--|---------|--|--|--------------------------|
| WP2200: Delay | Delay in provision of the calibration files. | Sig/Low | The reprocessing is delayed accordingly. | Change in task priority in agreement with ESA TO, to prioritize generation of the calibration files. | Neg/Low |
| Gaps in ERS data (L1 and/or L2) | Monitoring of instrument stability to highest precision works best for continuous (daily) data | Sig/Med | Some instrument or processing anomalies may go undetected | Provision of missing mission data by ESA | Neg/Min |
| WP4x00: Delay | Delay in provision of the deliverables | Sig/Low | The final output of the project is delayed. Possibly, the “marketing” of the project is affected due to the non-availability of some examples. | Change in task priority, in agreement with ESA TO, to minimize consequences. | Neg/Low |



Payment plan and Mission costs

- Mission costs and grants included in the FFP. No need for a separate invoice.
- The following payment plan was approved during the negotiation phase

| Milestone | % of Total Baseline | FFP Expenditures per quarter (Baseline) | | | | | | | | | | | | | | | | | | |
|---|---------------------|--|---------|------------|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|-----|-------|-----|-------|-----|
| Kick-off | 15 | <p>SCIRoCCo 2-years budget allocation per quarter</p> <p>Legend: Y1 Q1 (dark blue), Y1 Q2 (red), Y1 Q3 (green), Y1 Q4 (purple), Y2 Q1 (light blue), Y2 Q2 (orange), Y2 Q3 (light purple), Y2 Q4 (pink)</p> <table border="1"> <caption>Quarterly Budget Allocation Data</caption> <thead> <tr> <th>Quarter</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Y1 Q1</td> <td>15%</td> </tr> <tr> <td>Y1 Q2</td> <td>18%</td> </tr> <tr> <td>Y1 Q3</td> <td>14%</td> </tr> <tr> <td>Y1 Q4</td> <td>14%</td> </tr> <tr> <td>Y2 Q1</td> <td>9%</td> </tr> <tr> <td>Y2 Q2</td> <td>10%</td> </tr> <tr> <td>Y2 Q3</td> <td>10%</td> </tr> <tr> <td>Y2 Q4</td> <td>10%</td> </tr> </tbody> </table> | Quarter | Percentage | Y1 Q1 | 15% | Y1 Q2 | 18% | Y1 Q3 | 14% | Y1 Q4 | 14% | Y2 Q1 | 9% | Y2 Q2 | 10% | Y2 Q3 | 10% | Y2 Q4 | 10% |
| Quarter | Percentage | | | | | | | | | | | | | | | | | | | |
| Y1 Q1 | 15% | | | | | | | | | | | | | | | | | | | |
| Y1 Q2 | 18% | | | | | | | | | | | | | | | | | | | |
| Y1 Q3 | 14% | | | | | | | | | | | | | | | | | | | |
| Y1 Q4 | 14% | | | | | | | | | | | | | | | | | | | |
| Y2 Q1 | 9% | | | | | | | | | | | | | | | | | | | |
| Y2 Q2 | 10% | | | | | | | | | | | | | | | | | | | |
| Y2 Q3 | 10% | | | | | | | | | | | | | | | | | | | |
| Y2 Q4 | 10% | | | | | | | | | | | | | | | | | | | |
| KO+6m (website full operation and starting of the educational network) | 25 | | | | | | | | | | | | | | | | | | | |
| KO+12m (mid-term review) | 20 | | | | | | | | | | | | | | | | | | | |
| KO+18m (intermediate payment) | 20 | | | | | | | | | | | | | | | | | | | |
| EoC (Final review) | 20 | | | | | | | | | | | | | | | | | | | |





WP3100 – Support to/Relation with the user community

Sciocco Web-portal

- Web portal development :
 - SCIROCCO WEB_portal V1.0 (3 months pre-operational)
 - SCIROCCO WEB_portal V2.0 (6 months operational)

- Project products and documents: storage and management.

- Support to the educational network set-up.

- Advertise the availability of the grants, stages, training initiatives resulting from Task 4; encourage migration of the software to Open-Source.

- Collecting and handling ad-hoc processing requests (for both ERS/Scatterometer and METOP/ASCAT);

- Collect links to the most important existing networks of remote sensing and applications (e.g. Data Access Component DAAC, EUMETSAT Satellite Application Facilities, World Meteorological Organization, European Space Agency, etc.)

WP Activity description: RMA



Definition of

■ Calibration requirements

- Must be independent of instrument
- Goal: data consistency ERS-1 / ERS-2 / METOP-A / METOP-B

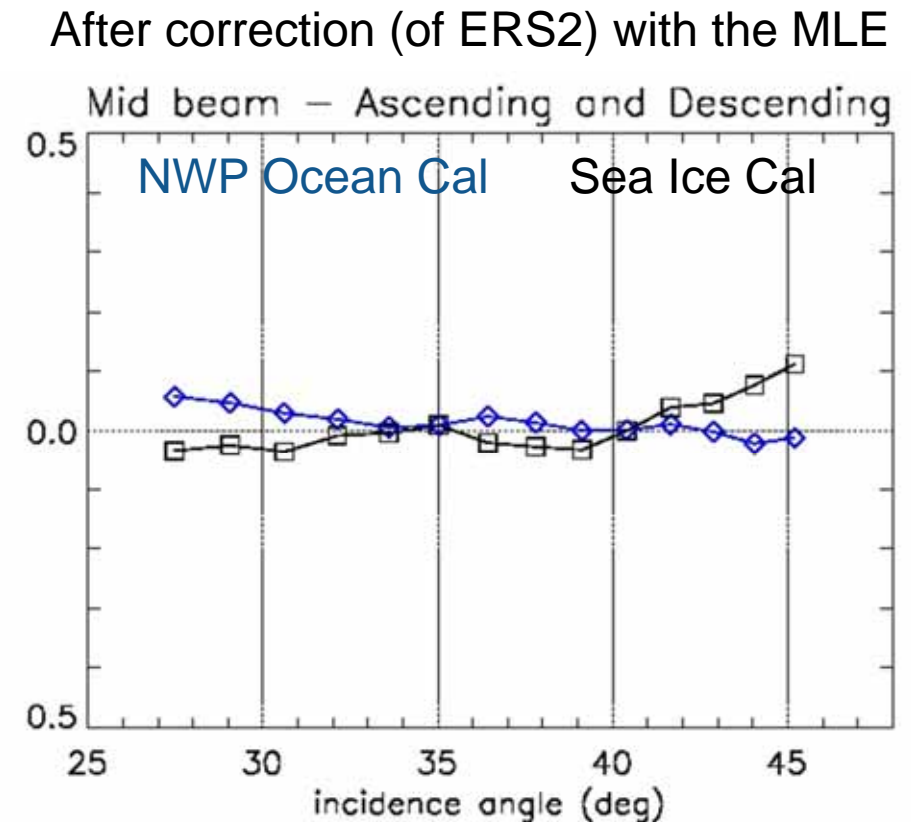
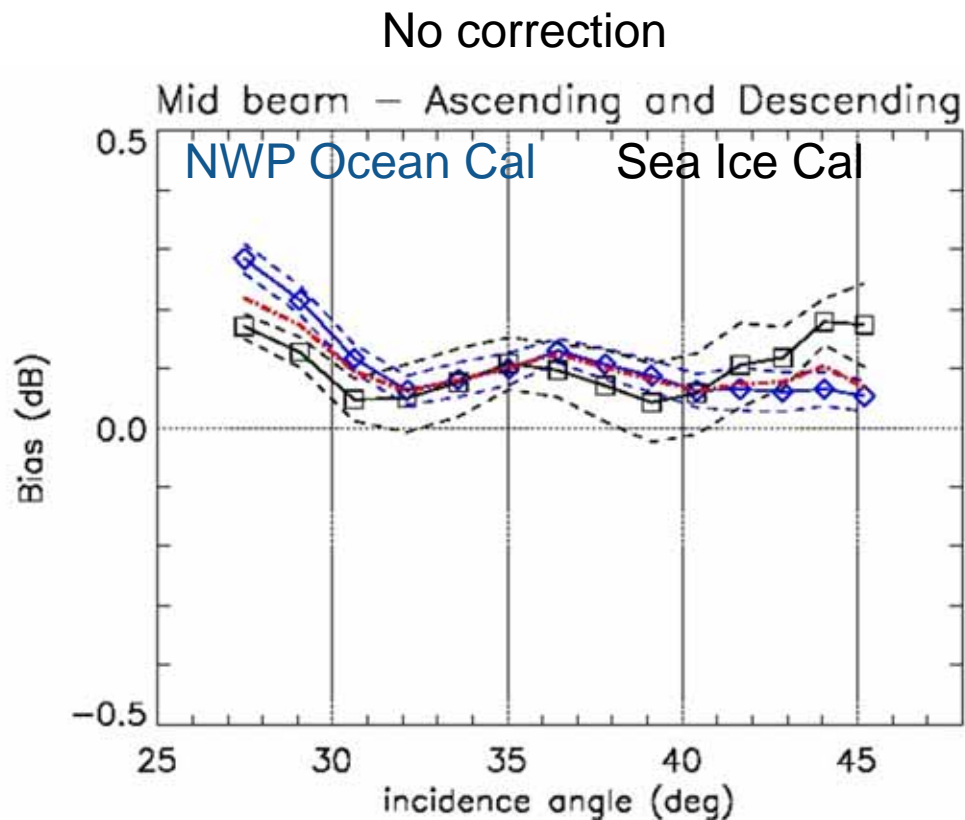
■ Guidelines

- How are the metrics defined in the requirements measured
 - ▶ Which reference is used?
 - ▶ NWP Ocean Cal / Rain Forest Cal / ... ?

■ Quality control

- To what extent are the requirements met?
- Operational requirements (coverage, data availability)
- Detect anomalies

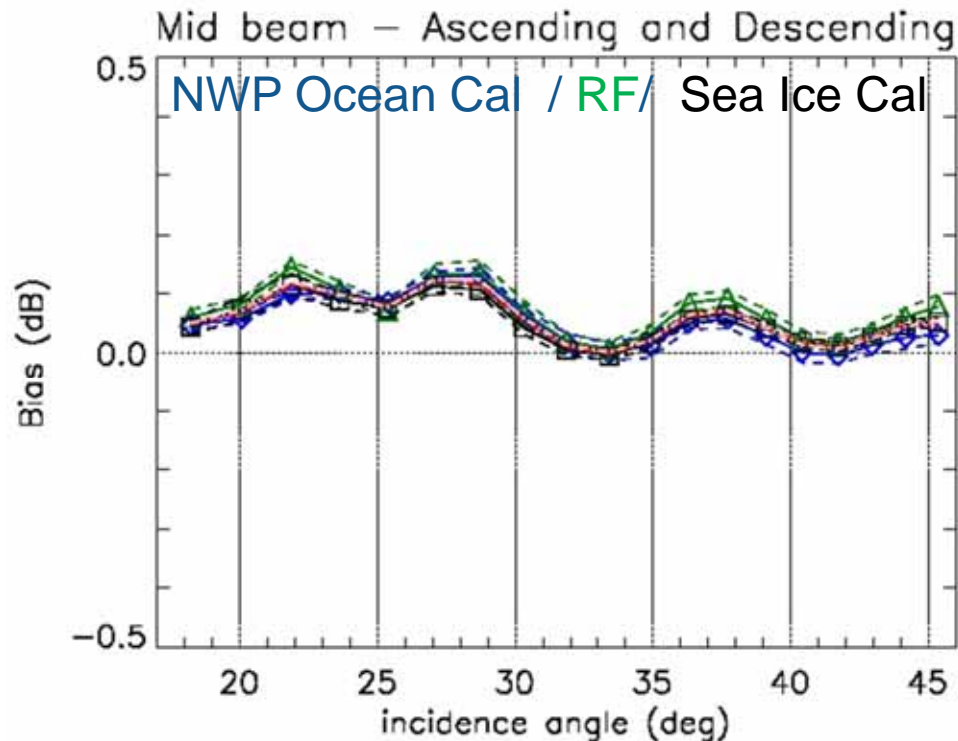
- Illustration of the effect of different references
 - MLE = “weighted” mean of the two calibration coefficients
 - Bias = ASCAT-A -- ERS2



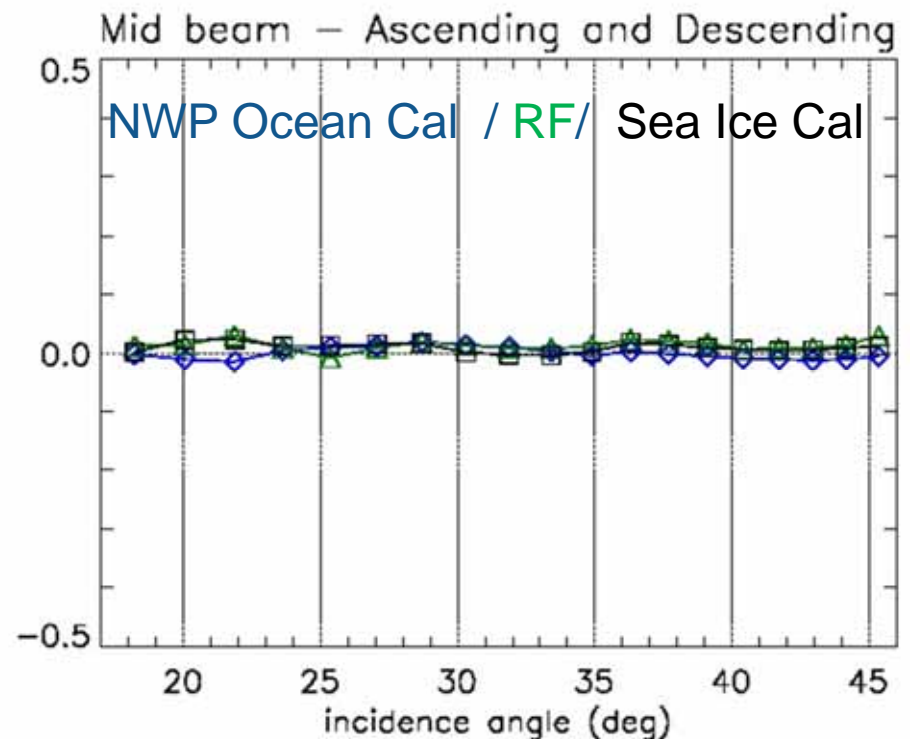
- Illustration of the effect of different references (it is not always that bad)
 - MLE = “weighted” mean of the two calibration coefficients

$$\text{Bias} = \text{ERS1} - \text{ERS2}$$

No correction



After correction (of ERS2) with the MLE



- ASPS to NetCDF conversion: which format ?
 - Eumetsat ASCAT L1B NetCDF format ?
 - ▶ Some flags are ASCAT specific (e.g. Solar array contamination)
 - ▶ Some flags will have to be grouped (using the summary bit?)
 - ▶ To what extent is CF compliance assured?
- Calibration files generation
 - Assess to what extent the calibration coefficients change over time
 - ▶ Due to instrument change (Side A / Side B), ...
 - According to guidelines

- Educational network:
 - Provide (introductory) courses on Radar, Remote Sensing
 - ▶ Open-access courses on-line ?
 - ▶ Possibly, as part of the MUSICS doctoral school (Belgium)
 - Signal and data analysis, Electromagnetic modelling (radar remote sensing), ...
 - EU ERASMUS+
 - ▶ Joint Master Degree
 - Need for 3 academic institutions
 - ▶ Industrial Traineeships
- Tools & exercises
 - “Reproducible Science” setup
 - ▶ [Data + Tools + procedure] to reproduce the results shown
 - This is ideal to start

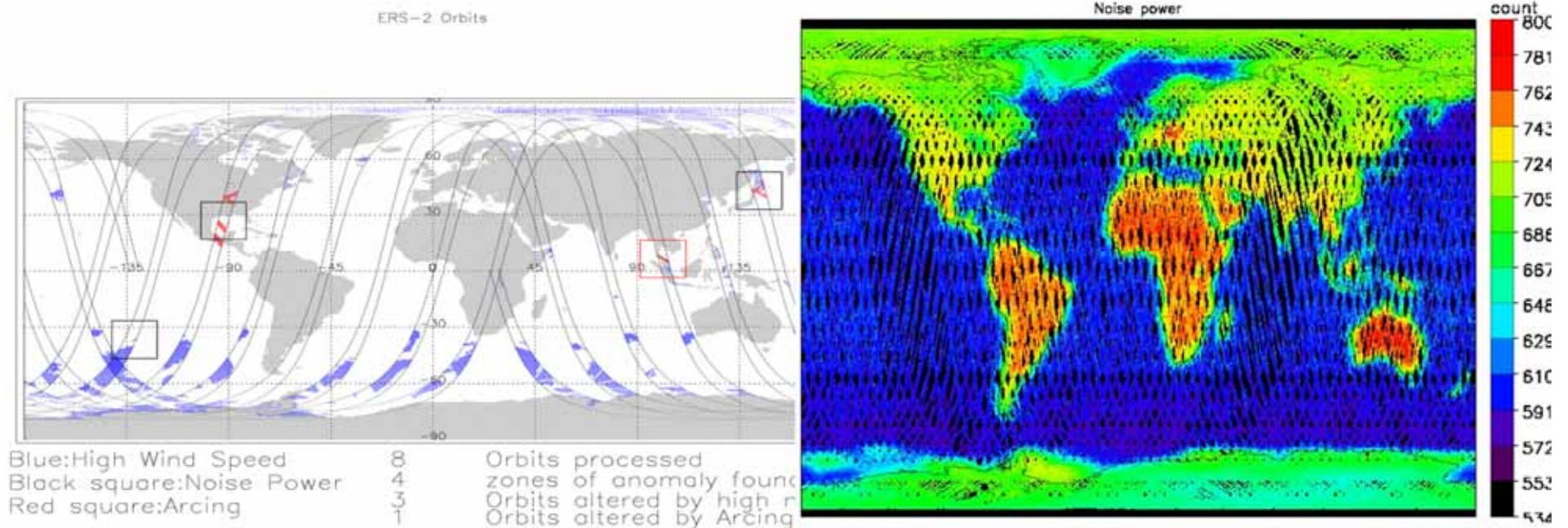
■ Grants

- Master thesis grants:
 - ▶ Grant to cover expenses linked to doing a master thesis at a host institution
 - ▶ Evaluation of the **research project & of the candidate**
- Best (PhD?) thesis award
 - ▶ Evaluation of the thesis
 - ▶ Will we have “many” candidates?
- Best (student) paper award
 - ▶ Contribute to the evaluation of the papers

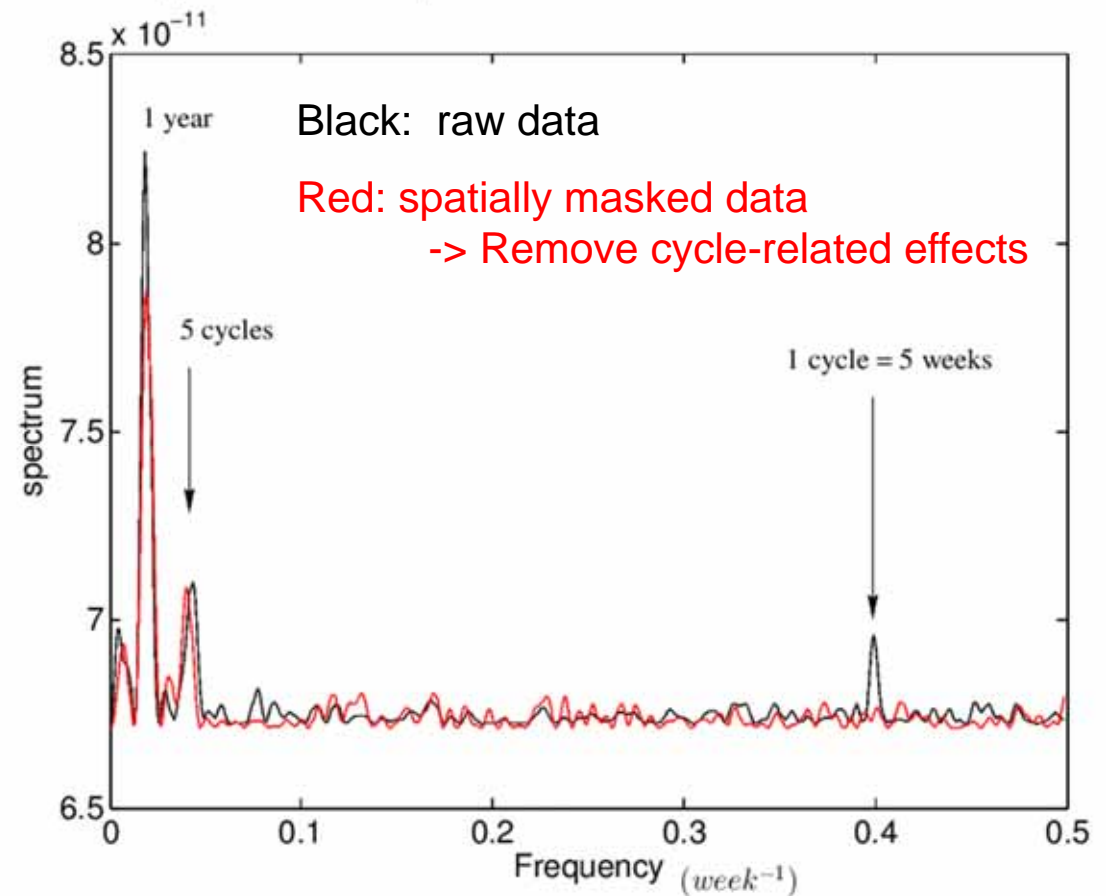
■ QC tools

- Goal: detect anomalies in (reprocessed) data
 - ▶ Some are ERS or even spacecraft specific
 - E.g. Arcing, internal calibration issues
- Noise power map, ...

ASCAT noise power map (6 days)



- QC tools
 - Long time series analysis
 - ▶ E.g. Rain Forest backscatter spectral analysis



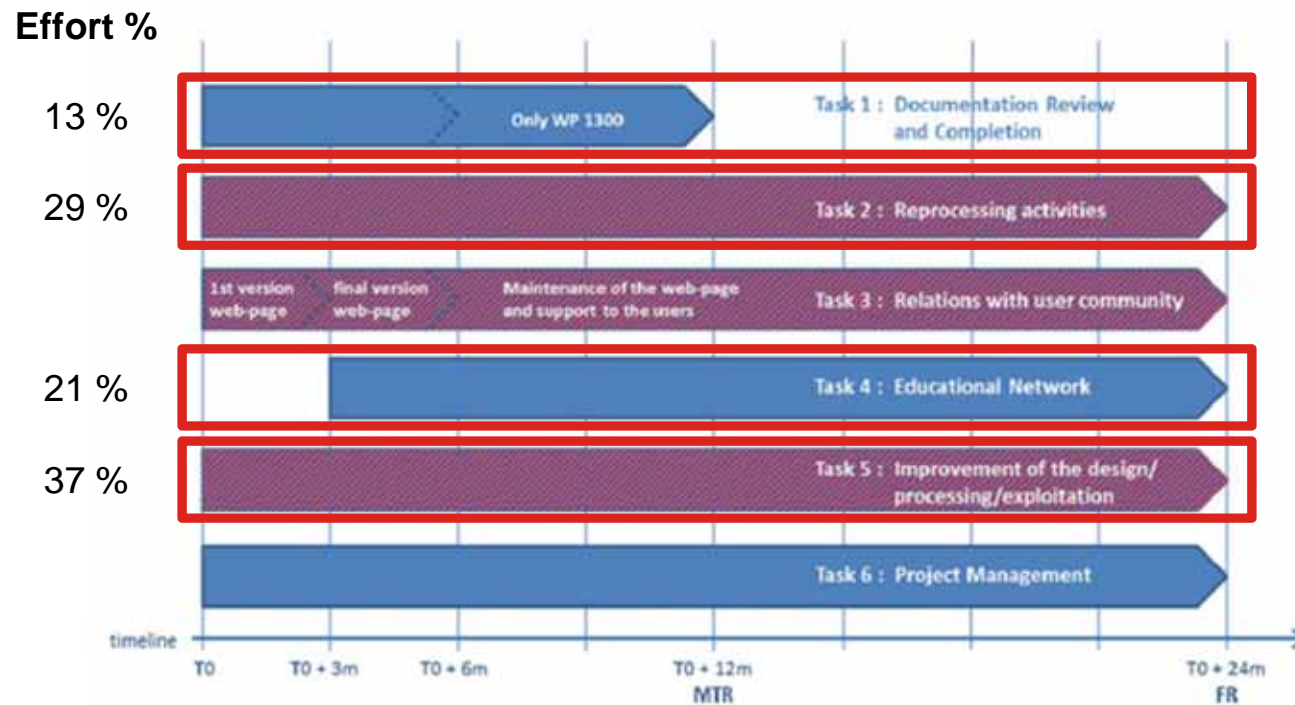
- Maintenance and evolution of WSP / ASPS / TOSCA / QC tools
 - As need arises from previous WP.
 - Including documentation
- Cross calibration
 - ERS-1 / ERS-2 / METOP-A / METOP-B



WP Activity description: TU Wien



- TU Wien will be active in 4 work packages with focus on soil moisture retrieval from ERS-1/2 SCAT



- Objective: Agreement and integration of various documentation to define standards
- TU Wien Activities:
 - Provide TU Wien internal used terminology for scatterometry
 - ▶ SCI-GLS-14-0001-v01-Scatterometry_Glossary (D1100)
 - Compose an Algorithm Theoretical Baseline Documentation (ATBD) of the Water Retrieval Package (WARP)
 - Inputs about calibration requirements, cross-calibration methodology and QC procedures in view of SSM retrieval
 - ▶ SCI-SPU-14-0001-v02-Scatterometry_Overview (D1200)
 - TU Wien already contributed to the WMO “Guide to Meteorological Instruments and Methods of Observations” Chapter 11 (Sep 2013)
 - ▶ May serve as a starting point for the next issue

- Objective: Reprocessing / generation of ERS-1/2 soil moisture data set
- TU Wien Activities:
 - Support the preparation of further reprocessing campaigns
 - ▶ Possible consideration of EODC as archiving and processing centre of Level 1 and 2 data
 - QC of Level 1 data with respect to Level 2 SM product generation to provide inputs to Serco for the proper development of WP 2100
 - Temporal and spatial data coverage
 - Backscatter statistics and data flagging over land
 - Results of TU Wien calibration methodology (Level 1 data) for a consistent model parameter estimation (ERS-1/2)
 - ...

- Objective: Reprocessing / generation of ERS-1/2 soil moisture data set
- TU Wien Activities:
 - Generation of a consistent Level 2 soil moisture product (ERS-1/2)
 - ▶ Prerequisite: ERS-1 Level 1 data archive
 - ▶ Generation of a consistent model parameter database for soil moisture retrieval
 - Combined use of ERS-1 and 2 Level 1 data is foreseen
 - ▶ Updates / reprocessing of Level 2 soil moisture products
 - Depending on Level 1 data availability
 - ▶ Provide an ERS soil moisture product handbook

- Objective: Reprocessing / generation of ERS-1/2 soil moisture data set
- TU Wien Activities:
 - Data comparison in view of processing analysis
 - ▶ TU Wien currently holds an archive of Level 2 soil moisture data for comparison (SM Product Performance Evaluation Report)
 - ASPS ERS-2 data (25 km) from 1996 to 2011
 - UWI / WNF ERS-1/2 data (50 km) from 1992 to 2010
 - ▶ Product validation against in-situ and model data
 - Soil moisture validation report
 - Provided inputs about the requirements for Level 1 data reprocessing with respect to surface soil moisture retrieval
 - ▶ Model parameter sensitivity analysis → requirements on calibration

- Objective: Promote and support Educational network
- TU Wien Activities:
 - Provide inputs to Serco and support the execution of WP 4100 by providing:
 - ▶ Presentations, Web Seminars and a List of reviewed papers
 - with respect to soil moisture retrieval from scatterometers
 - validation of remotely sensed soil moisture and
 - Applications of soil moisture products
 - Scientific Evaluation of educational grant proposals
 - Student Exchange Grant open to young students from ESA member states
 - ▶ MSc students wishing to base their thesis on the use of ERS data
 - ▶ 2 Grants are foreseen

- Objective: Evolution of the soil moisture retrieval algorithm
- TU Wien Activities:
 - Provided solicited advice relevant to the retrieval of surface soil moisture and inputs to Serco to support the execution of WP 5100
 - ▶ Based on experience made during
 - ERS soil moisture processing
 - Generation of MetOp-A/B ASCAT soil moisture products
 - Cross-calibration of ERS-1/2 SCAT and MetOp-A/B ASCAT
 - Possible improvement study of current surface soil moisture retrieval algorithm
 - ▶ Initially developed for ERS SCAT, current version tailored to ASCAT
 - Dynamic vegetation correction, Surface State Flags, ...

- Objective: Evolution of the soil moisture retrieval algorithm
- TU Wien Activities:
 - Update the soil moisture retrieval algorithm to the latest version.
 - ▶ Handle SCAT and ASCAT data
 - ▶ Implementation of the outcomes of the improvement study
 - Complement WARP documentation with:
 - ▶ Detailed Design Document (DDD) of the WARP processor
 - ▶ Input / Output Data Definition document (IODD) of WARP
 - ▶ Updates of WARP ATBD if needed



WP Activity description: ECMWF





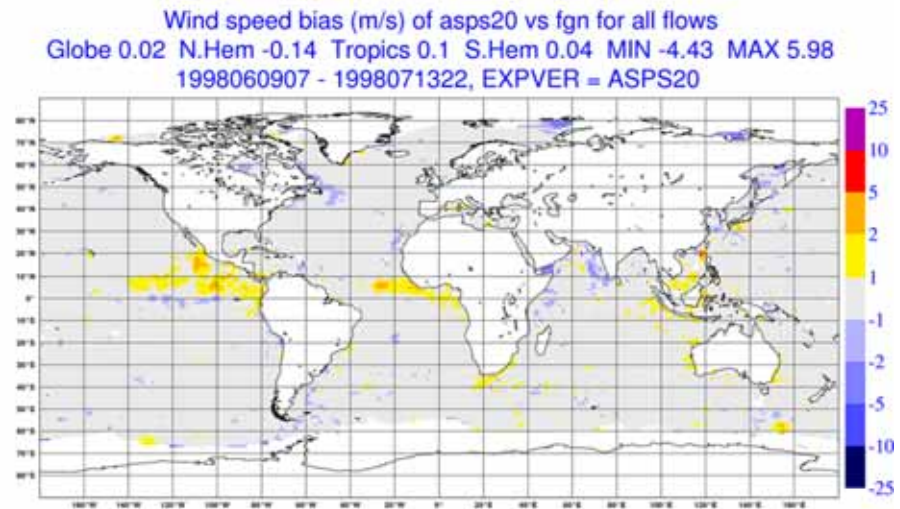
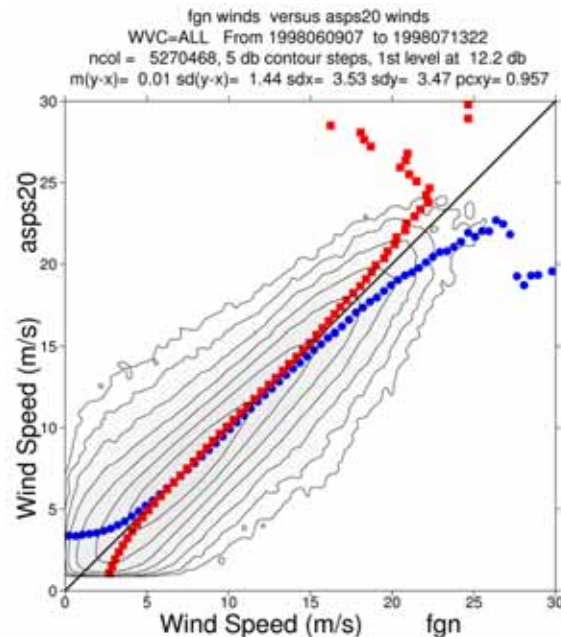
WP 1500 - ECMWF

Agreement and integration of documentation; Generation of a Scatterometry Glossary

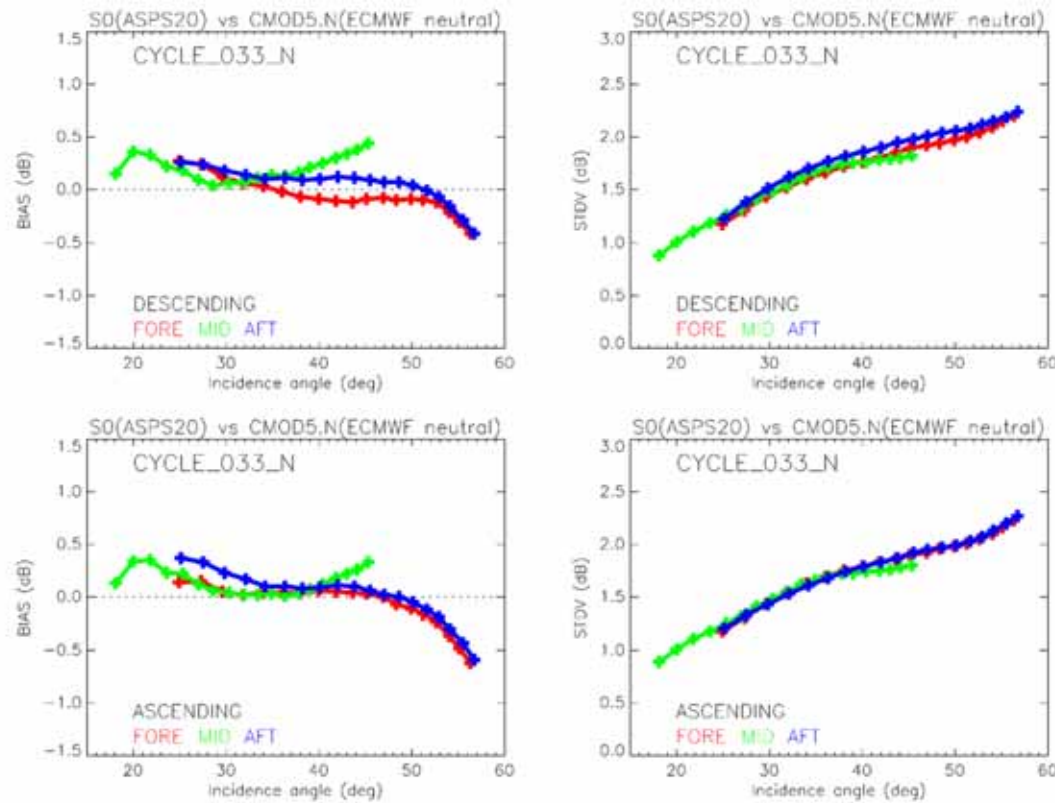
- Provide a glossary of ECMWF terminology and NWP models and data assimilation
- Provide inputs to WP 1200 about calibration requirements and Quality Control procedures

Quality Control of ERS-2 Reprocessed products

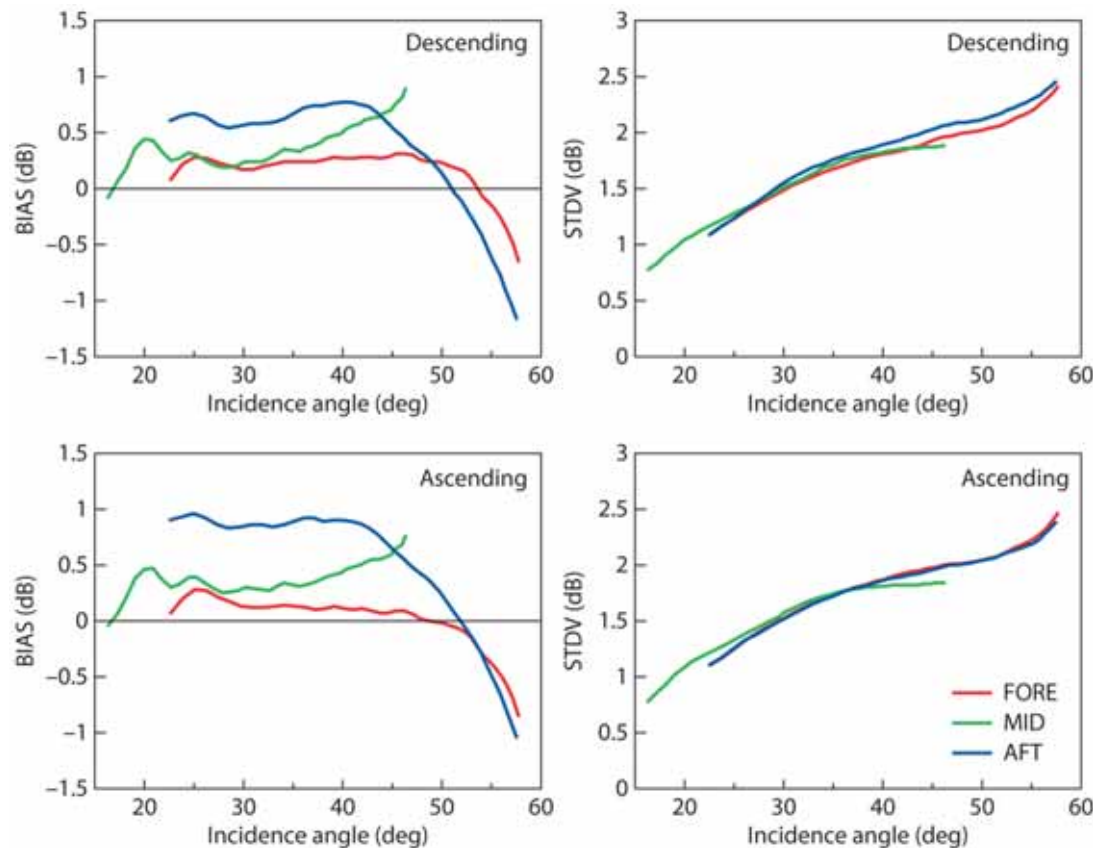
- QC of ASPS products (based on the routinely QC of ERS-2 UWI products and ASPS QC already done in 2009/2010)
 - Collocation of ASPS20 products with ECMWF FG winds (scatterdiagrams)
 - Maps of bias and standard deviation of ASPS vs ECMWF FG wind speed and direction



- Ocean calibration method: comparison of ASPS backscatter triplets with backscatter simulated from ECMWF neutral winds subjected to CMOD5.N



- QC useful to highlight anomalies in the data (Es: issue for the aft beam from cycle 69 to 74).



Cycle 70 (Dec 2001-Jan 2002)

Creation of an educational network

- Provide inputs to SERCO for the e-book
 - List of ECMWF Technical Memo, Reports and Scientific publications, on the assimilation of Scatterometer data in NWP models, available on our website for the user community.
 - Links to ECMWF Training courses on Data assimilation and ECMWF/EUMETSAT NWP-SAF Satellite data assimilation including presentations and lecture notes.

Validation of ERS-2 reprocessed products

- Research experiments with the assimilation of ERS-2 ASPS LR products into ECMWF IFS 4D-Var system
 - Assimilation over a period of 2-3 months (possibly during the Global Mission Scenario)
 - Comparison with an experiment assimilating ERS-2 UWI operational products as archived at ECMWF
 - Assessment of the impact of the ASPS products on the forecast scores
- For the ERS-2 scatterometer winds assimilation:
 - Use of L1b products in BUFR format
 - In-house wind inversion using CMOD5.N GMF
 - Sigma-nought bias correction applied before the wind inversion
 - Wind speed bias correction applied after the wind inversion
 - QC and SST screening



WP Activity description: KNMI



Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Verkeer en Waterstaat

So how can we improve wind processing?

- By analyzing long term data series we may:
 - Improve calibrations
 - Detect measurement problems and flag them
 - Detect processing problems and fix them
 - Improve the GMF, wind inversion, QC, and other processing aspects
- By improvement of physics models used:
 - For example air density corrected equivalent-neutral winds
- By applying newly developed tools to ERS data:
 - Tools have evolved over the years to support new missions (ASCAT, . .)
 - New tools/algorithms have been devised, e.g., spatial analyses, MLE based
 - Applying the latest software to ERS data will be beneficial

So how can we improve wind processing?

- Goal: assure data quality consistency over the years (or at least estimate it so variations in quality can be known)
 - ASCAT data quality has been improved over the years and ASCAT reprocessing is under review for completion in 2014
 - Given the analysis tools developed for ASCAT data quality may be assured for ERS data
 - Buoy winds and ERA-interim winds are the uniform wind references used in many tools (NWP ocean calibration, spatial analyses, triple collocation). Extraction of ERA-interim 10-m equivalent-neutral winds at the highest possible spatial and temporal resolution is available at KNMI for ERS reprocessing;

Our view of the project

Some key points:

- "... cross-calibration should be conducted at the lowest level possible, i.e. at the level of the backscatter coefficient, ..."
 - Commensurate the very successful and unique strategy adopted for ASCAT, OSCAT and HY2A
 - But it should be verified at higher (wind) levels as well!
 - This will be fed back to the lower level calibration effort and, following our experience, indicates how successful that has been.
- "Achieving the widest dissemination of the data and of the tools used to process these data ..."
 - So share data, tools and knowledge with the world to provide users with the best possible products, to enable other nations to re-use parts of our processing (re-use of code and knowledge), and to stimulate other nations to share their scatterometer data as well (CEOS OSVW VC).



KNMI Tasks

WP 1300: Documentation review and completion

- Objective: participate in documentation review and completion
- Key inputs: not depending on other WP's in the project
- Planned activities:
 - Provide documentation available at KNMI to the team
 - Encourage and support the inclusion of scatterometry in the WMO standard practices
- Planned deliveries:
 - Document: WMO_proposal_for_scatterometry_standard.



KNMI Tasks

WP 2300: Reprocessing preparations

- Objective: preparation to further reprocessing campaigns
- Key inputs: ERS backscatter data (ESA input)
- Planned activities:
 - Test benefits of NWP ocean calibration (ERA-interim reference, as ASCAT)
 - Prepare buoy collocation (absolute buoy reference, as ASCAT)
 - Prepare automatic monitoring and QA and QC of the reprocessed data stream
 - Prepare L3 products (wind, stress, vorticity, divergence), as ASCAT
- Planned deliveries:
 - (ASCAT) NetCDF template and periods of reprocessed ERS L2 data
 - Several documents



KNMI Tasks

WP 4300: Educational network

- Objective: Create an educational network
- Key inputs: Active SCIRoCCo web portal
- Planned activities:
 - Provide Inputs to Serco and support the execution of WP 4100
 - Advertise educational activities within the SAF user and IOVWST networks.
- Planned deliveries:
 - Education/training material
 - documentation



KNMI Tasks

WP 5300: Improvement of design/processing/exploitation

- Objective: Analyze the ERS-Scatterometer long term data series
 - To allow improving the instrument performance/processing
- Key inputs: ERS backscatter data (ESA input)
- Planned activities:
 - Define a cross-calibration strategy and analysis and validation of the reprocessed data and L3 processing; implement user service parallel to ASCAT
- Planned deliveries:
 - Documents, reprocessed L2 and L3 data compatible with ASCAT format;
 - Service parallel to ASCAT
- Possible complication:
 - Merging existing developments and services with those of SCIRoCCo





Points for discussion



scirocco
scatterometer instrument
competence centre



scirocco
scatterometer instrument
competence centre



Backup slides

Updated @ 2011-10-27 07:03 utc

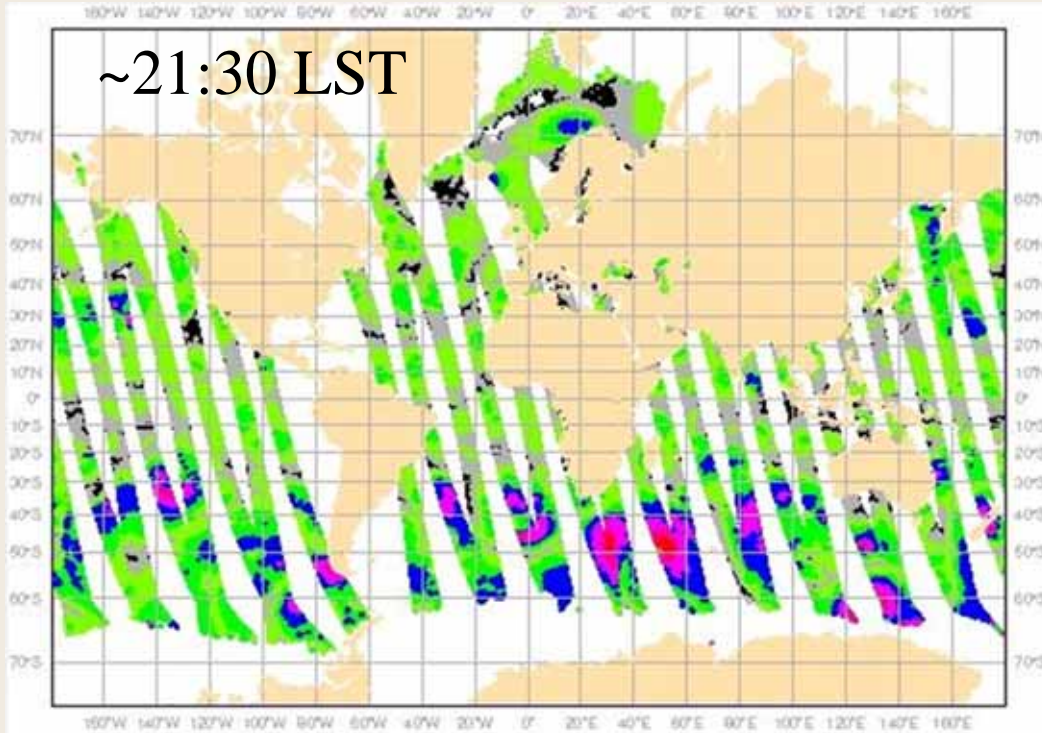
OSI SAF ASCAT Coastal product viewer

ASCAT12+, status: pre-operational



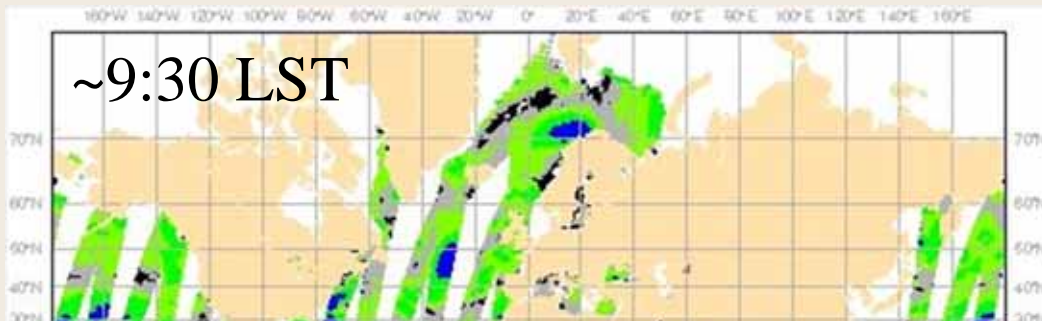
Ascending passes

Click in the map to zoom in



Descending passes

Click in the map to zoom in



Select view

- Monitoring information
- Buoy validations
- Data from previous day

Background information

- Modifications/anomalies
- Description of plots
- Access to products
- Acknowledgements
- ASCAT Product User Manual
- ASCAT Coastal Validation report
- Home OSI SAF Wind Centre

OSI SAF Wind Products

- ASCAT-A 25-km winds
Operational status
- ASCAT-A 12.5-km winds
Operational status
- ASCAT-B product suite (similar to A)
- Oceansat-2 winds
Development status
- QuikSCAT winds
Discontinued status
- Wind Products Processing Status

Other Wind Services at KNMI

- ASCAT 25-km winds (EARS)
Operational status
- ASCAT 12.5-km winds (EARS)
Operational status
- ERS-2 winds (EARS)
Discontinued status
- Scatterometer work at KNMI

Software

- BUFR reader

Related links

- EUMETSAT
- Ocean and Sea Ice SAF
- EUMETSAT EARS system
- Numerical Weather Prediction SAF
- Description of ASCAT instrument at
- ASCAT archived data at the EUMETSAT

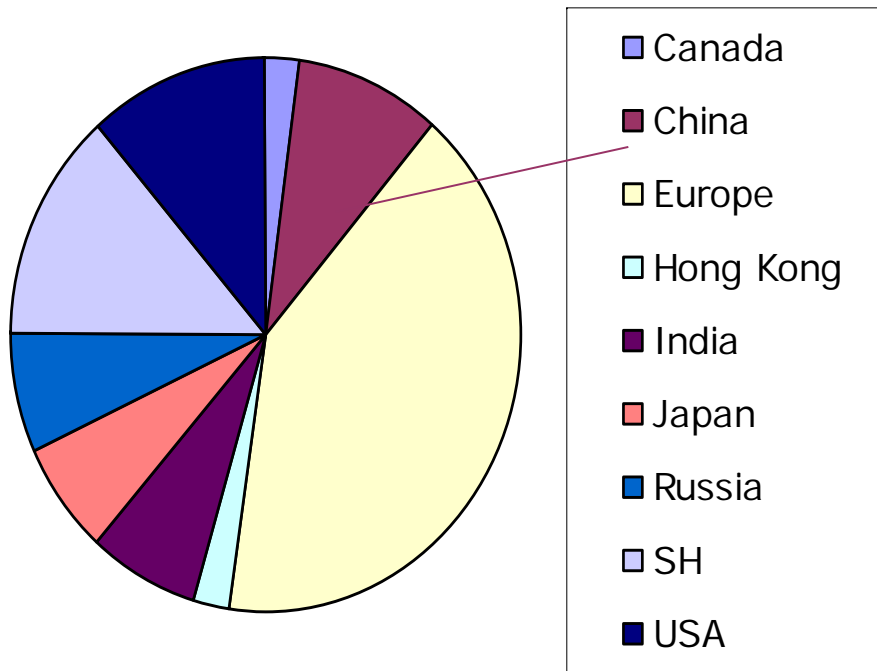
www.knmi.nl/scatterometer/



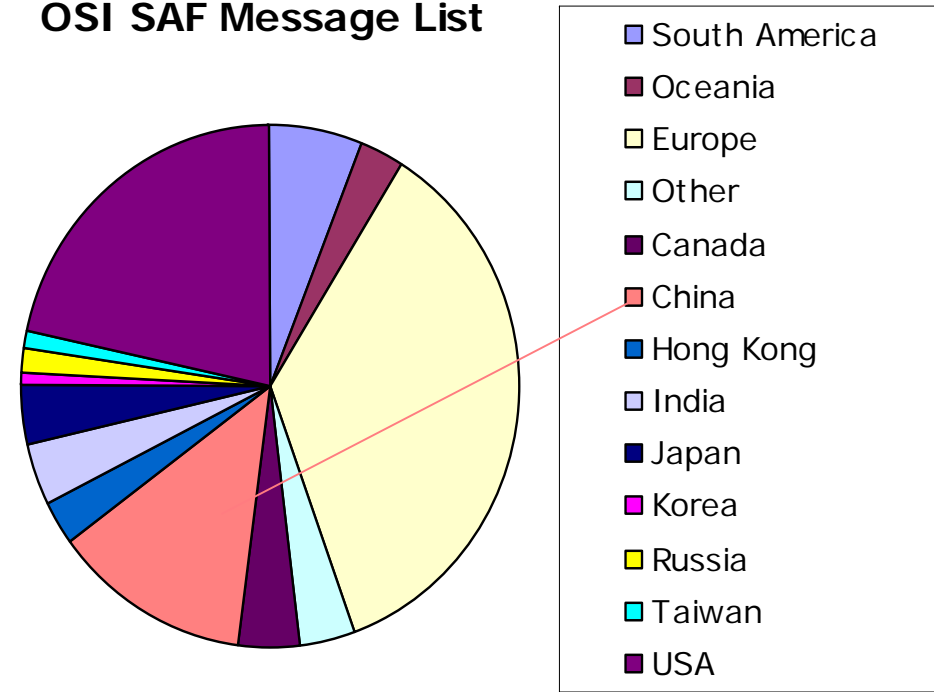
Global constellation users

- All EUMETSAT SAF wind product service messages are popular world wide (now include OSCAT; right)
- NHC, JTWC, OPC, ECMWF, NOAA, NASA, NRL, BoM, UK MetO, M.France, DWD, CMA, JMA, CPTEC, NCAR, NL, . . .
- Service messages also through EUMETCAST and JPL PODAAC

OSCAT Beta Users



OSI SAF Message List





Training

- EUMETrain marine course
http://eumetrain.org/events/marine_2013.html (video)
- Training Course Applications of Satellite Wind and Wave Products for Marine Forecasting
<http://vimeo.com/album/1783188> (video)
- Forecasters forum
<http://training.eumetsat.int/mod/forum/view.php?f=264>
- Xynthia storm case
<http://www.eumetrain.org/data/2/xynthia/index.htm>
- EUMETrain ocean and sea week
http://eumetrain.org/events/oceansea_week_2011.html (video)
- NWP SAF scatterometer training workshop
http://research.metoffice.gov.uk/research/interproj/nwpsaf/scatterometer/data_assimilation_workshop/
- Use of Satellite Wind & Wave Products for Marine Forecasting
<http://classroom.oceanteacher.org/course/view.php?id=103>
- Satellite and ECMWF data visualization
http://eumetrain.org/eport/smhi_12.php?



KNMI User Projects and Services

- Wind energy: EU NORSEWInD: www.norsewind.eu
- Ocean waves: EU MyWave: www.mywave.eu
- Storm surges and flooding: ESA eSurge: www.storm-surge.info
- 24/7 and archive winds: EUMETSAT Ocean and Sea Ice SAF: www.osi-saf.org , podaac.jpl.nasa.gov/dataset/ASCATA-L2-Coastal
- Wind processing software: EUMETSAT NWP SAF: www.nwfsaf.org
- L3 and L4 wind products: EU MyOcean: www.MyOcean.eu , podaac.jpl.nasa.gov

