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SESSION SUMMARIES

High Resolution SAR Wind Mapping

Chairs: W. Alpers, J. Horstmann, S. Lehner & D. Thompson

- High-resolution wind mapping is now a recognised operational capability of satellite SAR systems
- SAR winds should be output (along with currents) as part of a standard data package
- SAR wind maps should be used to help refine high-resolution meteorological models
- Need to advertise SAR wind mapping capability among potential users

Methodology and Techniques

Chairs: B. Chapron & H. Johnsen

- Improvement of knowledge of general physics behind the applications is necessary
- Simulators (as developed for forestry applications) should be looked into for oceanography applications
- Detection of oil spill in full polarization
- SAR Altimetry: can provide improvements in geophysical parameters detection (CryoSat will be launched by next SeaSAR workshop)
- Dual and quad polarisation should be exploited
- Along track Interferometry should be studied
- Fluctuations to improve knowledge of the marine boundary layer should be examined

Oil Spills

Chairs: O. Trieschmann, G. Campbell & V. Kerbaol

- Broad support for establishment of reference validated data set:
  - Requires cooperation between ESA, EMSA, JRC and other entities
  - There will be difficulties - Sensitivity of accessing validation data must be respected
  - Use this to verify/test all new algorithms
  - Need for regular updating to address new data streams
- Link with oceanographic models is important, in particular for higher level products
- No prospect of fully automatic unsupervised oil spill detection in medium term but algorithms to support improved manual analysis are to be validated
- The limitations of currently operational services are recognised. There is a need for improvement:
  - New techniques need to be supported (e.g. polarimetric or multi-scale analysis as presented)
  - The work must be undertaken with a view to operationalisation

- New data streams are obviously of interest; Method of access to test algorithms should be defined

- The following issues still need to be discussed further:
  - Improvement of confidence (e.g. making better use of ancillary data)
  - Recommendations for future missions
  - Integration of drift models and polluter identification
  - Strategy on statistical analysis
  - Steps to be undertaken to transfer R&D projects to operational services and to qualify them as "fit for function"

Vessel Detection

Chairs: J. Schulz Stellenfleth, G. Campbell & O. Trieschmann

- SAR-based vessel detection has wide range of applications with very diverse requirements:
  - Size, speed etc of targets of interest although there is increasing interest in "small targets"
  - Availability and utility of auxiliary data streams
  - Range of SAR parameters are required (resolution, swath, revisit)
  - It is not possible to give generic recommendation on maturity of satellite SAR for vessel detection nor on optimal system settings

- A comparison of the different services and algorithms for ship detection was requested

- Strong interest in the idea of (possibly multiple) supersites (or super ships):
  - Validated presence of vessels of known characteristics (size, heading, speed etc) in known environmental conditions
  - Regular updates to account for new data sources
  - More than one site required to ensure acceptable coverage of different environmental conditions

- Interest in the research community in working to improve detection of small targets in SAR imagery

- Integration of environmental conditions important (eg must give an indication of areas within an imaged area where ship detection algorithms do not work)

- Search utilities for SAR data from different sources are not well structured for use against detection of moving targets (eg vessels)

- Requirements for tasking and delivery times are very demanding in this domain

Wave Mode Algorithms – Validation and Assimilation

Chairs: H. Johnsen & G. Kallos

- For assimilation use, the importance of data quality control is fundamental

- Better guidelines for quality control and data filtering should be provided to the users

- The upgraded Level 2 product has some new parameters that can be used in that respect

- There is a need for further development of quality control procedures that will allow the reduction of the rejected raw data

- Spectral distribution is something that must be considered in future improvements

- The current Level 2 approach was discussed for Sentinel-1

- It is recommended that ESA continues to make higher level products available to the scientific community
- The new version of the Level 2 has been significantly improved, and the assimilation shows positive impact on the swell prediction
- A new empirical algorithm (Level 2) to measure SWH and mean period has been developed and is available for use

Wave Applications, Internal Waves, and Swell

Chairs: J. da Silva, F. Ocampo-Torres, W. Alpers & W. Huang

- SAR observations of Oceanic and Atmospheric internal waves have been presented for several sites. The generation and propagation characteristics of these waves have been discussed, along with methodologies for discrimination between waves of oceanic and atmospheric origin. Further efforts for understanding the generation and dissipation of these waves are needed. A compilation of Atmospheric Gravity Waves case studies is recommended, possibly in the form of AGW Atlas
- The recent change of ASAR WM Level 2 product (since end of Oct. 2007) has had a positive impact on the quality of the product. Further verifications are needed to confirm the quality of the product. ESA needs to provide the end users with a guide to enable them to filter the data properly in order to detect corrupt products
- DLR has developed a parametric inversion scheme, making use of the cross spectrum (Level 1b product) PARSA. The algorithm is an improvement of the MPI scheme used at ECMWF as it can take waves travelling in opposite directions into account
- DLR has developed an empirical algorithm CWAVE, which provides an estimate of the complete significant wave height (including short waves) and mean period and can be considered for level 3 products
- DLR suggests using the new inversion algorithm PARSA for a new level 2 product in cooperation with weather centres. This is tested in the project OSIRIS.

Ice Applications

Chairs: F.-M. Seifert & P. Clemente-Colón

- Support an Arctic Natural Laboratory for Ocean and Sea Ice Applications including ship and iceberg detection and tracking
- Present SAR data are essential in the detection and monitoring of sea ice and can improve the classification/characterisation of FYI/MYUI, ridging, etc. This is increasingly important as a significant increase in maritime traffic is being experienced by both Polar Regions
- In particular, the SAR data may improve summer ice characterisation as well as detection of icebergs in the Arctic, which appear more abundant than previously thought
- Complete Arctic (and circum-Antarctic) coverage is needed to track global changes
- Calibration of SAR systems appears to be nominal but issues are found from time to time that need to be addressed by the space agencies, e.g. ALOS Faraday rotation, L1.5 and interferometry calibration issues, etc
- Synergy of SAR with other remote sensing observations needs to continue to be exploited (passive microwave, visible, IR, etc)

- Our sea ice experience with using SAR should be exploited in the calibration and validation of CryoSat-2

- ASAR Wide Swath is ideal for ice charting/icebreaking operational support. The need for acquisition request time frames shorter than two weeks may arise. ESA is open to respond to some of these requests when directly approached by the PI

- Campaign planning should consider an advance planning of necessary EO data. PI's may want to consider reviewing/adding to their request as unforeseen changes in their "expensive" field campaigns occur

- The NRT acquisition capability for ALOS/PALSAR should be developed

Ocean Current Applications

Chairs: J. Johannessen & J.A. Lorenzzetti

- Dedicated and comprehensive field campaign is necessary

- Forward radar Imaging models are emerging towards an acceptable level of maturity but further advancement can be expected. Must adequately account for multi-frequency and polarisation missions. The optimum goal is to achieve a physical surface roughness model that can give a consistent description of the surface under any combination of wind, waves, current, stratification, surfactants, rain, etc

- Supersites should be consistently imaged by the multi SAR missions

- All SAR missions should incorporate Doppler grid processing in their ground segment

- Synergy should be standardised