Organisation of ESA’s In-orbit Data Quality Activities for ADM-Aeolus

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• Sensor Performance, Products & Algorithms Section responsible in phase E2 of a mission for:

• Processing algorithm evolution

• Calibration and Validation

• Routine Quality Control
Quality Reports on SPPA website

- Several types of product quality and performance reports (e.g. on product availability, baseline, health) for several missions.
- SPPA web-page serving as data quality portal
Sensor Performance, Products and Algorithms (SPPA)

The overall function of the Sensor Performance, Products and Algorithms (SPPA) section is to assure that the users are provided with the best possible product quality, in line with the mission requirements.

During the exploitation phase of a mission, SPPA is therefore responsible for:

- Processor (algorithms) maintenance and evolution
- Instrument and product routine and on-demand performance assessment and quality control
- System calibration and Product validation
- Assuring the end-to-end sensor dataset performance by:
  - Generation of ICTs (instrument control tables)
  - Harmonizing and establishing standardized Cal/Val procedures
  - Supporting data consolidation and reprocessing activities (data curation)
  - Organizing associated workshops and meetings responding to mission needs
Earth Explorer missions:

→ lessons learnt from an SPPA perspective

Main lessons learnt so far with Earth Explorers exploitation phase (GOCE, SMOS, CryoSat, Swarm):

- To be ready for **surprises** (bad / good) both with sensor(s) and with data
  → ADM: *new technology requires flexibility, reactivity (tools, procedures)*

- To establish a **central role for the data quality activities**, beyond the commissioning phase and for whole duration of the exploitation phase
  → ADM: *to demonstrate space DWL benefit for op. NWP, products need to fulfil high (quasi-operational) standards, -collaborative effort needed from the beginning*

- To explore the uptake of **new products**, in particular those associated with secondary mission objectives
  → ADM: *could fill potential time gap between other lidars and adds coverage.*

- To give **time for data to be used in operational environments**
  → ADM: “HW” limited life-time requires to be prepared and focus effort in quickly reaching the required standards in phase E2
The Data Innovation and Science Cluster (DISC) Concept

• User data quality concept tailored to innovative characteristics of Earth Explorers
• Regroups in a single cluster product, instrument and processor expert groups
• Central role in mission Cal/Val, sensor performance monitoring
• Enhanced Interaction with user communities
• First DISC being implemented for SWARM
Potential Aeolus DISC Functions and SPPA Activities

Quality Control
- Routine Sensor performance and product quality monitoring
- Interactive analysis of calibration proc. output

Processors
- Maintenance and Evolution
- L1, L2b/c, L2a calibration
- Prototypes and op. proc.
- Processor configuration

External Interfaces
- Cal/Val teams
- Validation Data Center
- Other ground processors/processing facilities
- Post launch support office

Tools
- Processor testbed for full processing chain (outside of PDGS)
- SPPA tools/portal (data quality dashboard etc.)
- EVDC (not in DISC)

Communication
- Quality working groups
- Validation/evolution workshops
- Web presence, user support, forums

Coordination and Project Management

Cal/Val
- Calibration (processing)
- Coordination of Cal/Val activities
- Cal/Val user support
- Validation team output digestion
Aeolus Calibration and Monitoring Facility
ACMF

• Calibration processing: generation of auxiliary files and instrument control parameters
• Routine and interactive quality monitoring and dissemination of screening reports
• Operator/Quality Engineer to perform QC for cases which require human intervention
• Evolution and Maintenance of all associated processors and tools. ->Poster
SPPA Role in Cal/Val

• Sensor and product routine performance monitoring
• Coordination of Cal/Val activities
• Maintenance and evolution of tools required for Cal/Val activity planning (OPOT etc.)
• Support in collection and harmonization of Cal/Val data, validation synthesis
• Cal/Val user support
Processors

- Maintenance and evolution of L1, L2A/B/C and calibration processors (prototype and op.)
- Definition of processor configuration parameters
- QWG’s involved in product baseline/processor update decision process
- Assistance to certain users running instances of the processors (e.g. Met. Offices)
- Exploration of the uptake of new algorithms/products
Timeline for data quality activities

• ADM-Aeolus phase E2 DISC to start full operation before end of commissioning
• ADM-Aeolus Quality Working Group announcement planned for Summer 2017
• First QWG meeting planned before IOCR
• Regular Validation & Evolution workshops planned after launch
Conclusions

• ADM-Aeolus Cal/Val and product quality activities: Mission success requires a complementary effort of scientific communities and ESA managed activities from the beginning.
• ESA managed core data quality mission activities include the data processor evolution, calibration and associated routine monitoring activities.
• Independent product validation by scientific communities key for mission success.
• Link and coordination between independent validation activities and ESA’s data quality activities important.
Selection of Related Workshop Presentations

- **Overall Aeolus Commissioning Phase Planning**, F. de Bruin, 12:20 (passed)
- **Aeolus On-Ground Data Processing Facility and Data Distribution**, F. Buscaglione, 14:20 today (passed)
- **ESA’s atmospheric Validation Data Centre (EVDC)**, A.M. Fjaeraa, 15:15 today
- **Aeolus Campaigns Planning**, D. Schuettelemeyer, 15:45 today
- **The Aeolus Operational Phase**, W. Lengert, 8:30 tomorrow
- **Aeolus CAL/VAL Implementation Plan**, A.G. Straume, tomorrow 12:30
- **The Aeolus Calibration and Monitoring Facility**, I. Di Lodovico, Poster
Thanks!

• Questions?