DLR Updates on Analysis-Ready-Data

Dr. Jonas Eberle, John Truckenbrodt, Anna Wendleder (Sentinel-1)
Dr. Martin Bachmann (EnMAP, DESIS)
Update on EnMAP & DESIS ARD

- DESIS (hyperspec. mission on ISS by DLR/Teledyne Brown): L2A product in CARD4L self-assessment

- EnMAP L2A „land“ product is CEOS-ARD conform @ threshold

- EnMAP L2A „water“ product currently in self-assessment (Aquatic Reflectance PFS)
  - Threshold level: 15 items already in place (additional 6 items in place for Target), 1 item currently internal only, 9 items need to be implemented - of which some need discussion with CEOS

- EnMAP Product Specifications, ATBDs and Mission Quaterly Report (incl. QC)
  - available @ enmap.org
  - L0 previews @ geoservice.dlr.de
Update on Sentinel-1 Normalized Radar Backscatter (NRB)

- Defined in Sentinel-1 ARD discussion workshops (2021)
  - Alignment with Sentinel-2 MGRS tiling grid and UTM projection, UPS for polar regions
  - Gamma Naught RTC product with additional auxiliary layers
  - Compliant with CEOS ARD NRB PFS (threshold and most target requirements)

- Processing at DLR terrabyte platform
  - Operational production together with thematic experts
  - Current test case: Germany for the year 2022
  - Processing of archive and new datasets starting mid 2023

- Exchange with ESA and NASA to collaborate on product specification and processing steps, auxiliary layers, software and data formats

- Extension of product specification to Ocean Radar Backscatter

Jonas Eberle, DLR, 23.03.2023
Feedback on ARD from DLR users

- Different types of users
  1. Having access to some global ARD datasets for direct analysis (e.g., Sentinel-1 on Google Earth Engine, ESA Sentinel-2 L2A Sen2Cor-based)
  2. Special wishes for processing from Level-1 to Level-2 (e.g., atmospheric correction tool used for Sentinel-2)

- Feedback for Sentinel-1 NRB
  - Projection alignment with Sentinel-2 MGRS tiling grid to simplify the combined analysis of Sentinel-1 and Sentinel-2
  - Universal Polar Stereographic Projection for polar regions
  - Additional (auxiliary) layers: No feedback for new layers (e.g., scattering area, gamma to sigma ratio) because they are often unknown to our users
  - Processing (e.g., ETAD correction, spatial resolution of DEM): Often implications are not clear and test datasets need to be available first for comparison before discussions with users
EO exploitation platform terrabyte
- DLR-internal platform for scientific data analysis
- HPC computing infrastructure + > 40 PB online storage
- Datasets: Sentinel-1 GRD/SLC, Sentinel-1 NRB, Sentinel-2 L2A, Landsat L2, MODIS, VIIRS, GEDI, Meteosat, (EnMAP, DESIS, TerraSAR-X, Sentinel-3, Sentinel-5p)
- Fast ethernet connection to DLR EO archive
- Public distribution of data? to be decided

EOC Geoservice (https://geoservice.dlr.de)
- Publicly available data access service
- Datasets: Curated data products, Sentinel-2 L2 MAJA (Germany), EnMAP L2 ARD (soon)
- OGC data visualization, access, and download services
- Interactive map viewer
Plans for data access and distribution

APIs and Technologies

- **APIs**

- **STAC and STAC API**
  - Using stactools packages for STAC item generation
  - Python stac-fastapi with PostgreSQL pgstac backend

- **Data formats**
  - COG for ARD
  - Original data format for existing datasets

- **Data analysis**
  - Open Data Cube with STAC, xarray and Dask (odc-stac)
  - Future: OGC EO Application Package (part of EOEPCA)