10TH ADVANCED TRAINING COURSE ON LAND REMOTE SENSING

Sentinel-3 Anja Strømme

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Sentinel-3 Mission Overview



- Operational mission in high-inclination, low Earth orbit
- Full performance achieved with 2 satellites in orbit (S-3A,-3B)

Optical Mission Payload providing

- Sea and land color data, through OLCI (Ocean and Land Color Instrument)
- Sea and land surface temperature, through the SLSTR (Sea and Land Surface Temperature Radiometer)

Topography Mission Payload providing

- Sea surface, lake, ice and river topography data, through a Topo P/L including a Ku-/C-band Synthetic Aperture Radar Altimeter (SRAL), a bi-frequency MicroWave Radiometer (MWR), and a Precise Orbit Determination (POD) including
 - GNSS Receiver
 - DORIS
 - Laser Retro-Reflector

In addition, the payload design will allow

- **Data continuity of the Vegetation instrument (on SPOT4/5)**,
- Enhanced fire monitoring capabilities



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Sentinel-3 Mission Objectives (simplified...)

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Sentinel-3 is providing continuity of timeseries from heritage sensors for Copernicus Services, including:

Continuity of ocean colour as good as ENVISAT MERIS or better

Continuity of SST as good as ENVISAT AATSR or better

Continuity of SSH as good as ENVISAT RA-2 or better with SAR capability derived from CryoSat-2

Continuity of land products (reflectance's, temperature) as good as ENVISAT MERIS and AATSR or better

Provide consistent quality L1 and L2 optical and topography products in a timely manner for Copernicus services

Continuity of SPOT VGT-P like products

1

Fire, River and lake height, atmospheric products...for Copernicus services













Sentinel-3 applications \rightarrow ever increasing





Agriculture, vegetation monitoring



Climate monitoring, numerical modelling and mesoscale analysis





<u>±</u>



Water resource management



Inland water quality



Fisheries: Harmful algal bloom/marine biology/global ocean primary production

+



Climate research





Snow and Ice



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Mesoscale ocean circulation, currents, tides



Sentinel-3 Mission Product Responsibilities





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Vegetation index 2017 - 2018



California on fire







On this Copernicus Sentinel-3 OLCI image acquired on 10 September 2020, the huge orange cloud covering most of the California coast is clearly visible.

Copyright: Contains modified Copernicus Sentinel data (2020)/processed on the Sentinel-Hub EO Browser





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Copernicus Sentinel-3 aerosols over California

(1)

Description: On this image, acquired by Copernicus Sentinel-3 on 12 September 2020, we can view on the right the land flag in green, and on the left the aerosols optical depth over California and Mexico **Copyright:** Contains modified Copernicus Sentinel data (2020)/processed by ACRI

California on fire





On this Copernicus Sentinel-3 OLCI image acquired on 10 Septen California coast is clearly visible. **Copyright:** Contains modified Copernicus Sentinel data (2020)/prc







10-11-12 September 2020





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A-68A's journey







Copyright: contains modified Copernicus Sentinel data (2017–20), processed by ESA; Antarctic Iceberg Tracking Database







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SENTINEL-3 ALTIMETRY CRYOSPHERE PRODUCTS

LEVEL-2 THEMATIC LAND-ICE PRODUCTS









SENTINEL-3 ALTIMETRY INLAND WATER PRODUCTS

LEVEL-2 THEMATIC DATA PRODUCTS



Data products in netCDF format at 20Hz * TDPs are expected to be delivered by Q4 2021. * **225 MB*** in size per pass for inland water. * They contain the main geophysical variables: - 1KM - Water level (including all the satellite corrections) - Water level (including all the satellite corrections) - Surface backscatter (roughness) * Product size to be confirmed

SENTINEL- 3A THEORETICAL ORBIT SENTINEL- 3B THEORETICAL ORBIT WATER BODIES PO RIVER BASIN

PERFORMANCES OF SENTINEL-3 OVER RIVER AND LAKES

* SAR mode improves the measurements over inland water * ESA provides a processing on demand platform to process data at 80Hz.

> RIVER & LAKE DATA QUALITY **10-15** OF DISPERSION OBSERVED ALONG A RIVER OR A LAKE CROSSING

LAKE WATER HEIGHT ACCURACY COMPARED TO GROUND TRUTH

BO of RETRACKABLE WAVEFORMS ARE AVAILABLE OVER THE LARGE LAKES

DEFINE YOUR TARGET ONLINE

You can define your targets over inland water <a>https://www.altimetry-hydro.eu/

USEFUL LINKS

Sentinel Online: **sentinel.copernicus.eu** S3 Land Altimetry Product Handbook: **Under preparation**

DATA ACCESS

Scihub: **scihub.copernicus.eu** ESA DIAS: **copernicus.eu/en/access-data/dias**

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Sentinel-3 C/D Satellite Status (summer 2021)

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Sentinel-3C

- Sentinel-3C satellite complete, all instruments integrated
- Environmental Campaign in progress
- FAR planning; KO Oct, Board Dec/Jan
- All activities progressing well
- Storage planned to start after completion of FAR



OLCI-D in Thermal-Vacuum chamber



Sentinel-3D

- MWR & SRAL: completed and awaiting integration
- OLCI: Environmental Campaign in progress
- SLSTR: All sub-units available
 - FPA Spectral Calibration in progress
 - SLSTR Radiometric Calibration planned to start Q4 2021
- OLCI-D & SLSTR-D will not be integrated onto S3D but delivered ready for storage

Sentinel-3 C/D Satellite Status (summer 2021)



Sentinel-3C

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Launch date to be defined by the Commission, but foreseen in the range:

- S3C; mid 2024 beg 2025
- S3D; 2026 end 2028

cuum chamber integration ress



- SLSTR: All sub-units available
 - FPA Spectral Calibration in progress
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Thank you for your attention!



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