

Proba-V Mission status Sentinel-2 Mission Status

Bianca Hoersch on behalf of the Proba-V and Sentinel-2 teams

Proba-V QWG#5, Torino, 9-10 May 2017

PROBA-V

High-level mission status

- **4 years in Space** – and counting! **Congratulations to a fantastic team & QWG!**
 - Participating States approved the mission extension @Feb 2017 PB-EO
 - **Mission will be operated until 'end of funding' = some time in autumn 2019**
- Spacecraft nominal & nominal US operations
- Only 1 close approach warning in the last 3 months
- > 1000 (direct) users
- MEP utilization ever increasing, including TPS
- New Web Portal released by VITO
- Upcoming events: PB-EO next week in Gent + MultiTemp 2017 in Bruges
- User requirements workshop for potential Proba-V follow-up: date/location tbc



SENTINEL-2

➤ Sentinel-2A nominal routine operations continue

- Systematic coverage of Europe, Greenland and Africa every 10 days (at equator). Rest of the World (due to reduced illumination at Northern latitudes): 20-day revisit till additional station (Inuvik) and/or EDRS is introduced (~summer 2017)
- First Sentinel-2 Validation Team (S2VT) and 2nd Sentinel-2 Quality Working Group meeting held in November 2016 confirming excellent performance of S2A. Product evolution recommendations being analysed.
- Improved mission planning check procedures have been introduced, based on in-orbit experience, to minimise outages
- Pre-operational Level-2A 'Europe' released on 2 May 2017 via Open Access Hub (see below)
- Sentinel-2B launch 6 March 2017, IOC phase proceeding nominally

Sentinel-2B first image

sentinel-2

15 Mach 2017

ESA OBSERVING THE EARTH COPERNICUS SENTINEL-2

Colour vision

- [Introducing Sentinel-2](#)

[ESA](#) > [Our Activities](#) > [Observing the Earth](#)

Applications

- [Plant health](#)
- [Changing lands](#)
- [Water bodies](#)
- [Disaster mapping](#)

A 'TOAST' TO COPERNICUS

About the mission

- [Facts and figures](#)
- [Satellite constellation](#)
- [Instrument](#)
- [About the launch](#)



Brindisi, Italy



Sentinel-2A sees Etna erupt: 16 March 2017

CORRIERE DELLA SERA
CORRIERE DEL MEZZOGIORNO CRONACA



Etna, esplosione dal cratere: dieci persone ferite

Colpiti da materiale lavico. In sei sono ricoverati in ospedale

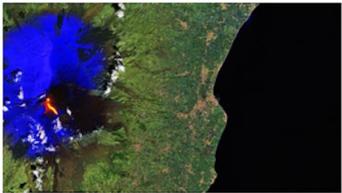
di Andrea Di Grazia

► Nuova eruzione-show dell'Etna, è la seconda in due settimane



16 MARZO 2017 | LIBRI | <http://video.com...> | [EMBED](#) | [SHARE](#) | [EMAIL](#)

CATANIA - La furia dell'Etna ferisce dieci persone. Un'esplosione freatica dal cratere che si è verificata stamane, mercoledì, alle 11.30 nei pressi del fronte lavico del vulcano, precisamente nella zona Belvedere, a circa 2700 metri di quota. Sul posto erano presenti alcuni turisti e una squadra di vulcanologi dell'Ingv di Catania, impegnata nei rilievi e misurazioni scientifiche.



La prima foto satellitare dell'esplosione (la lingua di fuoco e in blu la neve)



L'INTERVENTO
**Tillerson alla
Corea del Nord:
«La pazienza sta
finendo»**

di Redazione Online

Il segretario di Stato Usa: «Non vorremmo azione militare, ma sul tavolo l'opzione militare»

SVELATO IL PIANO SEGRETO
**«Operazione London Bridge»:
i piani per la morte della Regina | 64 anni
di Elisabetta**

di Luigi Ippolito, corrispondente da Londra



Così il Regno Unito affronterà il lutto. E il dilemma di Camilla regina | [Tutti i link](#)

L'INTERVISTA

**Ghedini: «Il no a Minzolini è buon segno
per Berlusconi»**

di Giuseppe Gasella



Rebecca Morelle 
@BBCMorelle

Back at hotel now after Etna explosion. Here's @NewsCamerawoman with the massive hole a lump of rock burnt through her coat.

4:35 PM - 16 Mar 2017

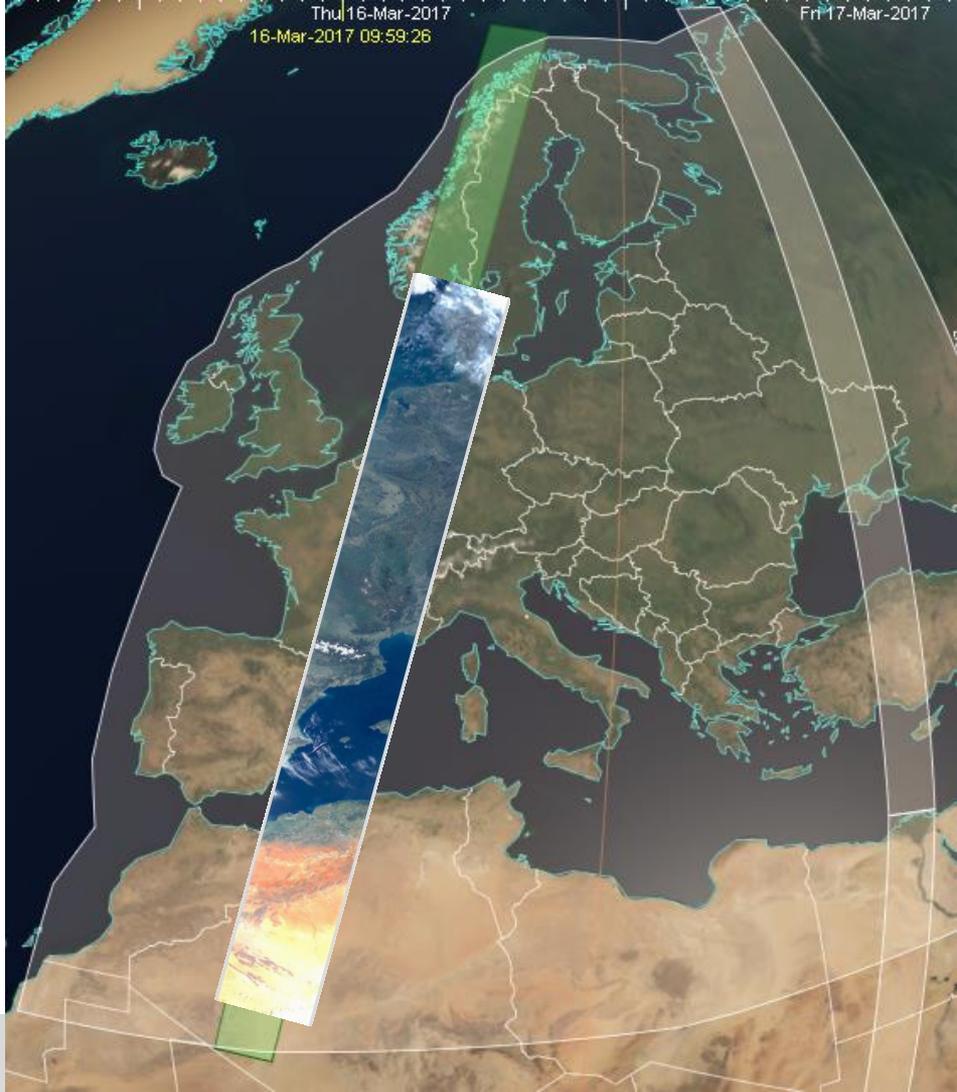


16 March
2017



19 March
2017

Sentinel-2B – 16 Mar 2017



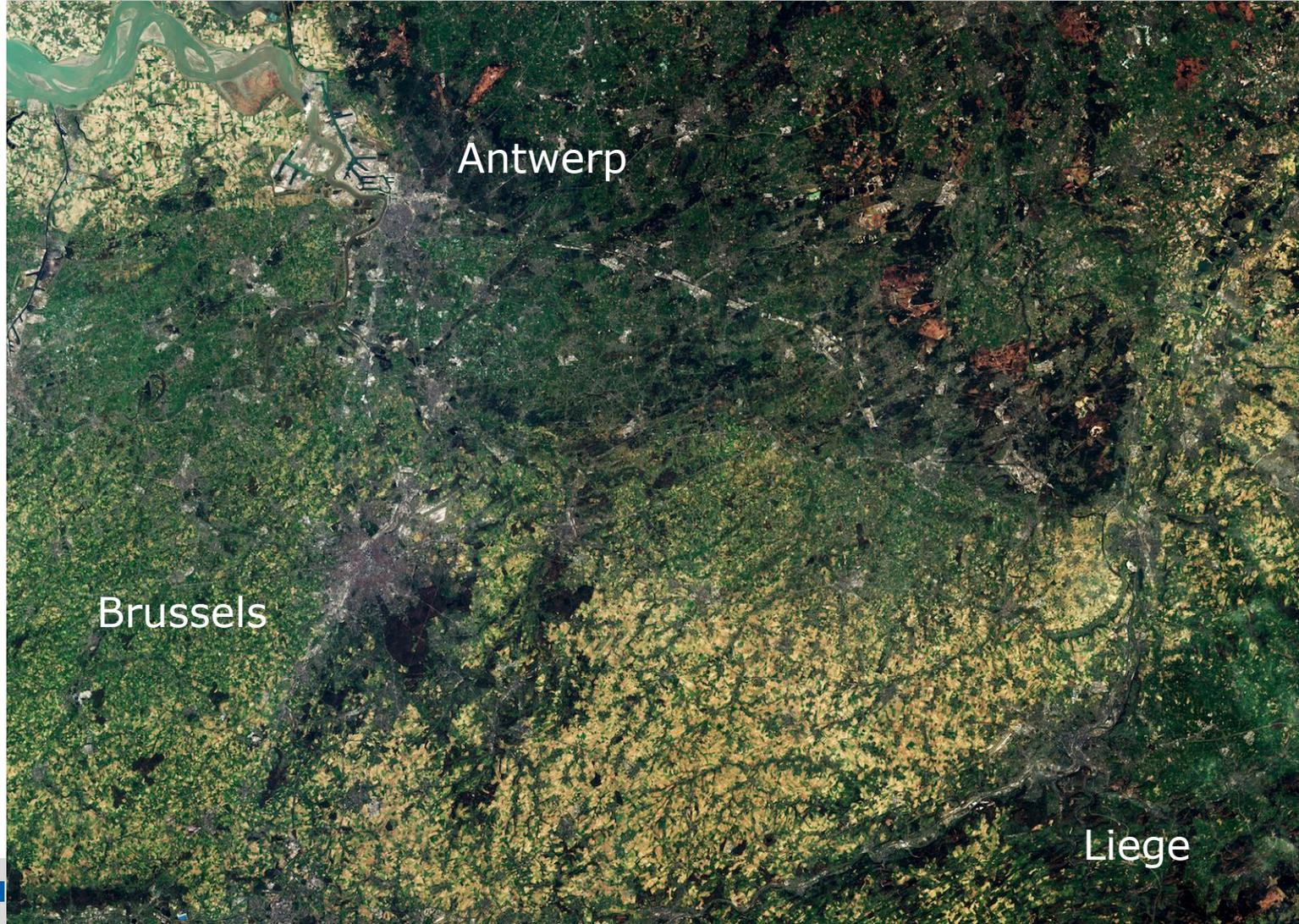
Sentinel-2B

Netherlands
16 Mar 2017



Sentinel-2B

Belgium
16 Mar
2017



Antwerp

Brussels

Liege



S2B

Antwerp
Harbour
16 Mar 2017



S2B

Brussels
16 Mar 2017



Sentinel-2B status



- All satellite functions are performing nominally.
- Several absolute calibration acquisitions were carried out with different integration times for the MSI SNR evaluation.
- About 6 hours of MSI image acquisitions were performed last week covering systematically Europe and vicarious sites for performance refinement.
- MSI decontamination 2-3 May

Upcoming

- Finalise IOC Phase activities, IOCR
- OCP Inter-Satellite Link to show the functional capability of transmitting data to ground via a GEO counter-terminal
- Reselection of defective detector element, update of GIPP/NUC
- Sample products release to QWG for assessment prior to IOCR



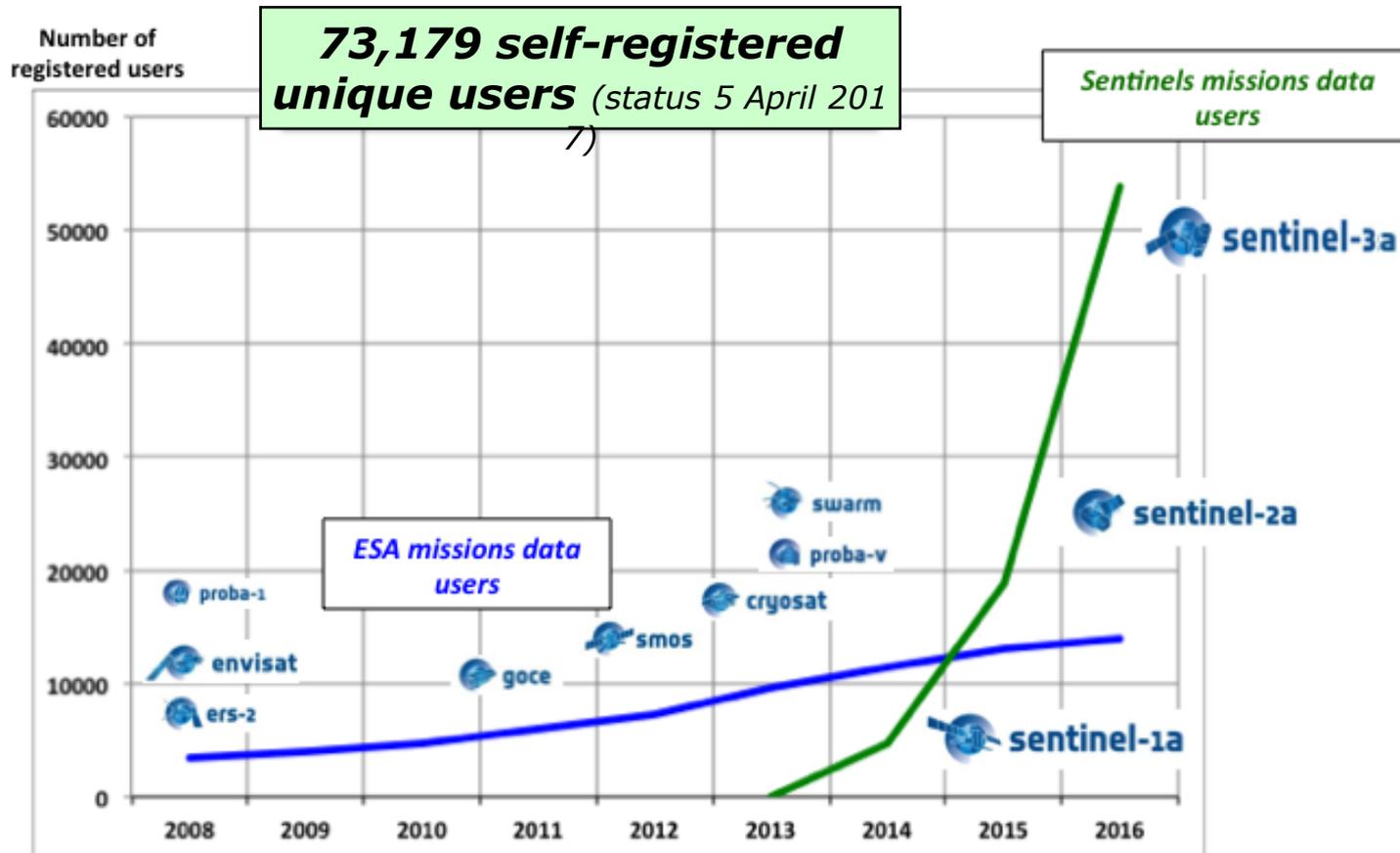
Sentinels Data Access – Current Configuration



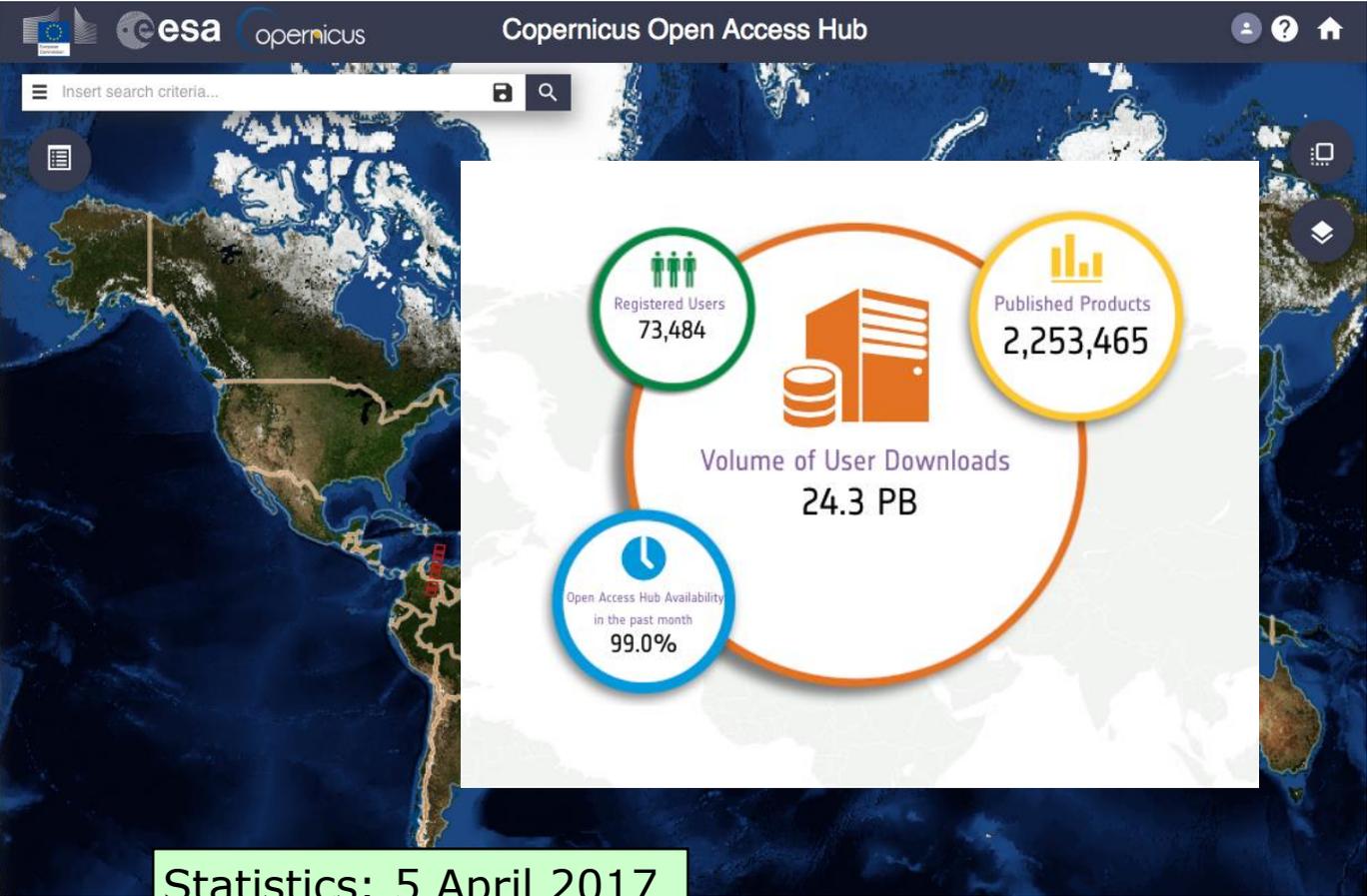
Statistics: 5 April 2017



Sentinels Data Access – User Registration



Sentinels Data Distribution – Overall Statistics



Annual Data Access Report online



SERCO PUBLIC serco

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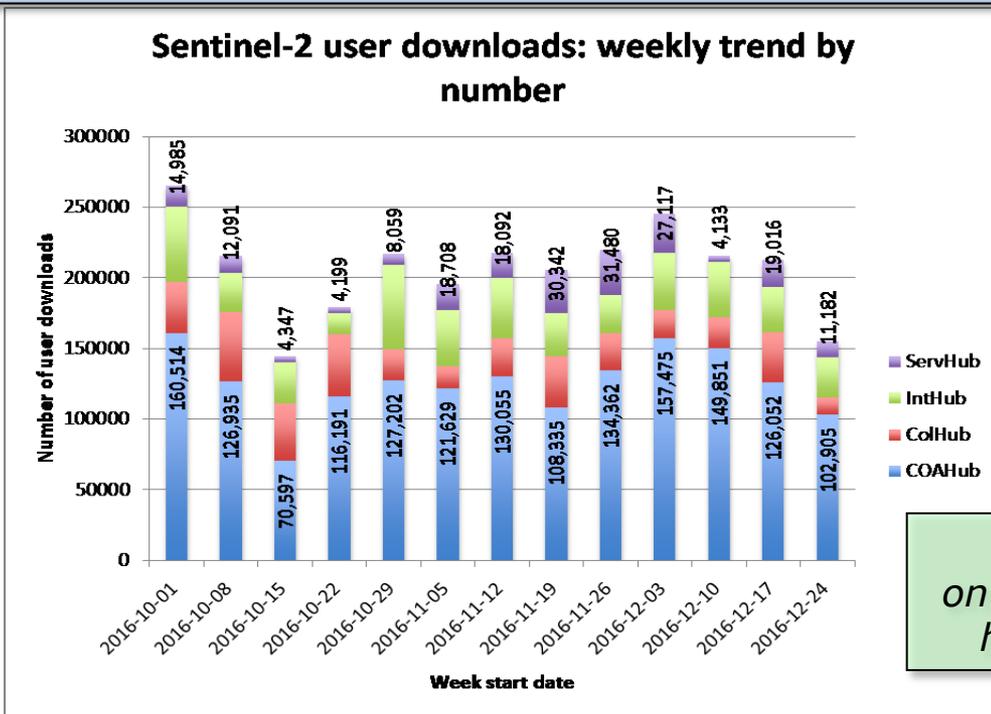
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<https://sentinels.copernicus.eu/documents/247904/2955773/Sentinel-Data-Access-Annual-Report-2016>



Sentinel-2: Data Distribution Statistics

Approx. 2,7 million products were downloaded during Q4-2016 (1,75PB of data)

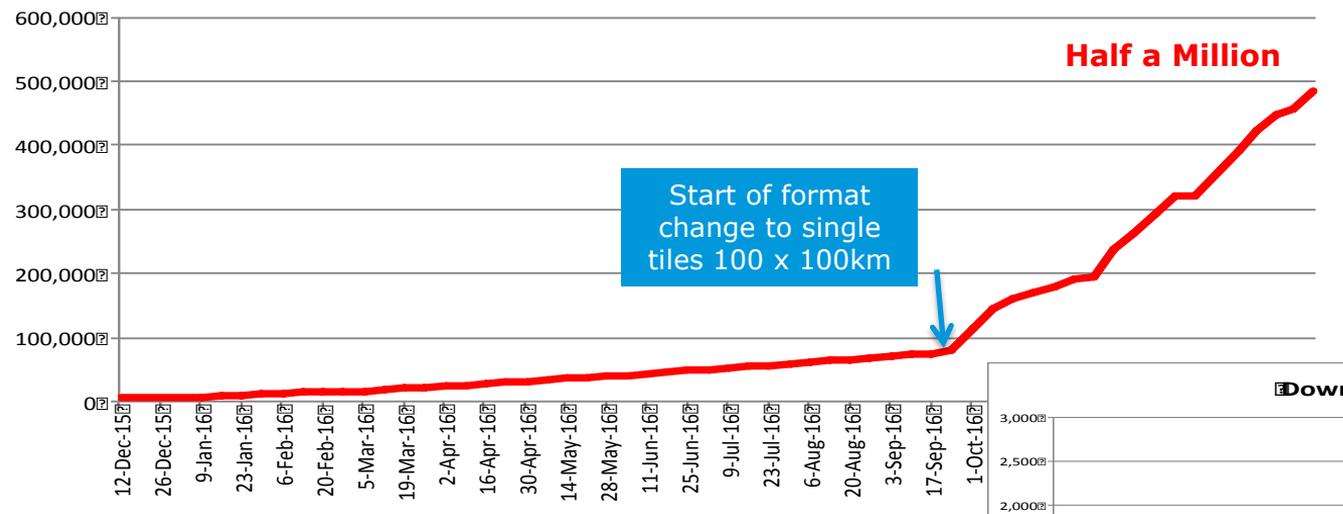


Exploitation ratio - 1:10
on average each product published has been downloaded 10 times

Sentinel-2 Data Access (since Dec 2015)

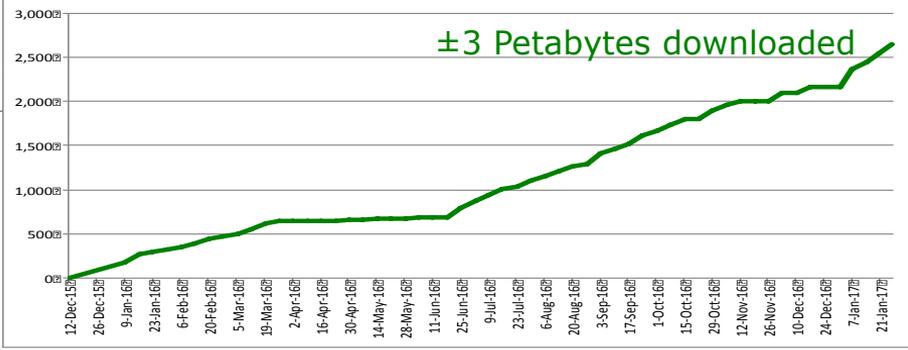


Number of Available Products



More than 6 Mio Sentinel-2 products downloaded in 15 months!

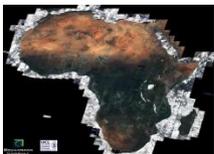
Downloaded Products (TB)



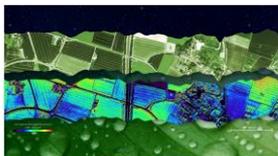
Ever increasing range of S2 Applications



Every second, a slice of rainforest the size of a football field is mowed down



Forests & Carbon, Vegetation monitoring



Agriculture, Fluorescence & biophysical parameters



Emergency management

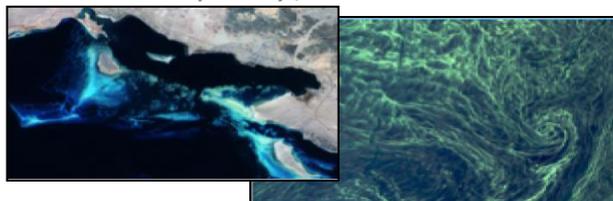


European Land cover, human impact, high resolution layers

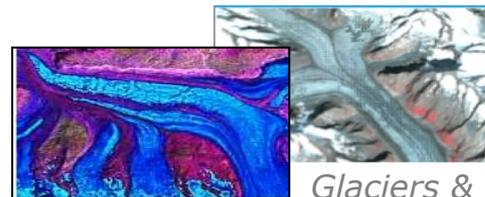


Global Land use & land cover

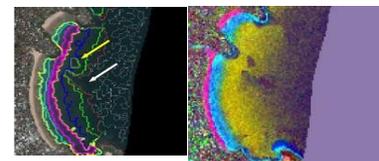
Water quality, Wetlands



Regional to Urban Applications



Glaciers & Ice



Coastal zones/bathymetry



Geology & Geomorphology



→ Level 1 C product status

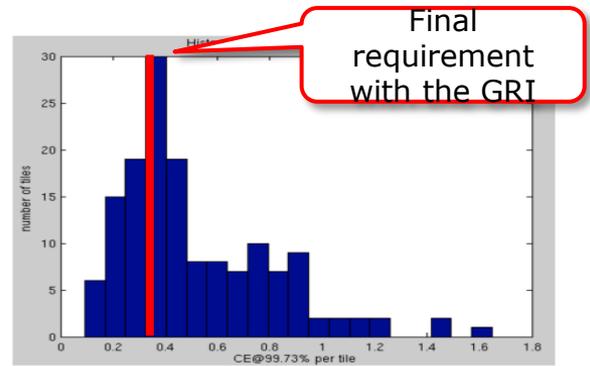
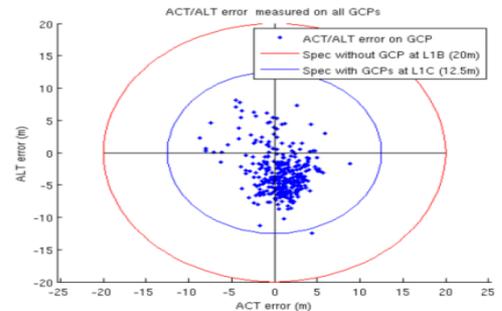
- › First products released on December 2015 (baseline 02.00)
 - Consolidation of processing chain => Baseline 02.04
- › Corrected some minor errors
 - Tile naming, detector footprint equators, physical gains metadata, clipping of reflectances at 1...
- › Improvements
 - Increased quantization depth, added meteorology auxiliary files
 - Improvement of geometric and radiometric calibration
 - Processing chain consolidation (robustness and processing time optimization)
- › Single tile products and short file names

➔ Level 1 C product outlook

- › Short term: baseline 02.05 since end of April
 - correction of errors affecting auxiliary files and metadata
- › Medium term (~2018)
 - Geometric refinement: 3 m multi-temporal geolocation accuracy
 - Improved DEM: better geolocation for mountainous areas
 - Masks in raster format
 - Under study: offset on reflectances

Mission Performances

- ➔ Absolute geolocation
 - › **CE 9.2 m at 95%**, well below the mission specification without the GRI (20 m)
 - › NB: the quality of the Digital Elevation Model can impact performance locally in mountainous areas
- ➔ Multi-temporal registration
 - › The multi-temporal is the only mission requirement which is not yet met (as expected):
 - **CE 1.12 pixels at 95%**, vs. 0.3 pixel specified
 - › The full performance will be reached after activation of the GRI
 - This has been verified on a few sample products during commissioning
- ➔ Multi-spectral registration
 - › Performance **below 0.3 pixels at 99% for all bands**
 - › This contributes to the quality of image composites (RGB)
 - › Co-registration performance also depends on the quality of the DEM (dependent on the altitude of imaged objects)



Sentinel 2 products

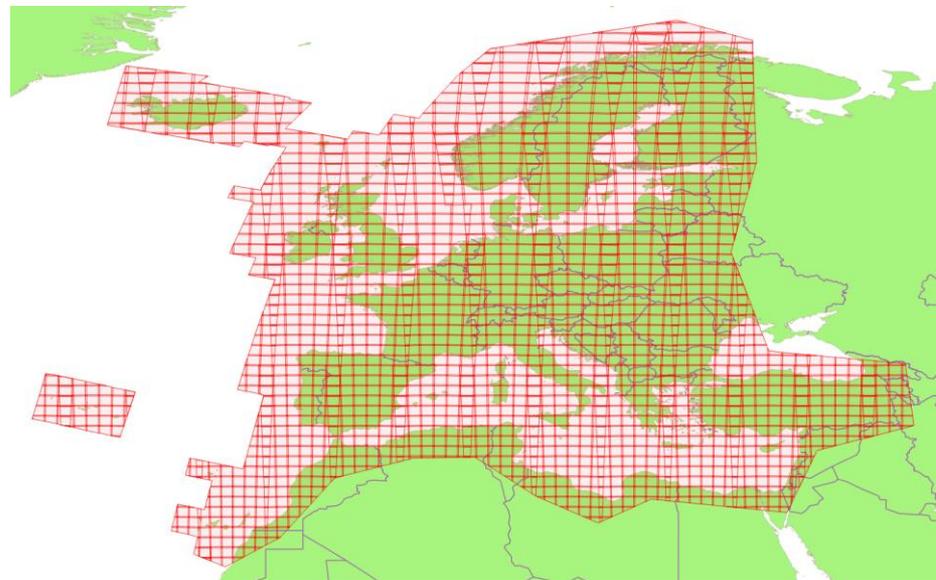
→ Level 2 A product

Characteristics	Current status
Definition	Bottom-of-Atmosphere reflectances
Projection	Same as L1C
Dissemination unit	Same as L1C
Production	User-side production with publicly available software Sen2cor
Preservation	N/A
Volume	~ 700 MB
Images format	JPEG 2000 15 bits integer with quantization value = 10000
Metadata	Same as L1C + Radiometric classification (cloud, cloud shadows, water, snow...)
Auxiliary data	Same as L1C + Retrieved aerosol optical thickness and water vapour



L2A Production over Europe, open on COAHub since 2 May 2017

- The **Sen2Cor** processor (version 2.3.0) is generating bottom-of-atmosphere (BOA) reflectance products.
- It generates daily up to **300GB** of **L2A** products (~600 Tiles per Day).
- L2A products are made available as from 02 May 2017 through <http://scihub.esa.int>
- Products granularity of **L2A** will be the same as **L1C** available on SciHub.



Next steps for S2 mission...

- Continue EDRS 'User Commissioning' for S2A (started)
- Jun 2017: start **Reprocessing** of data acquired during Sentinel-2A commissioning phase and entire Sentinel-2 archive into new tile format
- 14 Jun 2017: **Sentinel-2B 'First images' event** with celebration '60 years Rome Treaty'
- Sentinel-2B IOC finalisation - **IOCR** on 15 June 2017, mission **handover** followed by **ramp-up** (IOCR+ 4 m), data release to be authorised @IOCR
- Jul 2017: Results of **Level-2A** feasibility study, objective to decide roadmap for systematic global L2A production
- Autumn: Sentinel-2B 'User Commissioning' EDRS
- 2018: Start of GRI-based production for S2A and S2B.
- 2018: Towards operational L2A processor for global production, tbc
- 2018: Usage of better DEM, tbc
- 2018: Start major reprocessing exercise of all S2A/S2B archived data with GRI and operational L2A processor (archive size ~5PB!).

A satellite image showing a coastal region with a large, swirling plume of light blue and white sediment or phytoplankton extending from the shore into the darker blue ocean. The land is visible in the bottom left corner, showing green vegetation and some urban areas.

Thank you very much for your attention!
<http://sentinels.copernicus.eu>