



# PEPS

## French Access to Copernicus Space Data

C.Proy, P.Henry, P.Durand, E.Poupart, C.Taillan



## What's PEPS

### 3 main functions:

#### ❖ "Mirror site" of ESA hubs providing access to Sentinel 1 and 2 products

- Automatic download to ESA hubs (delay <48h)
- Access to the **global coverage** and **full archive**

#### ❖ Processing tools allowing, results visualization and/or downloading

- Unitary (MMI) or multirate (script) processings

#### ❖ Access to high performance resources (near the data) with user support

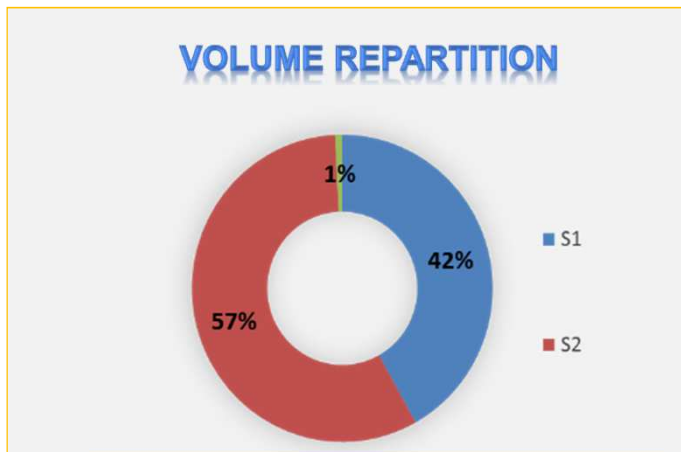
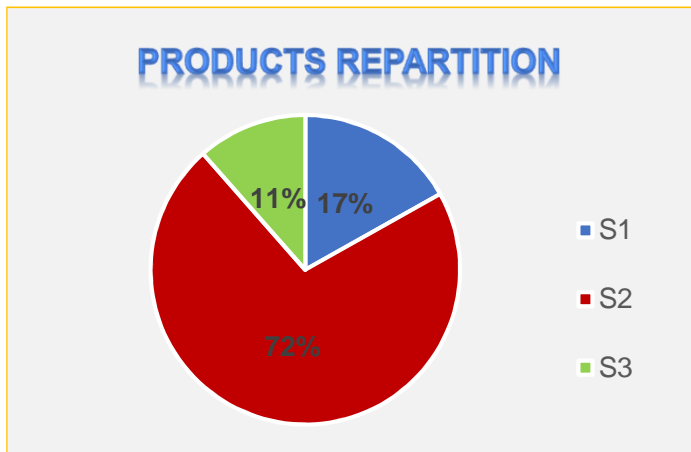
- ➔ Labs/universities: help to scientific users for the processing of large volume of Sentinel data
- Private companies: incubation of relatively "mature" processing chains for "scale" validation

## ❖ PEPS September 2019

**PRODUCTS**  
**17 705 737**

**VOLUME**  
**12 386 TB**

**DAILY ACQUISITION**  
**10.03 TB**



**BANDWIDTH**

↓ **1.15 GBPS**

↑ **359 MBPS**

## PEPS on line processing tools

### ❖ Standard tools

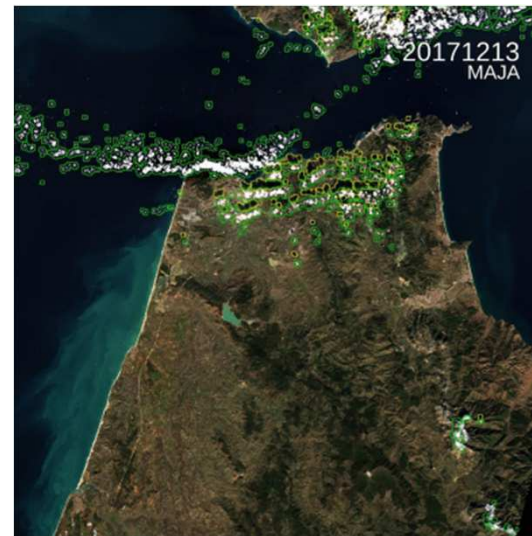
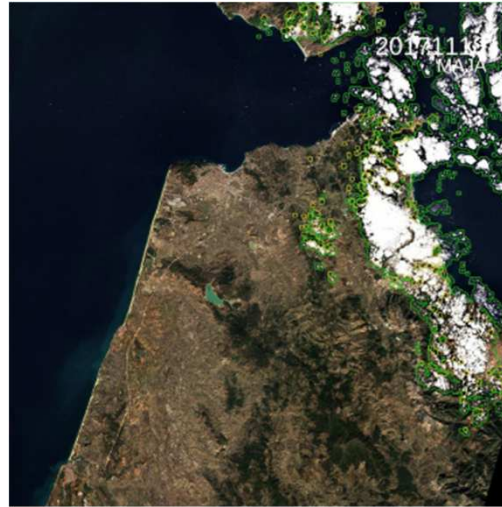
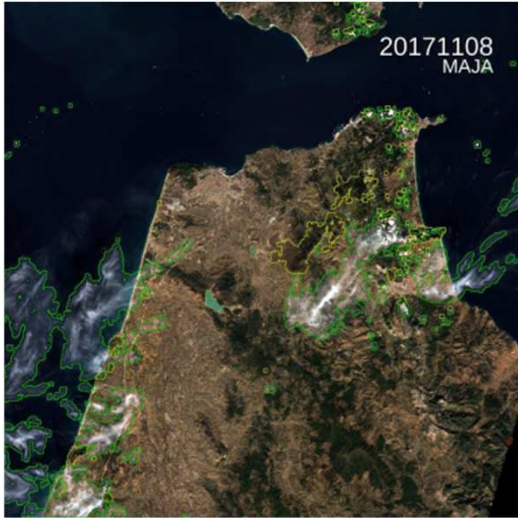
- Visualization, NDVI, color compositions, data extraction (spectral bands, orbit data...)

### ❖ Multidate processings

- Orthorectification of S1 products vs the S2 grid (available since 2017)
- S2 ground reflectance using MAJA (available since October 2018)
- S1 Tiling (available before end 2019)
- S2 images correlation (Medicis)
- S1 interferometry (Diapason and NSBAS)
- Fine registration of S2 images



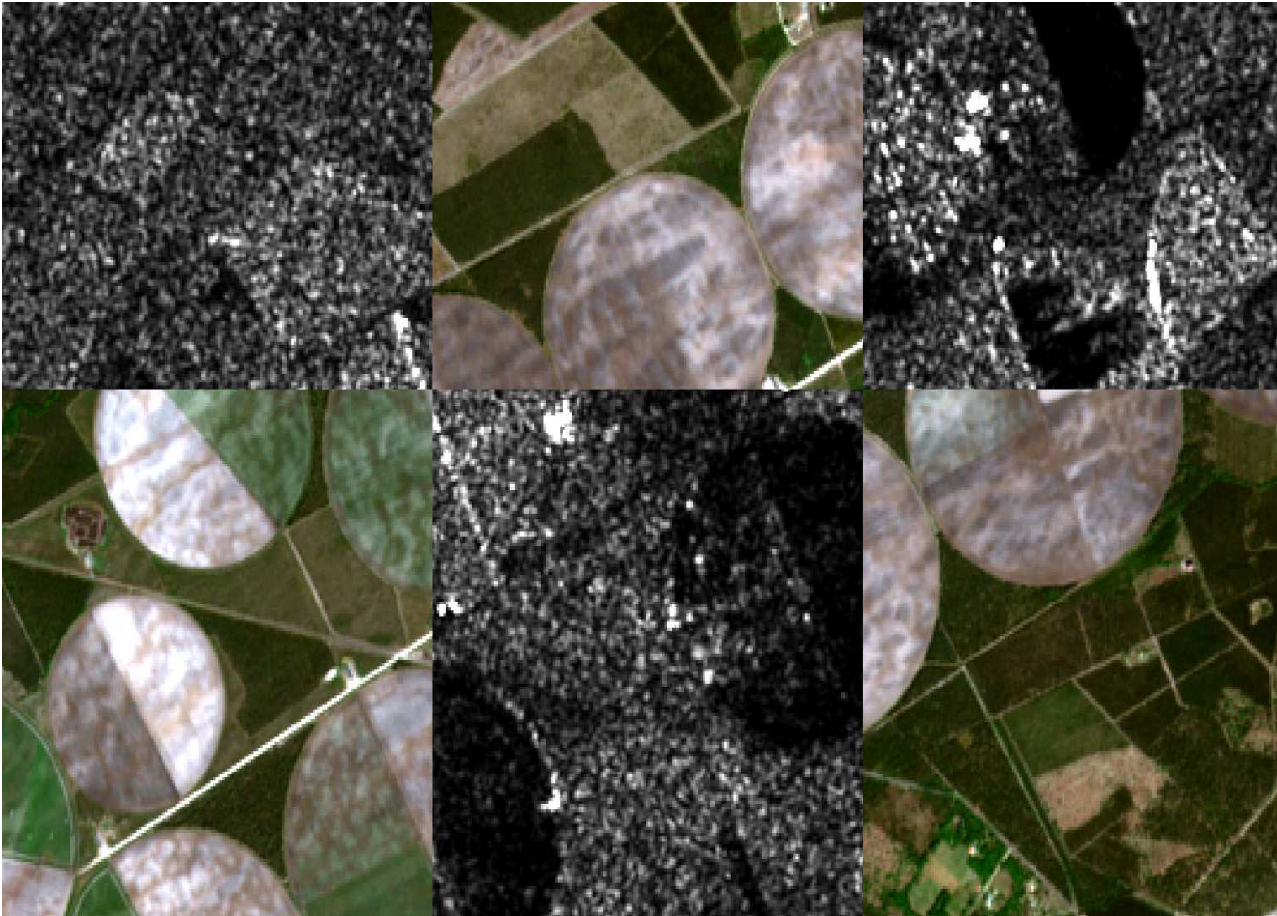
# Example of MAJA's output over Tanger/Gibraltar



Stability of the radiometry after atmospheric correction

Very accurate cloud detection

## Example of Orthorectification S1 on S2



The aim is to reproject GRD S1 products and split them in 120x120 km<sup>2</sup> S2 Ortho Tiles

2 ways :

- Use the website
- Create a WPS job



Nom de votre traitement (facultatif)

TRAITER LES PRODUITS (0) ⚙️

## Orthorectification S1 sur la Grille S2

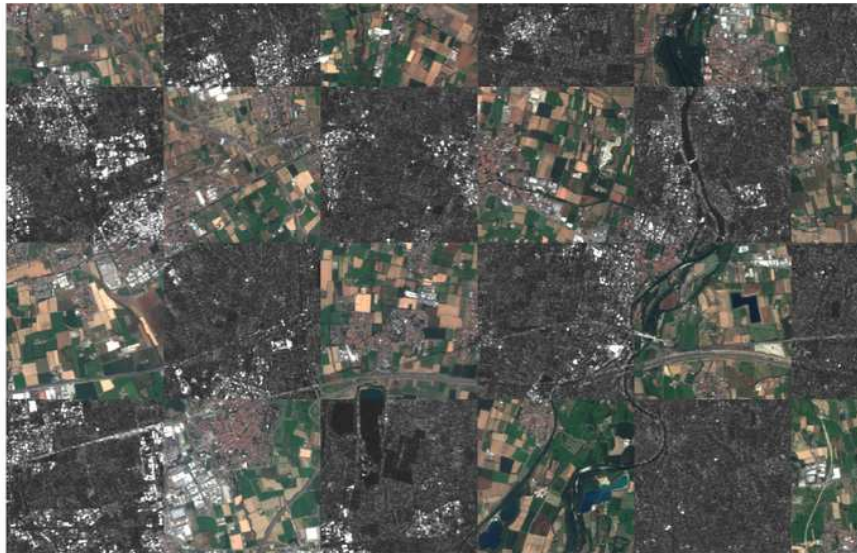


Figure 1 : Superposition de l'image Sentinel1 ortho-rectifiée et de l'image Sentinel2 de référence. On peut noter la continuité forte des contours des surfaces d'eau et des infrastructures routières. A pleine résolution (1 pixel image = 1 pixel écran), le décalage entre les deux ne doit pas dépasser 1 pixel.

### Description :

Ortho-rectification et tuilage des produits S1 GRD sur la grille Sentinel 2 (MGRS)

Ce traitement a été mis en place pour pouvoir faciliter :

- Des traitements multi-capteurs S1, S2
- La superposition d'image S1 et S2
- Le mosaïquage S1 et S2

Le taux de couverture d'une tuile MGRS par l'emprise S1 doit être au moins de 10% pour qu'elle soit générée.

La première étape est une calibration gamma

Le résultat est un zip contenant l'ensemble des tuiles générées en format GeoTiff

### Caractéristiques :

La durée moyenne d'exécution est de 20 minutes.

### Lancement via WPS :

Description du lancement du traitement via WPS sous PDF

# S1 Tiling Time Series

The aim is to generate time series on chosen S2 ortho tiles of 120x120 km<sup>2</sup>

S1 data are Gamma Calibrated

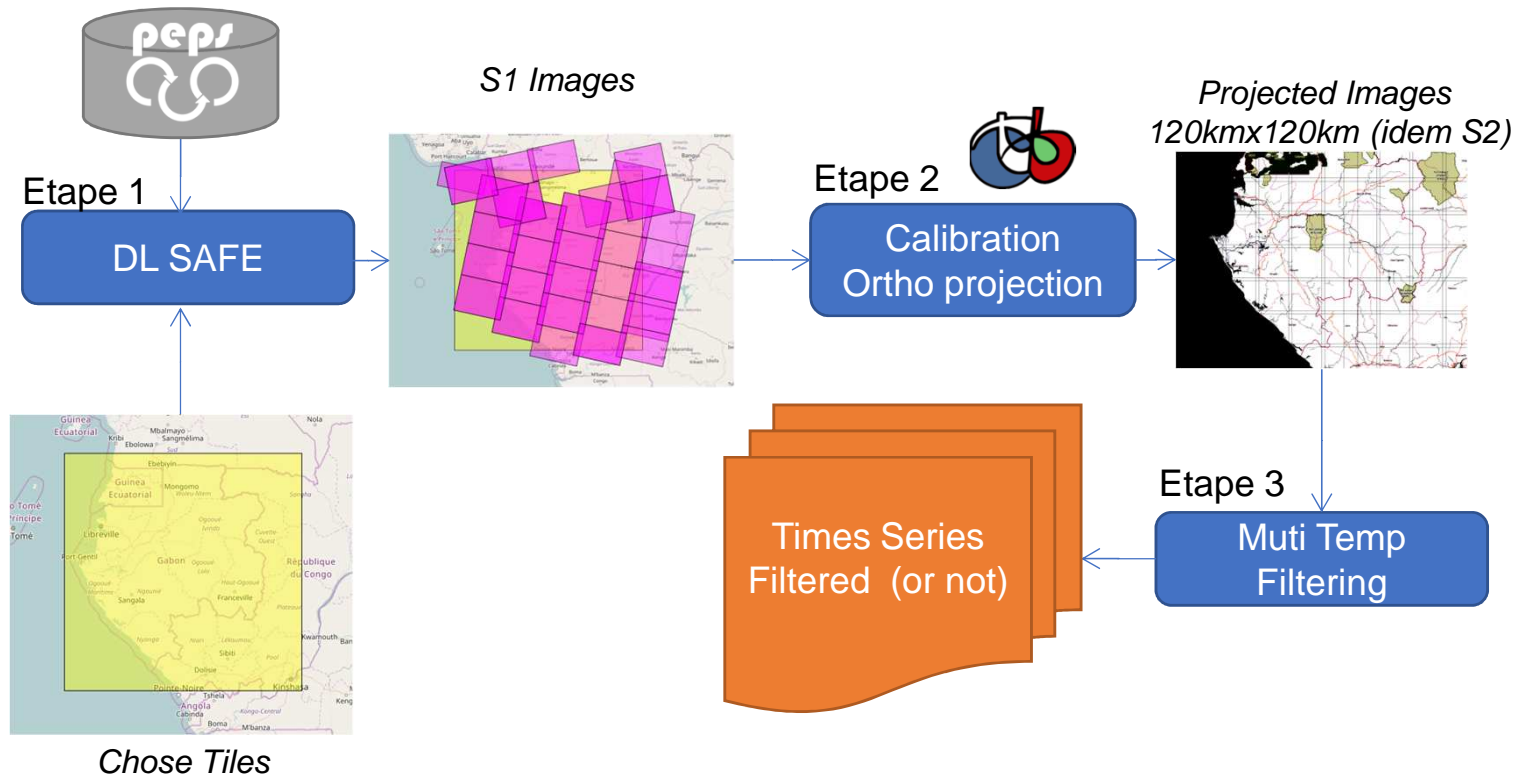




Image without filtering

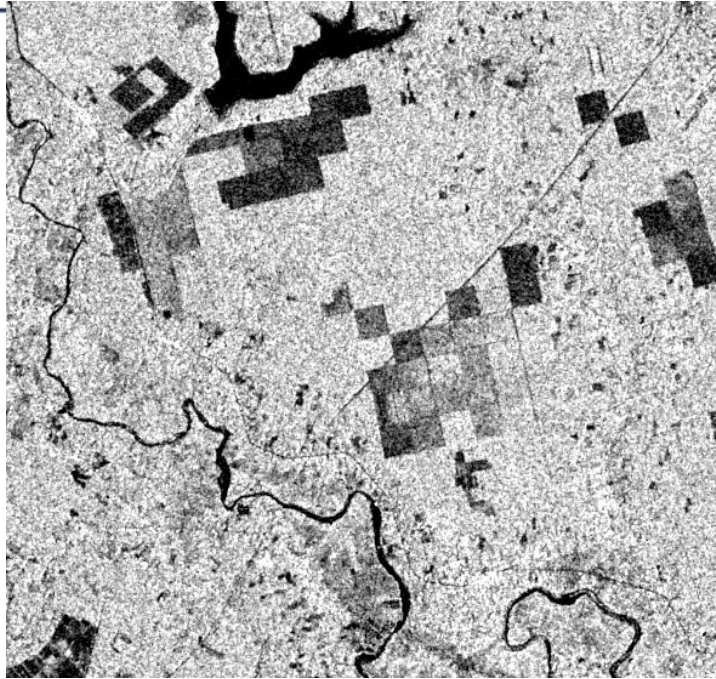
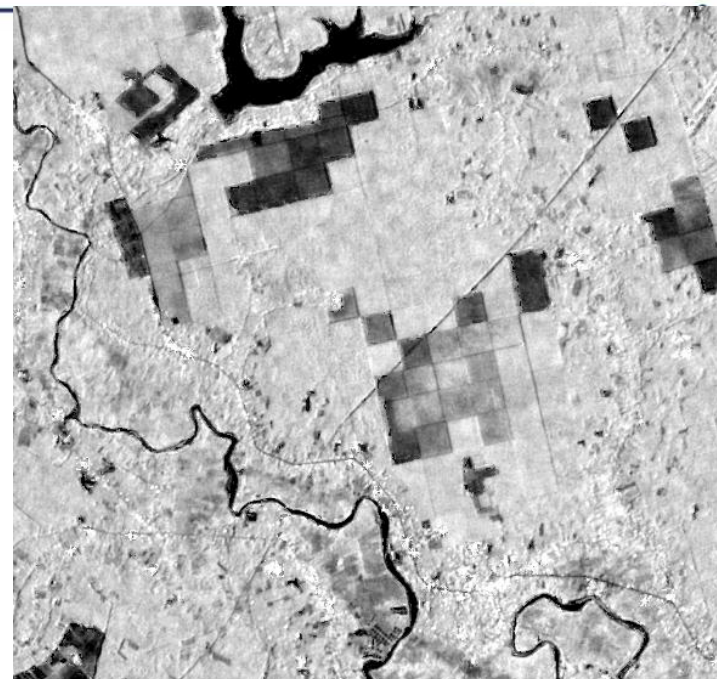


Image with multi temporal filtering



- **Reduced speckle**
- **Keeps the native resolution**
- **Better filtering results with number of images (minimum 15 recommended...)**

132.149.129.4:8083/datalake/S1-L1-ORTHO/31TGL/2018/07/20/

**Index of /datalake/S1-L1-ORTHO/31TGL/2018/07/20**

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
<a href="#">Parent Directory</a>	-	-	-
<a href="#">s1b_sig_31TGL_vvvh_DES_139_20180720txxxxxx.tif</a>	2019-08-07 14:45	1.8G	
<a href="#">s1b_sig_31TGL_vvvh_DES_139_20180720txxxxxx_filtered.tif</a>	2019-08-07 16:21	1.8G	

# Speed-up downloads from PEPS with peps\_download.py



## [https://labo.obs-mip.fr/multitemp/speed-up-downloads-from-peps-s2-mirror-site-with-peps\\_download.py/](https://labo.obs-mip.fr/multitemp/speed-up-downloads-from-peps-s2-mirror-site-with-peps_download.py/)

The screenshot shows the 'multitemp' website. The main article title is 'Speed-up downloads from PEPS S2 mirror site with peps\_download.py'. The article text explains that the French Sentinel mirror site (PEPS) stores products on tapes, which is slow. A tool named 'peps\_download.py' was created to speed up downloads by accessing products on disks. A code block shows a shell script snippet: `Make catalog request`, `For all product in the request result :- while product is not downloaded`, `- try to download the product`, `- if still on tape, wait for 2 minutes`. The right sidebar features a search bar and two article cards: 'Les séries temporelles de niveau 3A de Sentinel-2' and 'Sentinel-2 Level-3A time series', both by Olivier Hagolle from October 17, 2019. A footer cookie notice is visible at the bottom.

---

## PEPS link with Thematic Data Centers

### ❖ MUSCATE environment uses PEPS catalog and access directly to the products

- For Theia (Land Surface Thematic Data and Services Center)
  - systematic MAJA processing over France, north Africa...
  - + snow detection, monthly L3A synthesis, land cover...
  - <http://www.cesbio.ups-tlse.fr/multitemp/?p=14600>

- For Form@ter (Solid Earth Thematic Data and Services Center)
  - systematic interferometry processing over large areas

### ❖ SPOT archive

- Provide access to SPOT data to complete multirate Sentinel2 series (SWH processing)



# PEPS

## Some statistics

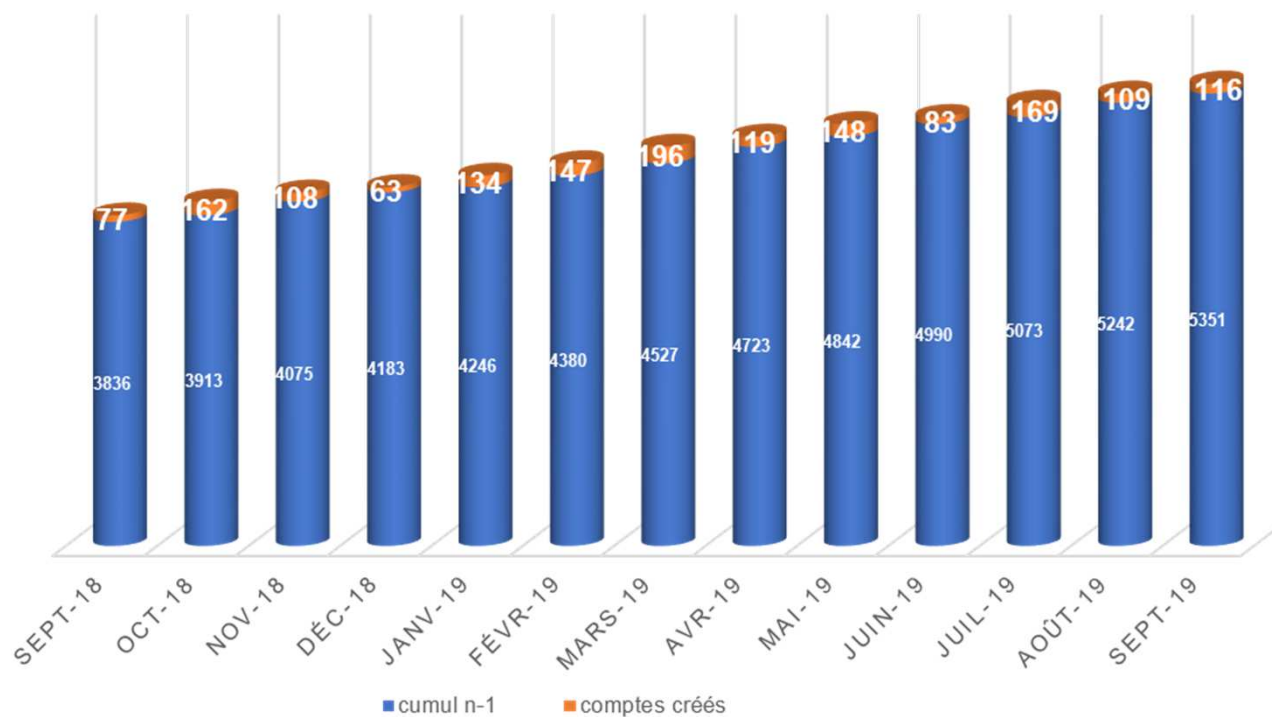


## ❖ Stable increase of registered users

5351 registered users (french users: 60.2%)

Users registration evolution

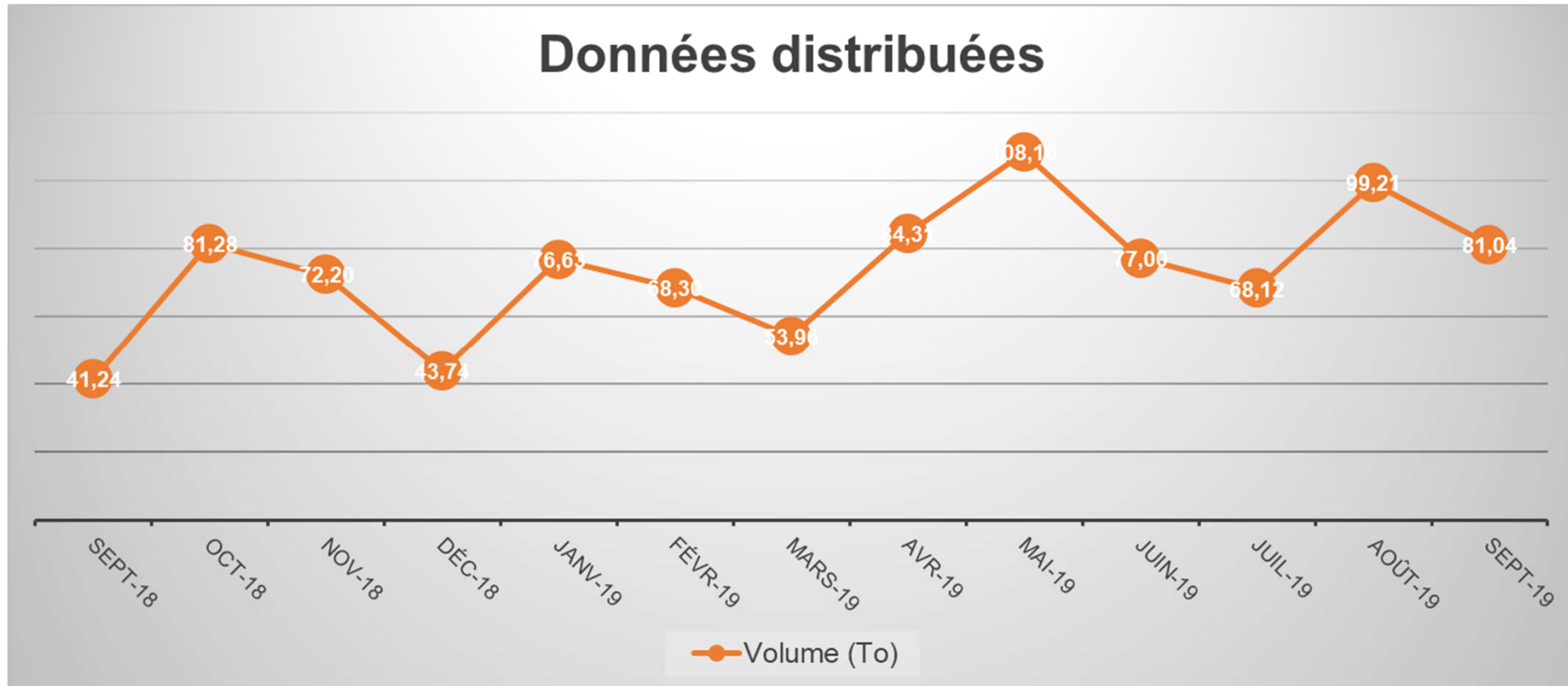
Around 5% of them use PEPS each month



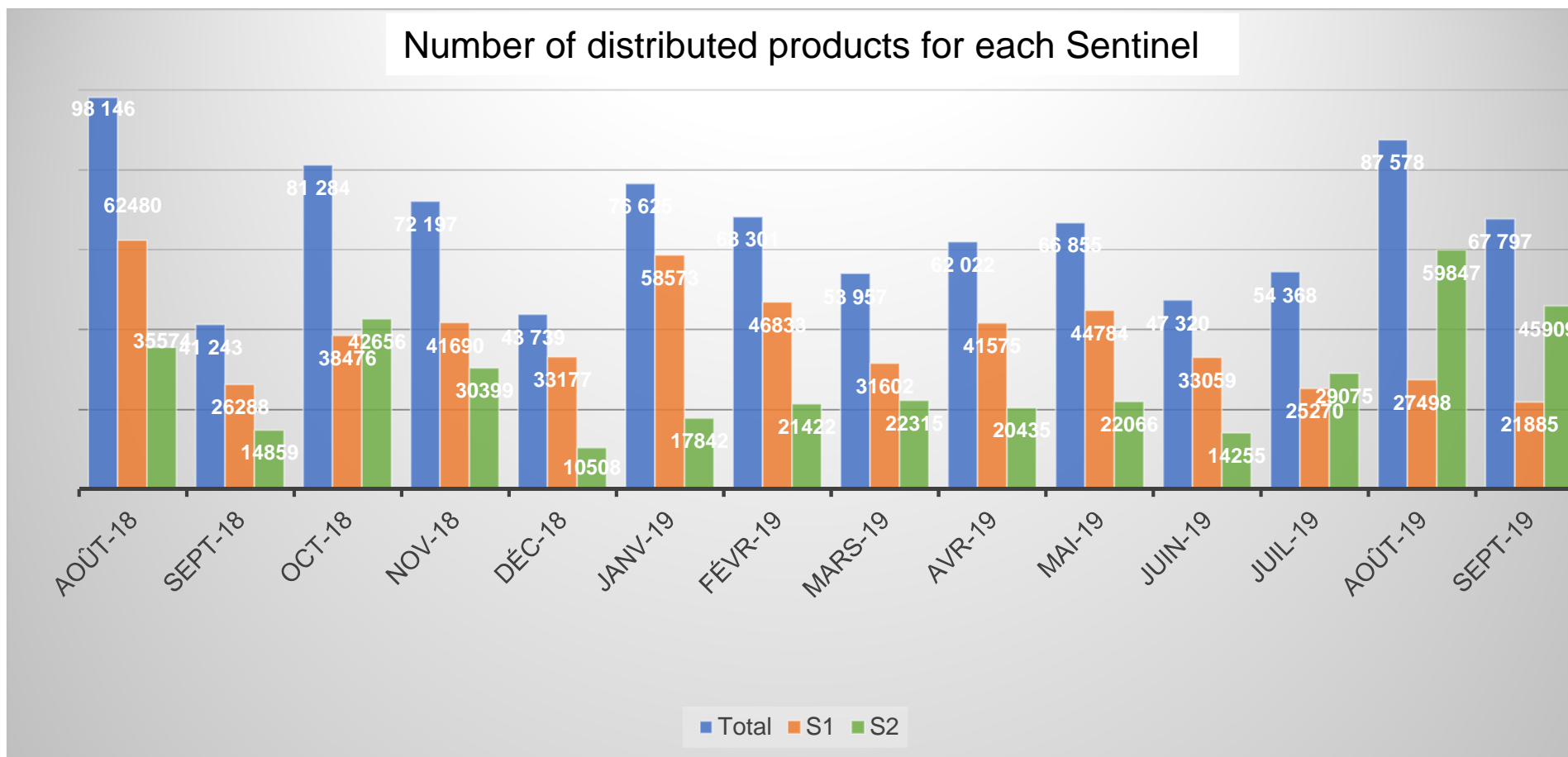
## Distributed data volume

- 2018 vs 2017: x2

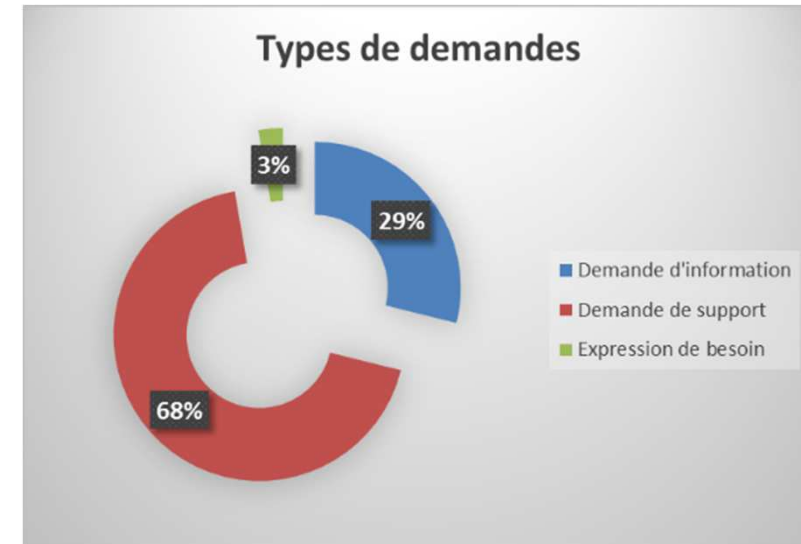
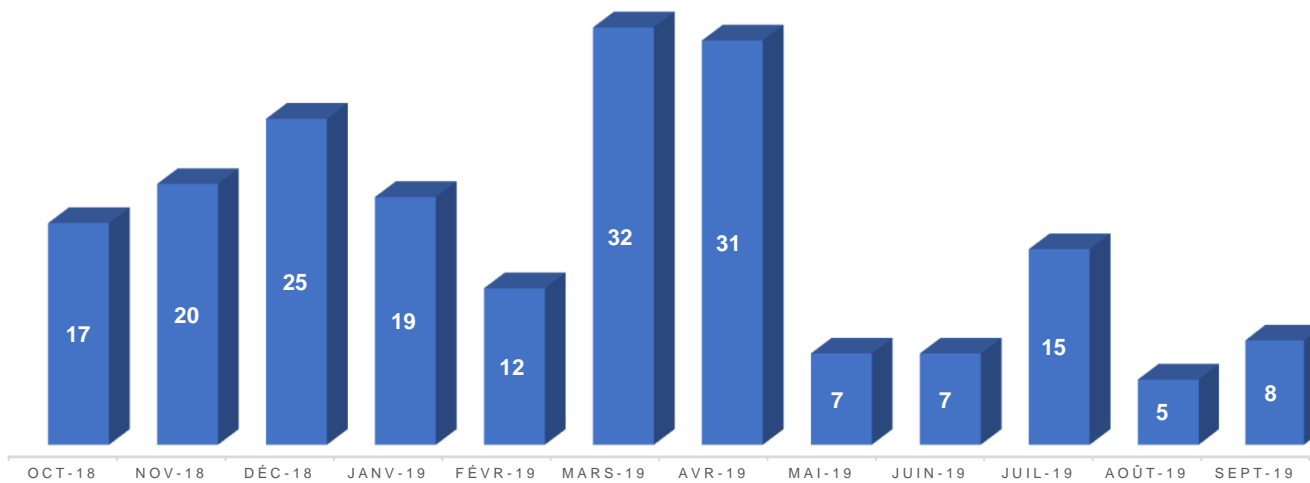
- Slight increase between 2018 and 2019



## ❖ Which is the 'top' Sentinel?



## NOMBRE DE DEMANDES UTILISATEURS



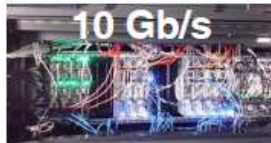
RÉPONSE MOYENNE

**= 48H**



# CONCLUSION - OPPORTUNITIES

17



- Integration of processings via PEPS accessible to all (public mode)
  - ✦ Express your needs
- Hosting of experimental processing near data
  - ✦ Submit your projects

Contact : [patrice.henry@cnes.fr](mailto:patrice.henry@cnes.fr)

THANK YOU FOR ATTENTION