



31 MAY & 1st JUNE 2023 • Parc Floral, Paris

FLATSIM : radar data providing precise measurement deformation at continental scale

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Sentinel-1 : system overview

Interferometry : very quick introduction (in two slides !)

FLATSIM service :

- introduction, products, information, data access, computing**
- computational challenges, scientific projects and some results**

Sentinel-1 Overview

European Union program



Sentinel-1:

radar imaging for ocean, land and emergency

Mission based on 4 similar satellites

S1A (data since October 2014)

S1B (September 2016 - December 2021)

S1C and S1D to come, hopefully beyond 2030

Main characteristics:

C-band imaging **Radar** instrument ($\lambda = 5,6\text{cm}$)

Instrument duty cycle of 25 min/orbit in HR modes

Near polar sun synchronized orbit at 693 km

(ascending node at 18:00LT)

7 years lifetime, consumables for 12 years

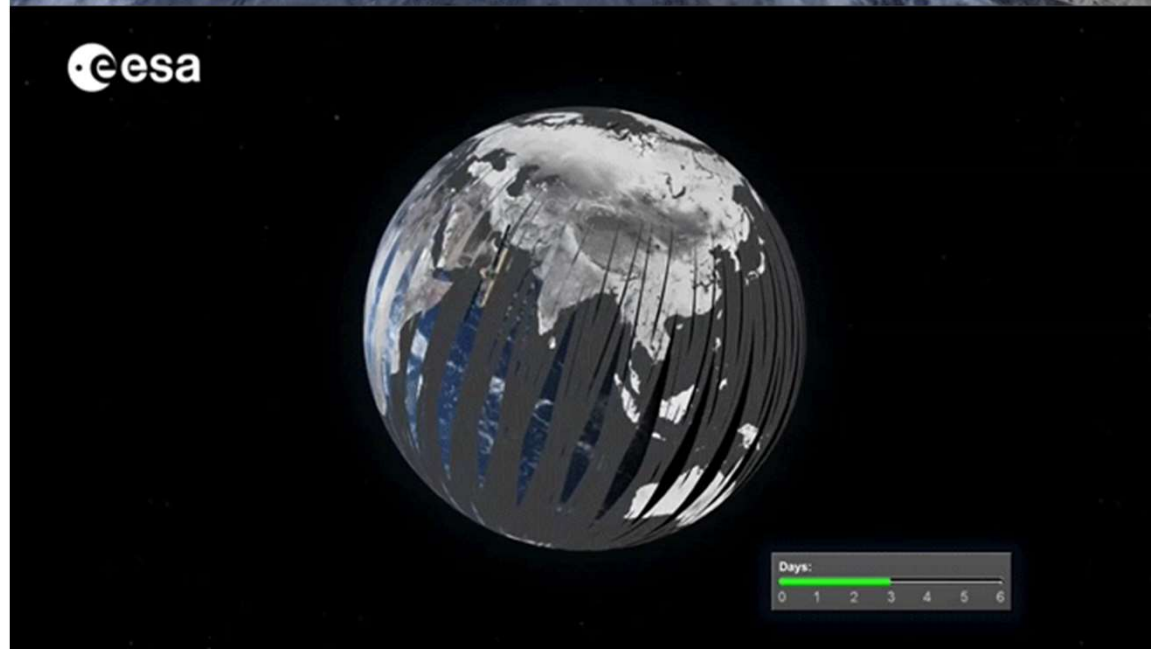
Goal of **6-days repeat cycle (with 2 operating satellites)**

Systematic data processing

open & free data access (for the 1st time)

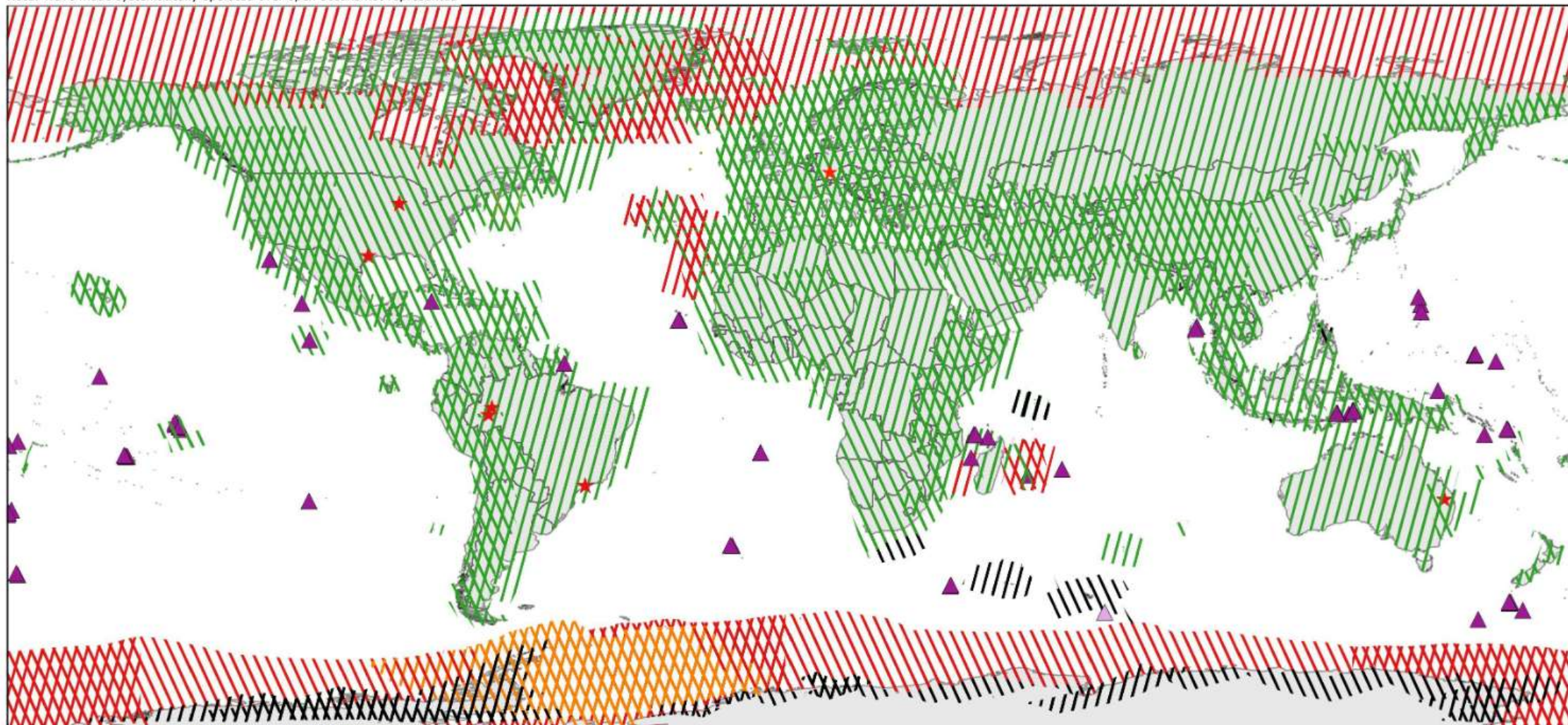
Instrument operations based

on a **predefined observation scenario**



Sentinel-1 Constellation Observation Scenario: Mode - Polarisation - Observation Geometry

Note: Seasonal campaigns not represented
 Note: Wave mode systematically operated over open oceans not represented






POLARISATION SCHEMA



HH or HH-HV

VV or VV-VH

HH or HH-HV

MODE/POLARISATION

-  IW mode / dual polarisation
-  IW mode / single polarisation
-  EW mode / dual polarisation
-  EW mode / single polarisation

-  SM mode / dual-polarisation
-  SM mode / single-polarisation

PASS

-  ASCENDING
-  DESCENDING

-  Calibration Site

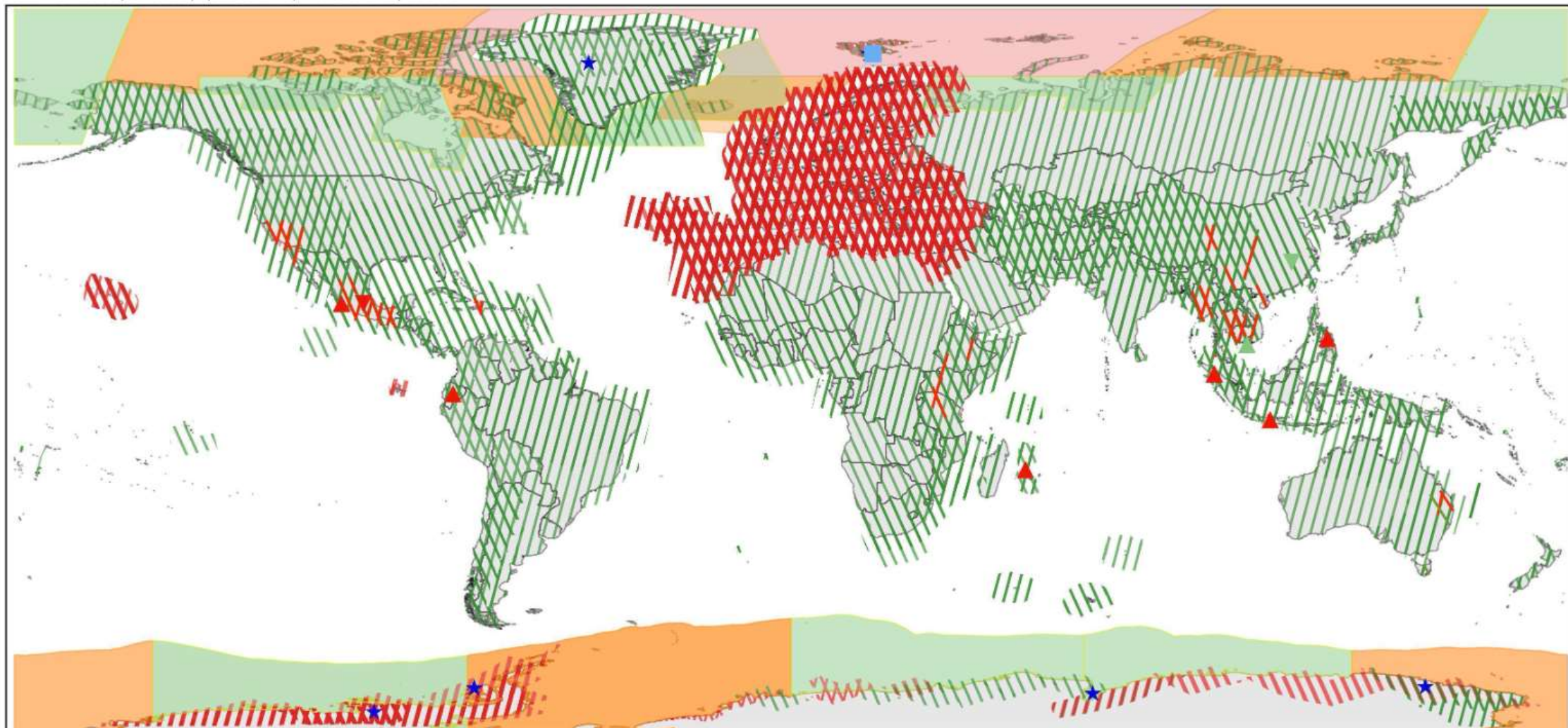
(locally different modes or polarisations possible)

Sentinel-1 Constellation Observation Scenario: Repeat & Coverage Frequency



validity start: 11/2021

Note: Seasonal campaigns not represented
Note: Wave mode systematically operated over open oceans not represented



PASS REPEAT FREQUENCY **

- ASCENDING
- DESCENDING
- 6 days
- 12 days

COVERAGE FREQUENCY **

- 1 days
- 1-3 days
- 2-4 days

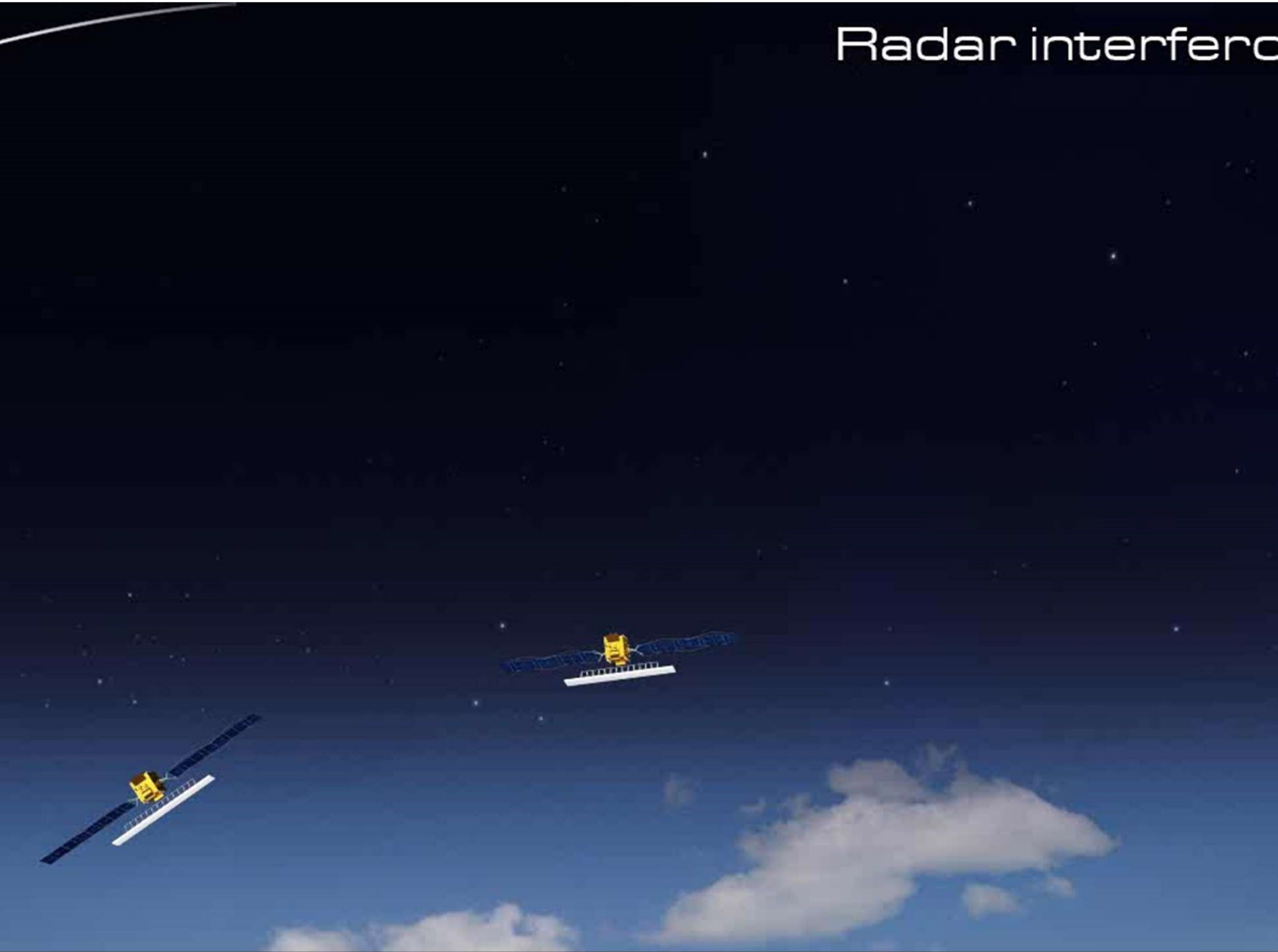
REFERENCE DATA SITES (6d repeat)

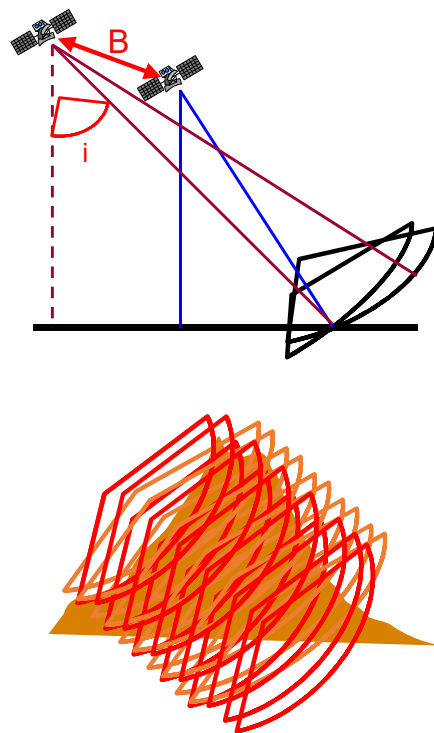
- Highly active volcanism
- Fast subsidence
- Short growth cycle, intensive agriculture
- Fast changing wetlands
- Fast moving outlet glaciers
- Permafrost & glaciers

* coverage ensured from same, repetitive relative orbits
** coverage considering passes from all (asc & desc) orbits

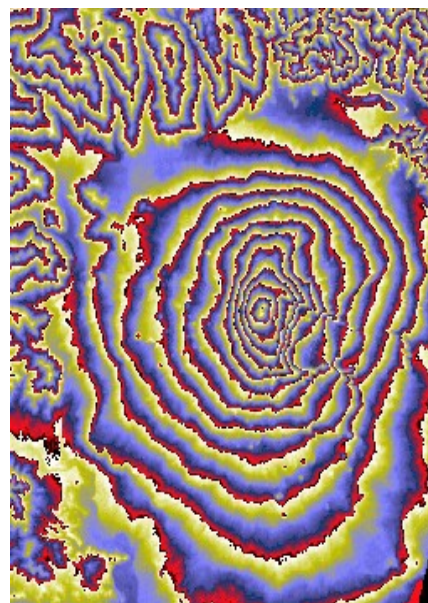
© CNES-DCT/ONAF

TTVS





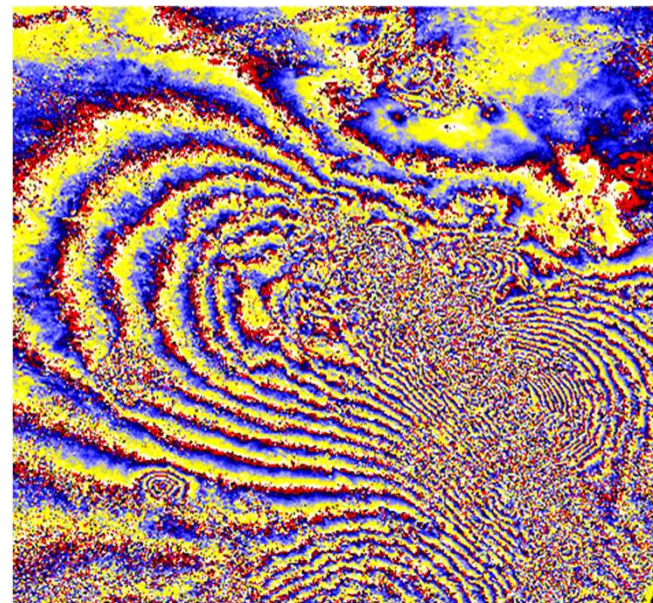
Relief



Etna

Iso-distance fringes

Ground Motion



Landers

Iso-displacement fringes

Digital Elevation Model

or

Map of ground displacements

FLATSIM : ForM@Ter LArge-scale multi-Temporal Sentinel-1 InterferoMetry)

Objective : massive processing of interferometric data over full **Sentinel-1 archive** to deduce **velocity maps of displacements**

Earth Surface deformation on a continental scale

Surveillance in space and time of critical regions

(Large active faults, magmatic systems, landslides, lithospheric deformation at large scale)

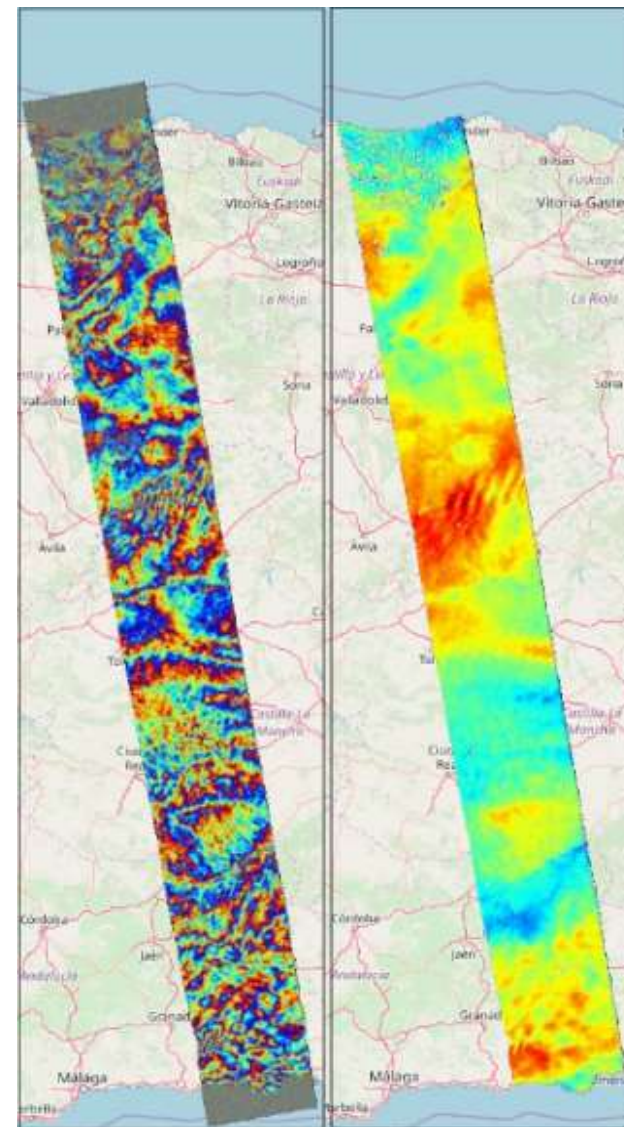
Based on NSBAS : processing chain maintained by ISTerre lab in Grenoble.

Principle of integration :

- Best integration possible to **increase scalability** of the chain **within CNES architecture** (HPC, PEPS, ...).
- Processing of simultaneous tracks possible.

Gathering Sentinel1 IW products :

- Along track : up to **5 consecutive frames** (segments > 800km long)
- **Mosaicking of the 3 subswaths** (with inter swath continuity - 250km width)
- At **different resolutions** (according to areas and level of products)



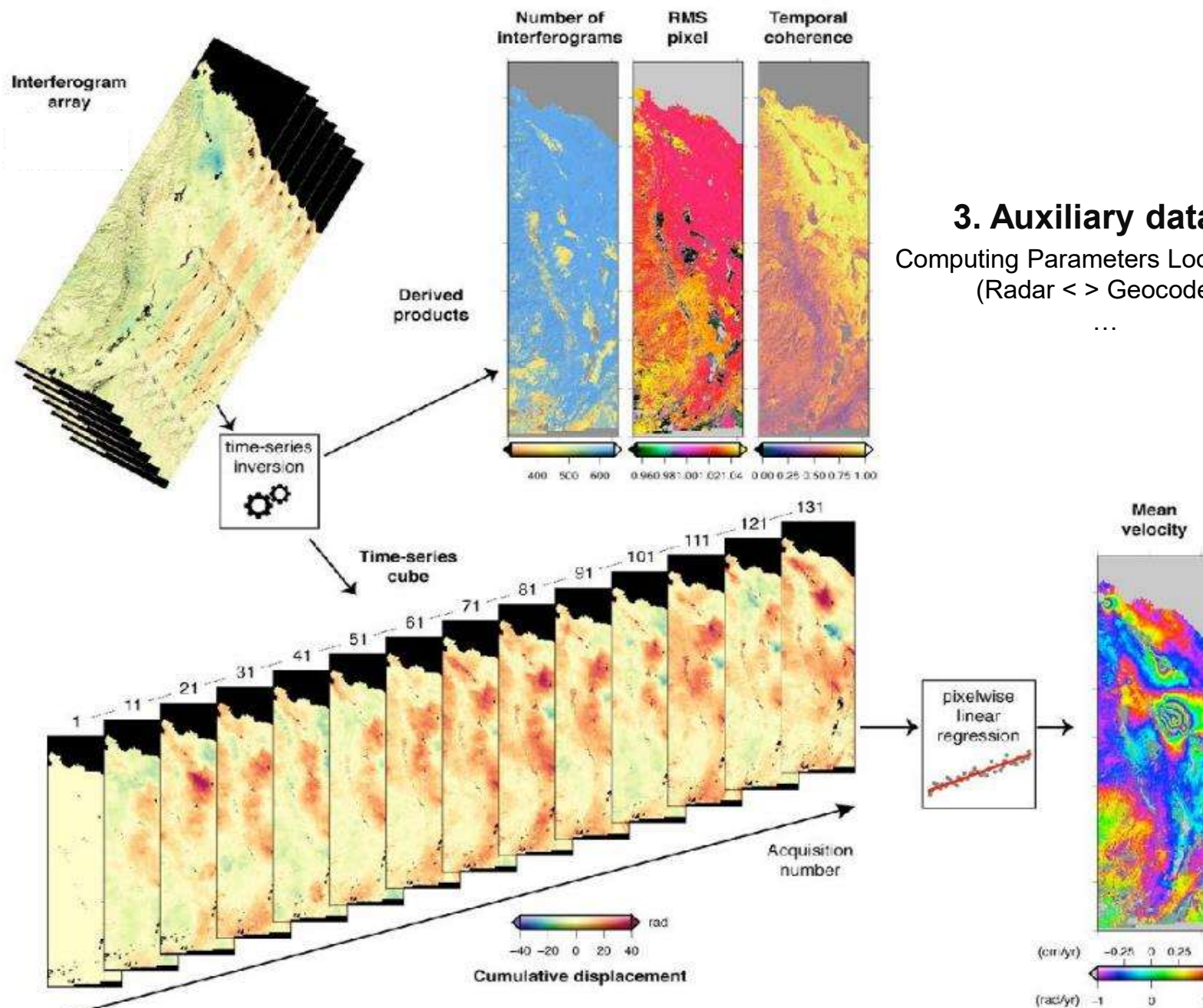
1. Interferograms

Wrapped/UnWrapped
radar/Geocoded
Atmospheric Phase Screen
Coherence

Short and long-term
IW swaths concatenated
Burst selection

2. Time series

Displacement Time Series
Mean Velocity Map
Quality Indicators
...



3. Auxiliary data

Computing Parameters Lookup table
(Radar < > Geocoded)
...



Article

FLATSIM: the ForM@Ter Large-scale multi-Temporal Sentinel-1 Interferometry service

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Version August 13, 2021 submitted to Remote Sens.

Abstract: The purpose of the ForM@Ter Large-scale multi-Temporal Sentinel-1 Interferometry service (FLATSIM) is the massive processing of Sentinel-1 data using multi-temporal Interferometric Synthetic Aperture Radar (InSAR) over large areas, *i.e.* greater than 250,000 km². It provides the French ForM@ter scientific community with automatically processed products using a state of the art processing chain based on a Small Baseline Subset approach, namely the New Small Baseline (NSBAS). The service results from a collaboration between the scientific team that develops and maintains the NSBAS processing chain and the French Spatial Agency (CNES) that mirrors the Sentinel-1 data. The proximity to Sentinel-1 data, the NSBAS workflow and the specific optimizations to make NSBAS processing massively parallel for the CNES High Performance Computing infrastructure ensures the efficiency of the chain, especially in terms of Input/Output, which is the key for the success of such a service. The FLATSIM service is made of a production module, a delivery module and a user access module. Products include interferograms, surface Line Of Sight velocity, phase delay time series and auxiliary data. Numerous quality indicators are provided for an in-depth analysis of the quality and limits of the results. The first national call in 2020 for region of interest ended up with 8 regions spread over the world with scientific interests including seismology, tectonics, volcano-tectonics and hydrological cycle. To illustrate the FLATSIM capabilities, an analysis is shown here on two processed regions, the Afar region in Ethiopia, and the eastern border of the Tibetan Plateau.

Keywords: InSAR; Sentinel-1; automatic processing; time series analysis; deformation monitoring; tectonics; subsidence

Published in September 2021 in:



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Special Issue "Radar Interferometry in Big Data Era"

- Print Special Issue Flyer
- Special Issue Editors
- Special Issue Information
- Keywords
- Published Papers

A special issue of *Remote Sensing* (ISSN 2072-4292). This special issue belongs to the section "Engineering Remote Sensing".

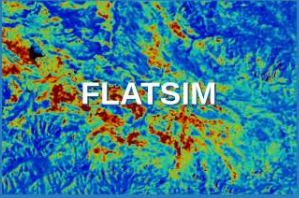
<https://doi.org/10.24400/253171/flatsim2020>

Full information



<https://www.poleterresolide.fr/projets/en-cours/flatsim/>

FLATSIM



2.2.0

Products delivery for FLATSIM

- Product description (general for NSBAS, including GDM-SAR and FLATSIM)
- Product names and acronyms:
- How are the products generated?
- Metadata Definitions
- Interferogram based products
- Auxiliary Data
- Time Series
- Auxiliary Files

CONTRIBUTORS

- Institutions
- Contributors from CNES
- Academic contributors

https://formater.pages.in2p3.fr/flatsim/pres_flatsim.html

Product description (general for NSBAS, including GDM-SAR and FLATSIM)

Product names and acronyms:

In the column **Radar** the product is in radar geometry, in column **EPSG4326** the product is geocoded.

Products from the interferogram package:

Name	Acronym	Radar	EPSG4326	Description
WRAPPED_INTERFEROGRAM	InW	InW_radar	InW_geo	Wrapped Diffe
FILTERED_WRAPPED_INTERFEROGRAM	InWF	InWF_radar	InWF_geo	Filtered Wrapp
ATMOSPHERIC_PHASE_SCREEN	APS	APS_radar	APS_geo	Interferogram,
SPATIAL_COHERENCE	Coh	Coh_radar	Coh_geo	Spatial coherer
UNWRAPPED_INTERFEROGRAM	InU	InU_radar	InU_geo	Unwrapped Di

Products from the time-serie package:

Name	Acronym	Radar	EPSG4326	Description
LOS_DISPLACEMENT_TIMESERIES	DTs_LOS	DTs_radar	DTs_geo	TIME SERIES
MEAN_LOC_VELOCITY	MV-LOS	MV-LOS_radar	MV-LOS_geo	Mean LOS velc
NETWORK_MISCLOSURE	Net	Net_radar	Net_geo	Network miscl
STACK_INTERFEROGRAMS	Stk-In	Stk-In_list_InW	Stk-In_list_InU	Stack of coregi

Products from the auxiliary data package:

Name	Acronym	Radar	EPSG4326
LOOKUP_TABLE_RADAR2GROUND_COORDINATES	LuT	LuT_radar	LuT_geo
MAP_OF_LOS_VECTOR	CosNEU	CosNEU_radar	CosNEU_geo
DEM	DEM	DEM_radar	
TEMPORAL_COHERENCE	TCoh	TCoh_radar	TCoh_geo

DTs_geo

Product Description

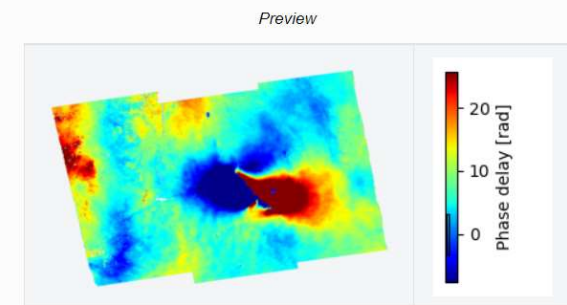
This product is in ground geometry. The number of looks of the product before projection in ground geometry is provided in metadata and corresponds to `Rlooks_unw*nsamp` (two parameters from the processing file `nsbas.proc` and from the `lect.in` file, respectively, `nsamp=1` by default in FLATSIM or GDM-SAR). The ground spacing in degree is set such that it is slightly less than the pixel size of the corresponding product in radar coordinates.

Composition of the bands is described in [DTs](#) page.

(Note :result computed in the task `mk_TCoh_geo_rint` in `nsb_populate_product.sh`.)

Example

Png file with a legend file:



A metadata file can be downloaded here: [DTs_geo.meta](#)

Access products via the [ForM@Ter website](#)

after validation by the InSAR experts of the FLATSIM team

Data availability is temporarily limited depending on projects : from few months to 3 years maximum. But some products may be distributed after discussion and agreement with the project team.



ForM@Ter News Diary Français

FORM@TER POLE DATA AND SERVICES RESOURCES

Sign in

Search Description

NSBAS_TS-PKG_S1_AFAR-D079-VV-2014-2021_IW123_2014-10-23_2021-04-25

About the resource

Identifier
NSBAS_TS-PKG_S1_AFAR-D079-VV-2014-2021_IW123_2014-10-23_2021-04-25

Parent
urn:ogc:def:EOP:CNES:AFAR:

Product Type
TIMESERIE

Parameters

Platform	SENTINEL1
Instrument	SENTINEL-1 C-SAR
SensorMode	IW
Polarisation	VV
Subswath	IW1_IW2_IW3
OrbitNumber	
RelativeOrbitNumber	79

MeanLosVelocity

Download data

OrbitDirection DESCENDING
ProductValidity VALID
Resolution 160
NbCols 3581
NbRows 7769
WaterCover 0
SnowCover
CloudCover
ProcessingLevel TS-PKG
ProcessingMode CONSOLIDATED
Version 2.1.10
ProcessingContext AFAR-D079-VV-2014-2021
Correction SD-ERA

Dates
Sep 16, 2021 (create)
Oct 8, 2021 (publication)
Oct 8, 2021 (revision)

Keywords
Africa Ethiopia _all Afar Oromiya Amhara Tigray Somali Southern Nations, Nationalities and Peoples
Dire Dawa Addis Ababa Harari People Eritrea _all Debubawi Keyih Bahri Debub Maekel
Semenawi Keyih Bahri Gash Barka Anseba _unknown Djibouti _all Dikhil Tadjourah Red Sea Tropical
Northern Coastal Autumn AFAR TIMESERIE | 2.1.10 | VALID TS-PKG AFAR-D079-VV
AFAR-D079-VV-2014-2021 CONSOLIDATED SD-ERA DESCENDING IW1_IW2_IW3 SENTINEL1
SENTINEL-1 C-SAR IW VV 160 CNES 2014 October 23

Temporal extent Oct 23, 2014 → Apr 25, 2021

Constraints license: <https://creativecommons.org/licenses/by-nc/4.0/>

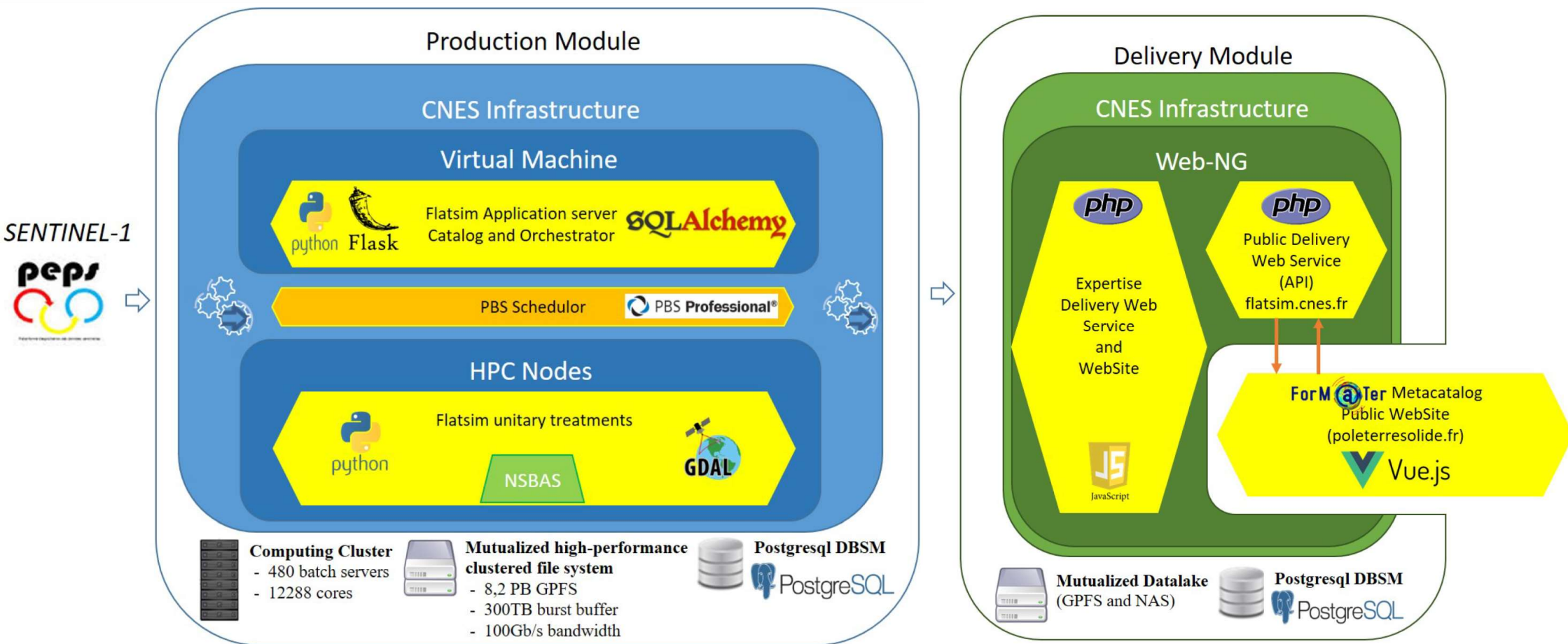
About the metadata

Identifier 36a3f053-3341-50ea-a076-cb9da91c7471

Contacts point of contact
CNES

ForM@Ter manager
Contacts

SOFT and HARD~ware



Specific challenge of interferometry processing

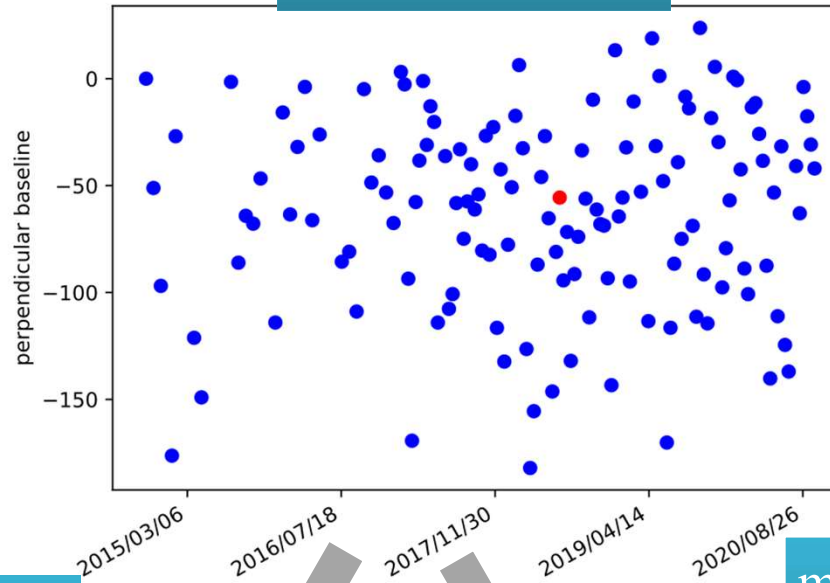
Interferometry is combinatorial by nature

A “star-shaped” network is prone to error propagation

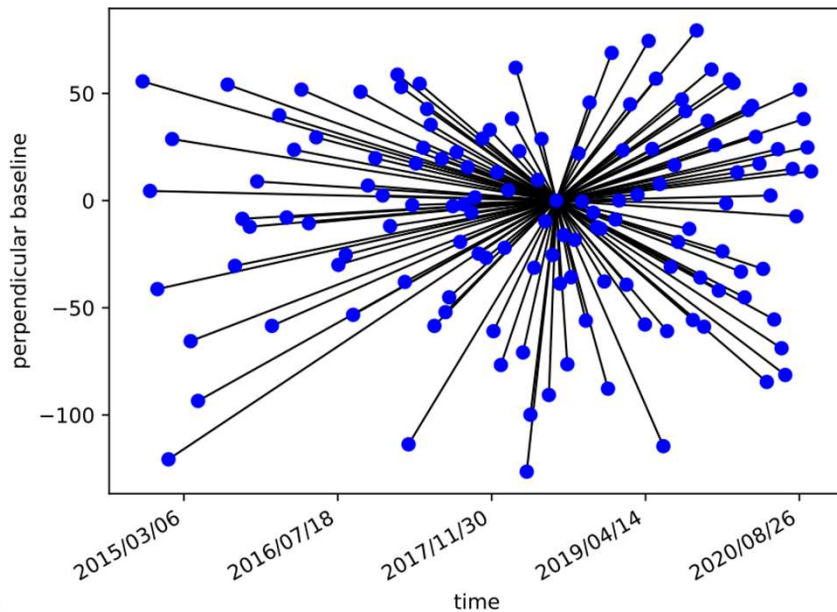
Redundancy implies multiple access to every data granule

I/O intensive !

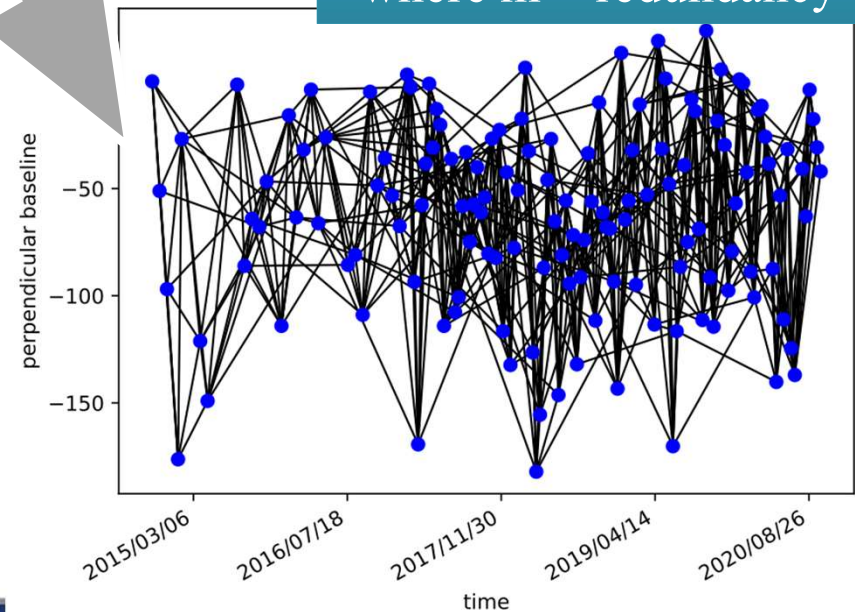
N satellite images



N interferometric pairs



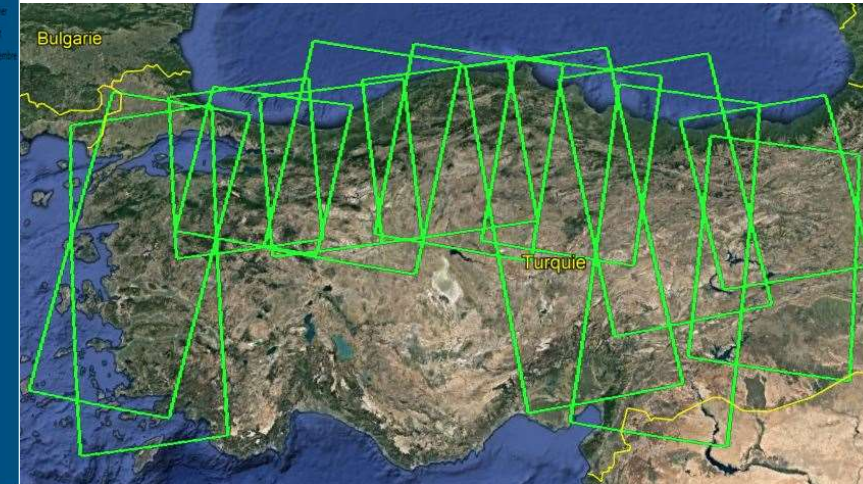
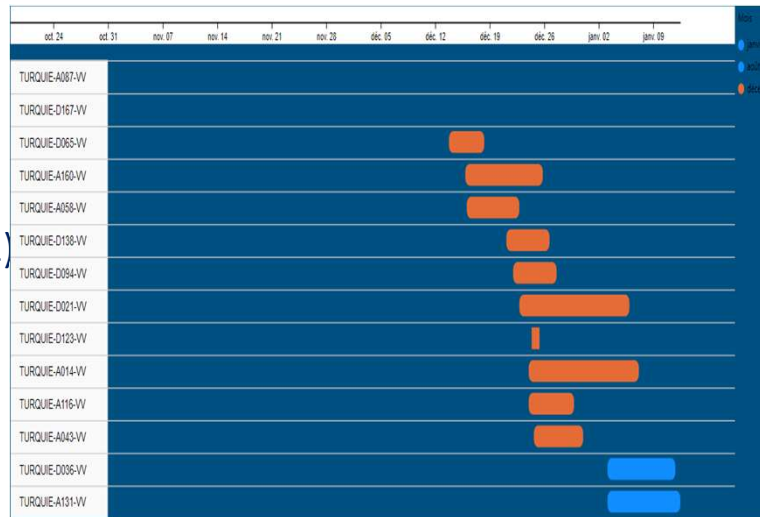
$m \cdot N$ interferometric pairs where $m = \text{redundancy}$



FLATSIM : an example of computing over Turkey

14 orbits delivered

- 4280 dates (10/2014 – 04/2021)
- ~ 21 000 generated products
- ~ 17 000 acquired products
- 47 To for output data



639:35

47:53

506:07

11391:50

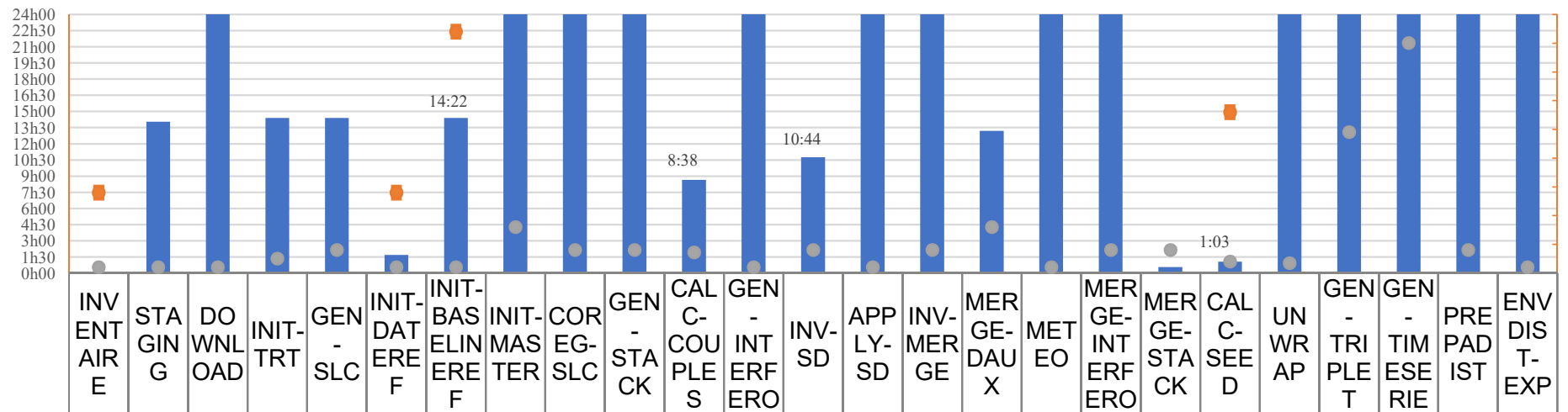
28:06

256:59

6000:40 117:27

Computing duration over Turkey

Duration (hh:mm)



Used resources (cpus * tasks)

	INV-ENT-AIR-E	STAG-ING	DOWN-LOAD	INIT-TRT	GEN-SLC	INIT-DAT-ERE-F	INIT-BAS-ELIN-ERE-F	INIT-MAS-TER	COR-EG-SLC	GEN-STAC-K	CAL-C-COUP-LE-S	GEN-INT-ER-FE-RO	INV-SD	APP-LY-SD	INV-MER-GE	MER-GE-DAU-X	MET-EO	MER-GE-INT-ER-FE-RO	MER-GE-STAC-K	CAL-C-SEE-D	UN-WR-AP	GEN-TRI-PLE-T	GEN-TIM-ESE-RIE	PRE-PAD-IST	ENV-DIS-T-EXP
■ TURQUIE	0	0,58	26,6	0,6	0,6	0,07	0,6	2	195	5,42	0,36	1267	0,45	21,1	4,36	0,55	475	391	0,02	0,04	1050	1,17	10,7	250	4,89
● ncpus x nb taches	14	1019	1851	225	5482	14	42	336	5483	176	50,4	6705	168	6707	56	112	4569	9559	56	28	3798	343	560	8952	2241
● nb cpus (moyenne)	1	1	1	2,5	4	1	1	8	4	4	3,6	1	4	1	4	8	1	4	4	2	1,7	24,5	40	4	1

FLATSIM : 1rst and 2nd announcement



Total surface exceeds 20 million km² with ascending and descending tracks

France also covered

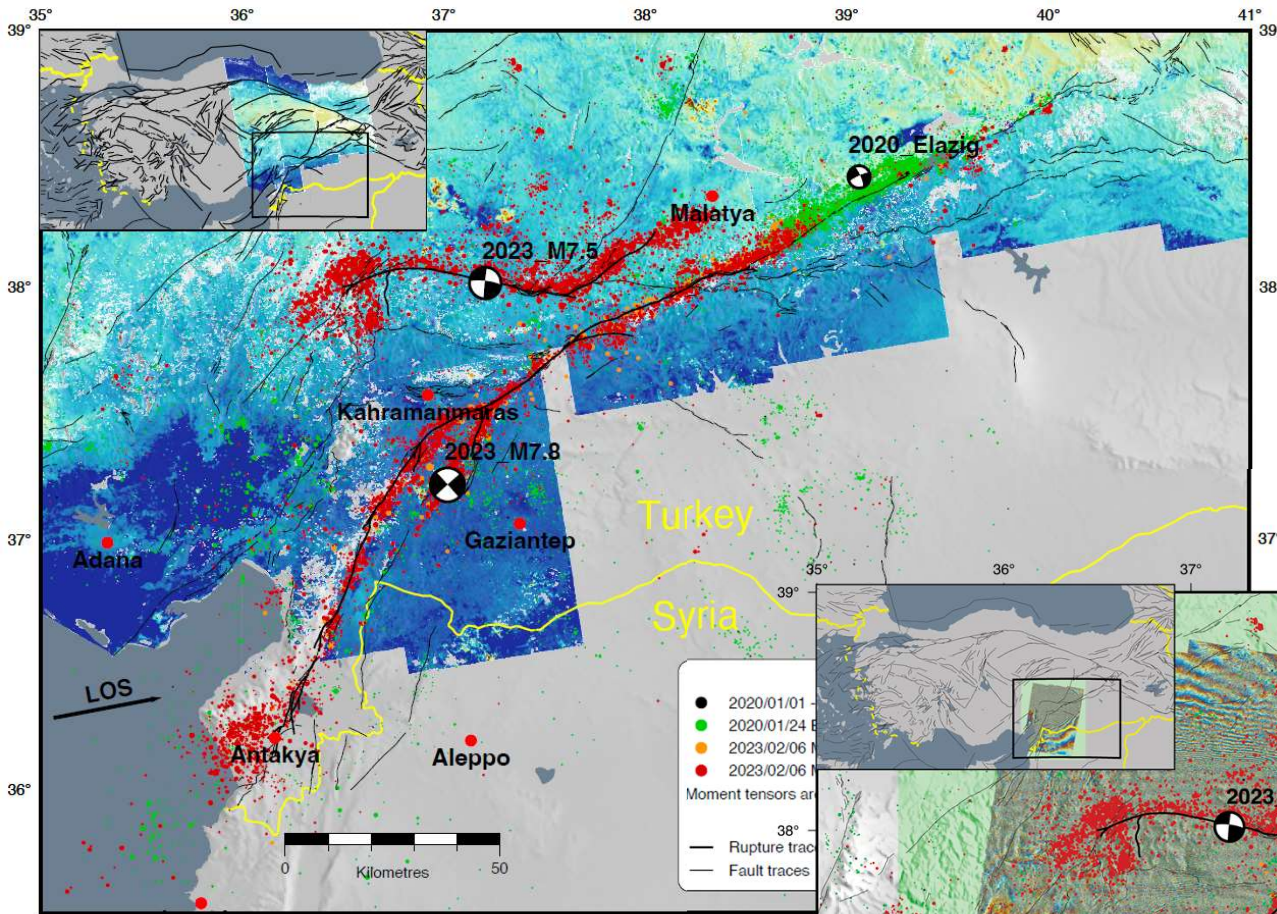
Selected Areas

Location	Themes	Leaders	Products
Announcement of Opportunity 2020 (data October 2014 - end of April 2021)			
Afar	Landslides, Tectonics, Volcanology	R. Grandin (IPGP)	Access to products
Central Andes, Peru-Chile	Landslides, Tectonics, Volcanology	M. Chlieh (ISTERre)	Access to products
Eastern border of the Tibetan plateau	Tectonics	M.-P. Doin (ISTERre)	Access to products
Okavango Delta	Hydrology, Tectonics	M. Jolivet (Géosciences Rennes)	Access to products
Ozark aquifer	Hydrology	K. Chanard (IPGP, IGN)	Access to products
Tarim	Tectonics	M. Simoes (IPGP)	Access to products
The Balkan region	Anthropogenic and climatic hazards, Tectonics	M. Métois (LGLTPE)	Access to products
Turkey	Tectonics	R. Jolivet (Laboratoire de Géologie, ENS Paris)	Access to products
Announcement of Opportunity 2022 (data October 2014 - end of May 2022)			
Caucasus	Hydrocarbon Reservoir Dynamics, Mud Volcanoes, Tectonics	F Masson	Access to products
Central Chile	Erosion, Tectonics, Volcanism	A Socquet	Access to products
Himalaya and western Tibet	Hydrology, Landslides, Permafrost, Tectonics	MP Doin, C Lasserre, R Jolivet	Access to products
Levant	Hydrology, Tectonics	S Michel	Access to products
Maghreb	Hydrocarbon Reservoir Dynamics, Hydrology, Landslides, Tectonics	C Doubre	Access to products
Makran	Tectonics	S Chevrot	Access to products
Mozambique	Tectonics	M de Michele, A Fuenzalida	Access to products
South Mexico	Tectonics, Volcanism	E Pathier	Access to products
Tian Shan	Landslides, Permafrost, Tectonics	M Rizza	Access to products

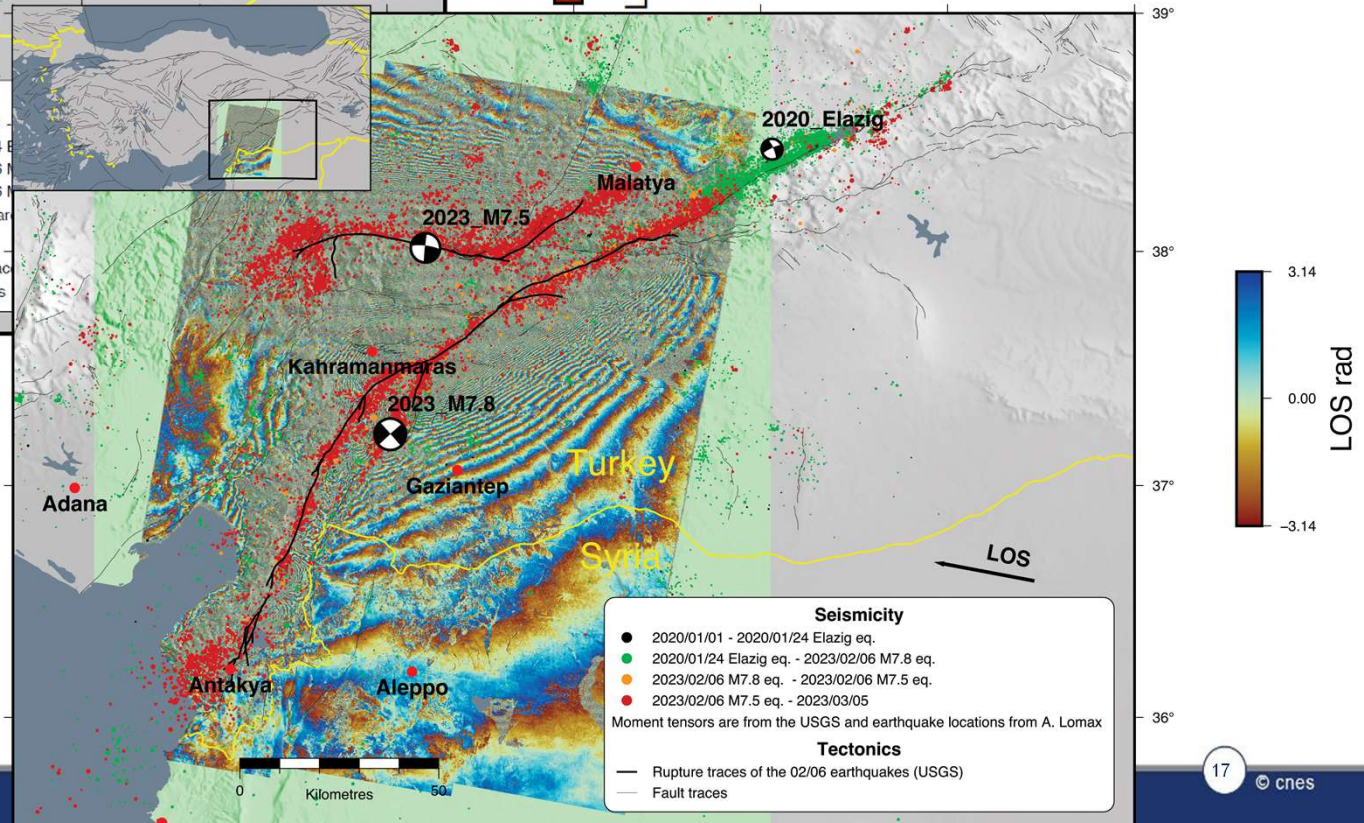
**Resolutions
30m
for interferograms**

**120 or 240m
for Time Series**

FLATSIM : 2023 Türkiye earthquake



Kahramanmaraş earthquake
6 February 2023
« Double quake » (M7.8 + M7.6)



* East Anatolian Fault accomodates ~ 1.5 cm/yr motion between Arabia and Anatolia => strain mapped by Flatsim
 * Earthquake mapped +3 days after the event, data processed automatically

Such massive data and computing time **not possible at laboratories level**

Needs to have High Power Computing, close to the data :

CNES leverages its infrastructure and technical expertise to tackle this challenge, proposing 2 announcements of opportunities for French scientists. Now 17 projects are involved.

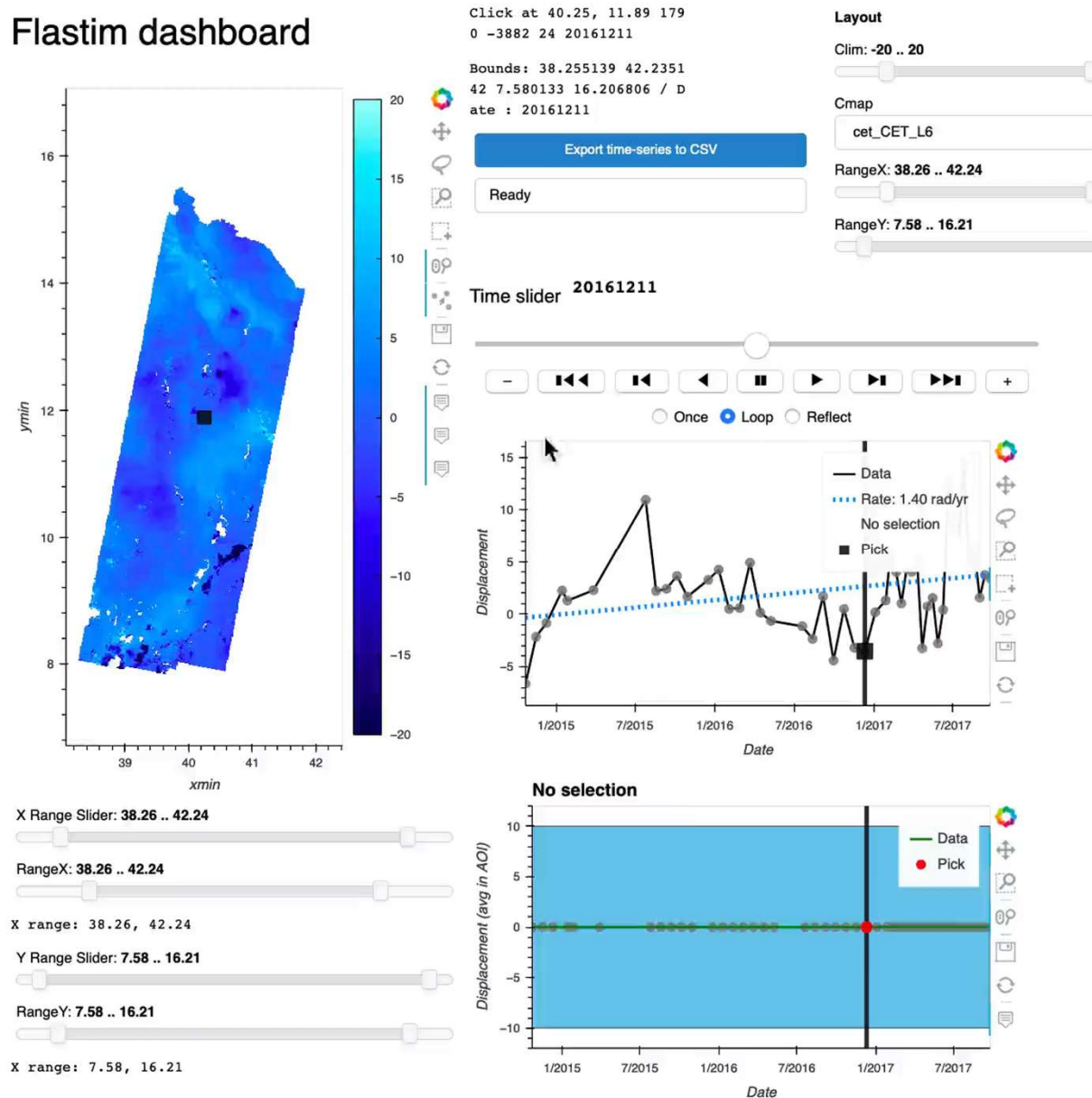
CNES has largely surpassed the previous limit of about 7 times France (4 million of km²), and still the amount of data generated and stored as well as the computing time **remain real issues**.

CNES tries to provide the maximum of its capacity to support FLATSIM Service, among other demanding services on its HPC infrastructure, with an evolutive infra (datalake, HPC6G, Datalab/jupyterhub with collaborative sandboxes for software development and high-performance computing)

In FLATSIM project, one can highlight **a significant collaboration** between engineers from CNES and InSAR scientific experts from CNRS/INSU in the framework of data and service center ForM@ter

Needs for interactive tools to help with post-processing of products
Needs for low-level tools for spatial/temporal subsetting of products

Flastim dashboard



Thank you



Thanks also to other main contributors to FLATSIM project :

Claude Boniface, Marie-France Larif, Marion Fresne, Clément Schaettel (CNES)
Cecile Lasserre (ENS Lyon) Marie-Pierre Doin, Erwan Pathier, Franck Thollard (ISTERRE)
Emilie Ostanciaux, Elisabeth Pointal (IPGP)

Sentinel-1 Interferograms and time series collection on Afar 2014-2021

Search Description Export

Results: 1 to 16 among 2527 (16 per page)

Reset search

Search ...

Spatial extent

Time slot

From 01/10/2014
To 01/05/2021

Parameters

Version: ---

ProductType: **AUXILIARYDATA**
INTERFEROGRAM
TIMESERIE

ProcessingSite: ---

ProcessingContext: ---

RelativeOrbitNumber: Ex : 123

OrbitDirection: ---

<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-04-14_2021-04-26</p> <p>Apr 14, 2021 → Apr 26, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D079-VV-2014-20_21_IW123_2021-04-13_2021-04-25</p> <p>Apr 13, 2021 → Apr 25, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 79 OrbitDirection DESCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-A116-VV-2014-2021_1_IW123_2021-04-09_2021-04-21</p> <p>Apr 9, 2021 → Apr 21, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 116 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D006-VV-2014-20_21_IW123_2021-04-08_2021-04-20</p> <p>Apr 8, 2021 → Apr 20, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 6 OrbitDirection DESCENDING ProductValidity UNVALID Resolution 160</p>
<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-04-02_2021-04-26</p> <p>Apr 2, 2021 → Apr 26, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-04-02_2021-04-14</p> <p>Apr 2, 2021 → Apr 14, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D079-VV-2014-20_21_IW123_2021-04-01_2021-04-13</p> <p>Apr 1, 2021 → Apr 13, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 79 OrbitDirection DESCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D079-VV-2014-20_21_IW123_2021-04-01_2021-04-25</p> <p>Apr 1, 2021 → Apr 25, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 79 OrbitDirection DESCENDING ProductValidity VALID Resolution 160</p>
<p>NSBAS_INT-PKG_S1_AFAR-A116-VV-2014-2021_1_IW123_2021-03-28_2021-04-09</p> <p>Mar 28, 2021 → Apr 9, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 116 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-A116-VV-2014-2021_1_IW123_2021-03-28_2021-04-21</p> <p>Mar 28, 2021 → Apr 21, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 116 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D006-VV-2014-20_21_IW123_2021-03-27_2021-04-20</p> <p>Mar 27, 2021 → Apr 20, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 6 OrbitDirection DESCENDING ProductValidity UNVALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D006-VV-2014-20_21_IW123_2021-03-27_2021-04-08</p> <p>Mar 27, 2021 → Apr 8, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 6 OrbitDirection DESCENDING ProductValidity VALID Resolution 160</p>
<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-03-21_2021-04-26</p> <p>Mar 21, 2021 → Apr 26, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-03-21_2021-04-14</p> <p>Mar 21, 2021 → Apr 14, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-A014-VV-2014-20_21_IW123_2021-03-21_2021-04-02</p> <p>Mar 21, 2021 → Apr 2, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 14 OrbitDirection ASCENDING ProductValidity VALID Resolution 160</p>	<p>NSBAS_INT-PKG_S1_AFAR-D079-VV-2014-20_21_IW123_2021-03-20_2021-04-01</p> <p>Mar 20, 2021 → Apr 1, 2021 Product Type INTERFEROGRAM Platform SENTINEL1 Instrument SENTINEL-1 C-SAR SensorMode IW Polarisation VV</p> <p>Subswath IW1_IW2_IW3 RelativeOrbitNumber 79 OrbitDirection DESCENDING ProductValidity VALID Resolution 160</p>

I - Activités PBS

1 - Suivi des comptes projets

Tableau 1 : Récapitulatif des jobs soumis sur la période du 2022-02-26 au 2022-03-26

	Compte	Queue	Heures CPU Consumées	Heures CPU Utilisées	Nb Jobs Echec	Nb Jobs Soumis	Nb Jobs Succès	Walltime moye (t)
0	Total	/	160 289.451	54 169.243	6 939	269 048	262 120	2 201.44
1	flatprodexec	qt72h	159 960.218	54 135.546	3 585	230 521	226 947	2 537.40
2	flatprodexec	qt1h	317.89	32.935	3 343	38 490	35 147	32.56
3	flatprodexec	inter	7.83	0.1	0	1	1	28 188.
4	flatdevexec	qt72h	3.431	0.651	11	22	11	1 122.90
5	flatdevexec	qt1h	0.82	0.12	0	14	14	21.14

2 - Suivi des queues

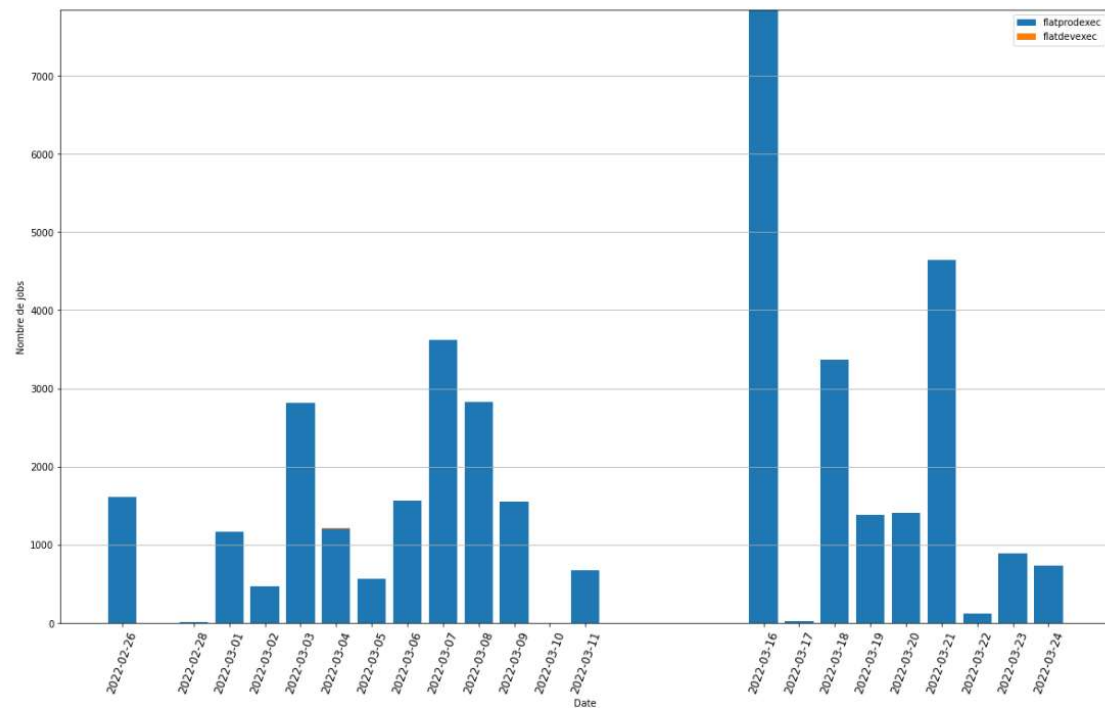


Tableau 2 : Récapitulatif du volume de données des filesets des projets au 2022-03-26

	Fileset	Inodes alloués	Nb Fichiers	Nombre de fichiers créés	Pr_Uze	Quota	Taille Moyenne/Fichiers	Taille Moyenne/Fichiers	Volume créé
0	ot_flatsim_prod	27 923 043	19 719 286	22 145 130	82.65%	440.0 T	363.644 T	19 337 M	796.872

2 - Volume journalier

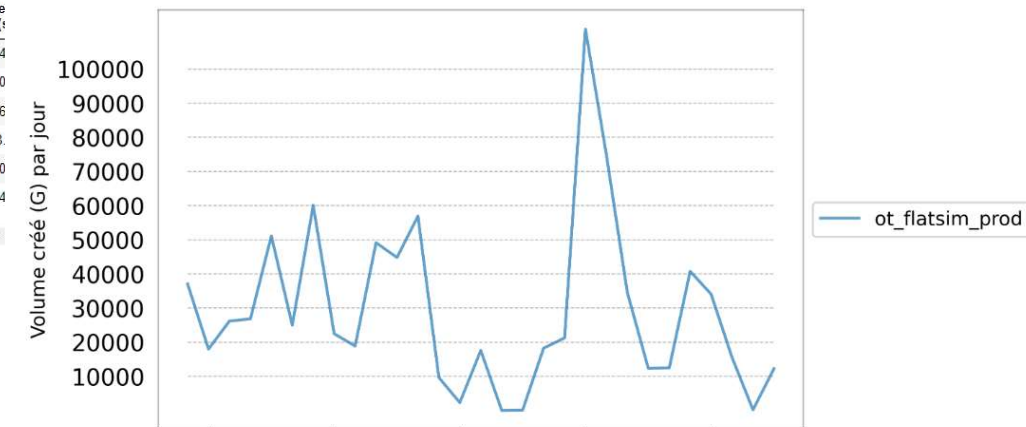
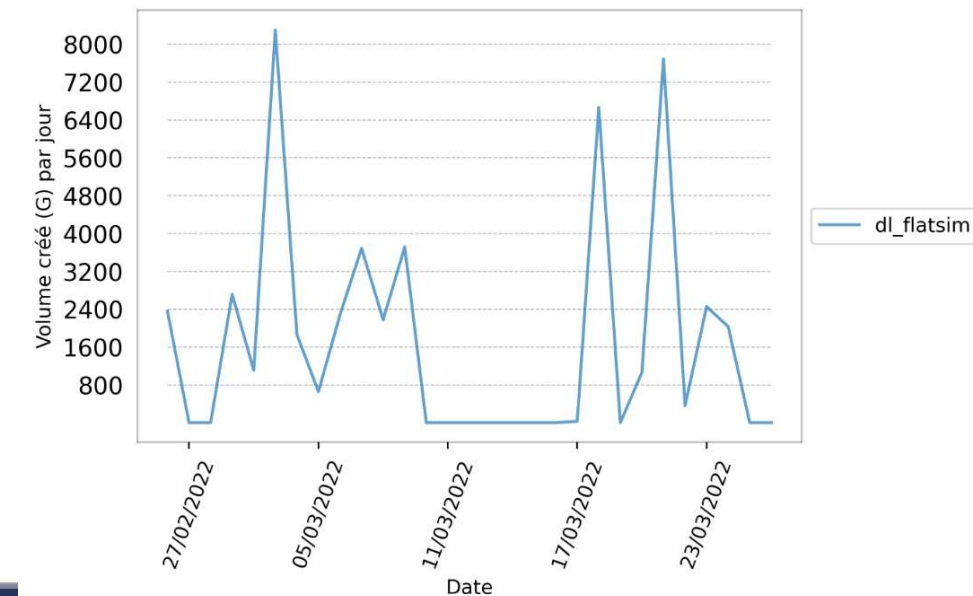


Tableau 6 : Récapitulatif du volume de données des filesets des projets au 2022-03-26

	Fileset	Inodes alloués	Nb Fichiers	Nombre de fichiers créés	Pr_Uze	Quota	Taille Moyenne/Fichiers	Taille Moyenne/Fichiers	Volume créé
0	dl_flatsim	195 753	90 695	21 784	78.97%	250.0 T	197.414 T	2 229 G	45 673

2 - Volume journalier



Graphe 9 : Volume créé (G) par jour entre le 2022-02-26 et le 2022-03-26