

MDIS 2019

ForM@Ter, solid Earth
data and services center

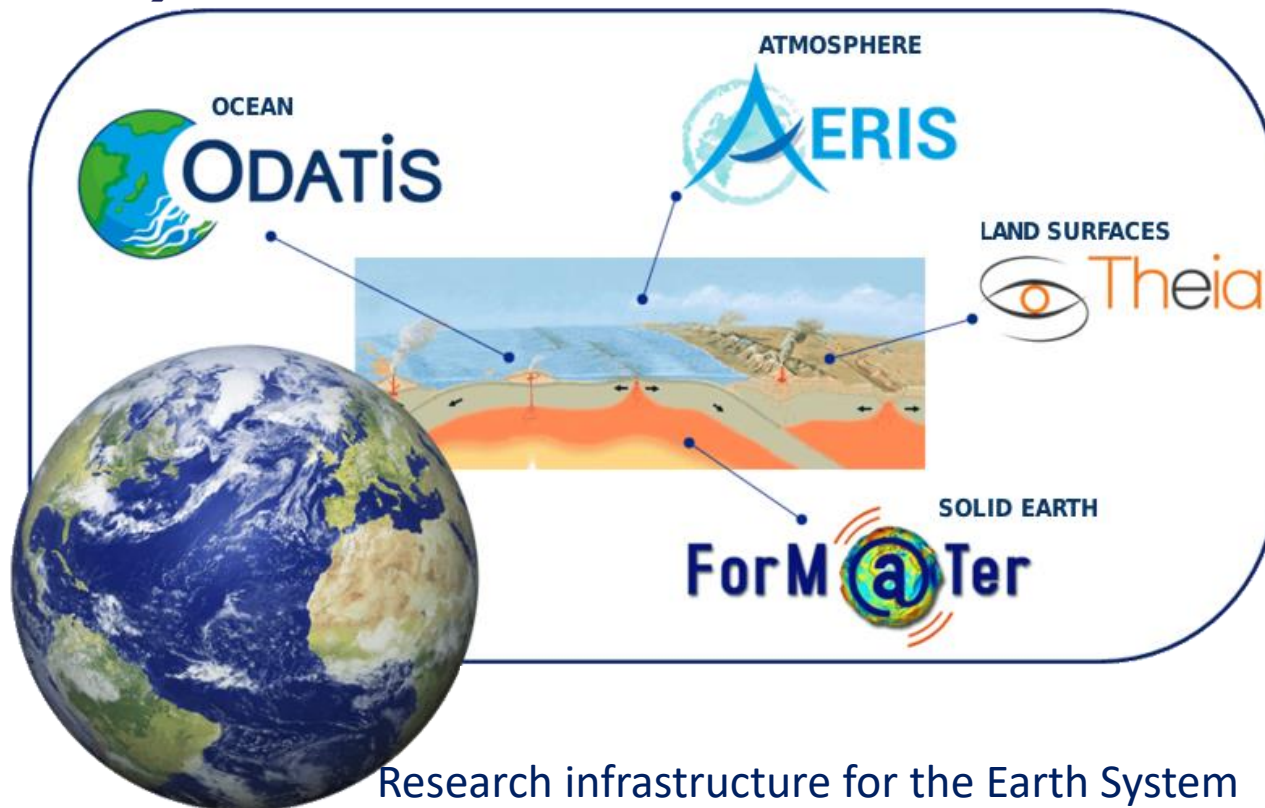


M. Diament (1), E. Deschamps-Ostanciaux (1), C. Lasserre (2), E. Pointal (1)

1 Université de Paris, Institut de physique du globe de Paris, CNRS, Paris, France.

2 Université Grenoble-Alpes, Université Savoie-Mont Blanc, CNRS, IRD, IFSTTAR, ISTerre, Grenoble, France.

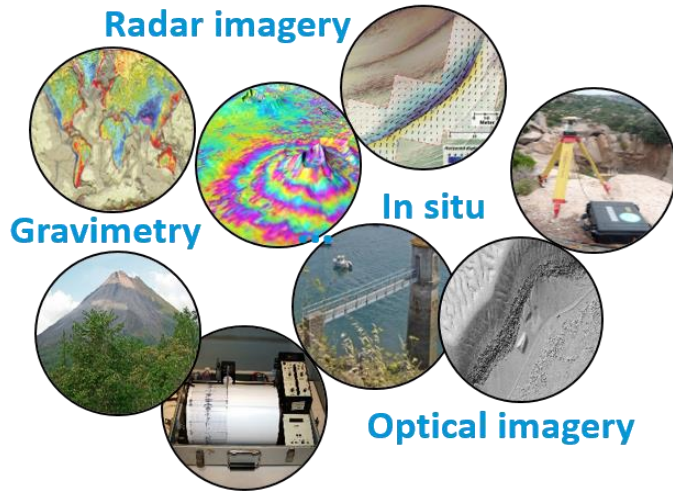
ForM@Ter, the solid Earth data and services center
of the Research Infrastructure Data Terra



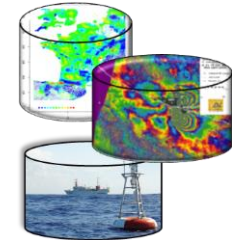
Research infrastructure for the Earth System



Shape, movements and deformation of the Earth



Facilitate data access

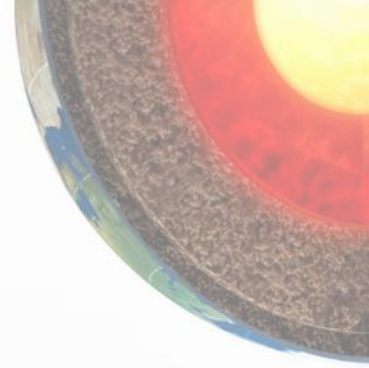


Distribute tools and software

Facilitate exchanges between the various solid Earth fields

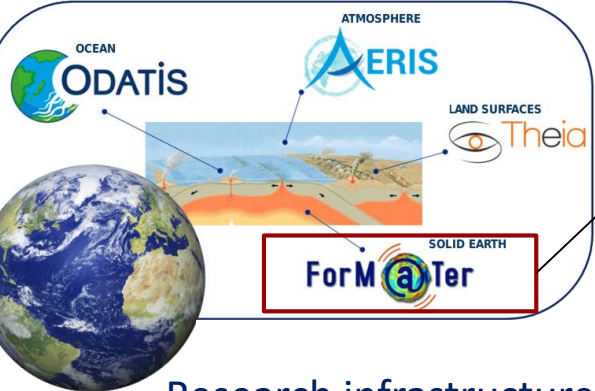


Positioning in the European RI environment



Structure

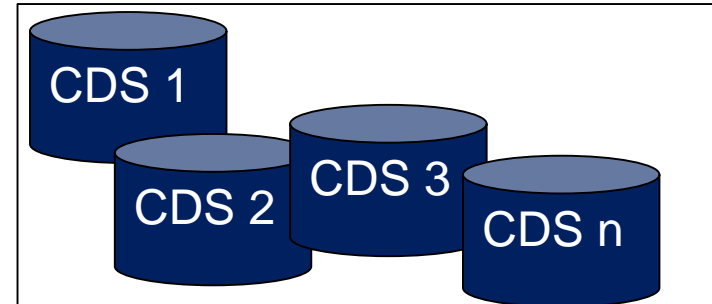
ForM@Ter



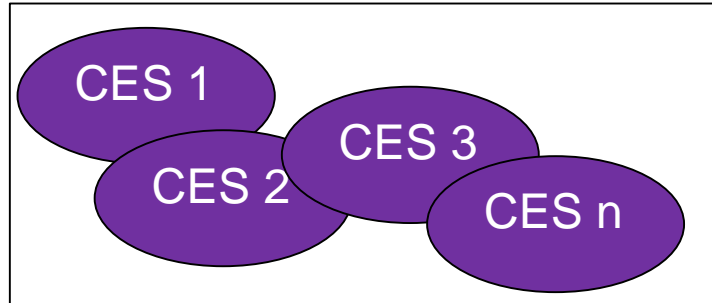
Research infrastructure for the Earth System

CCD

Coordination center



Data and Services centers

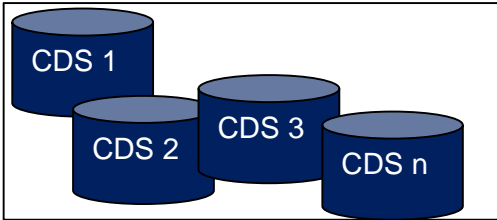


Scientific Expertise Centers



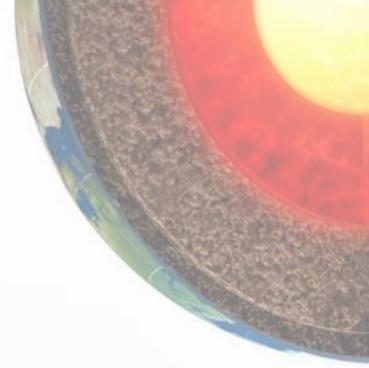
Structure

Data and Services centers



- Géodésie
- Géologie
- Géomagnétisme
- Géophysique Marine
- Géothermie
- Gravimétrie
- Sismologie
- Volcanologie
- ...



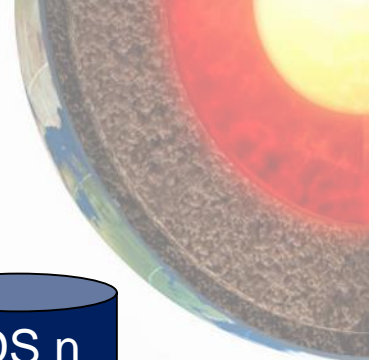


Current projects with CDS

➔ **CEDRE** – “*towards Certification of solid Earth Data REpositories in France*”

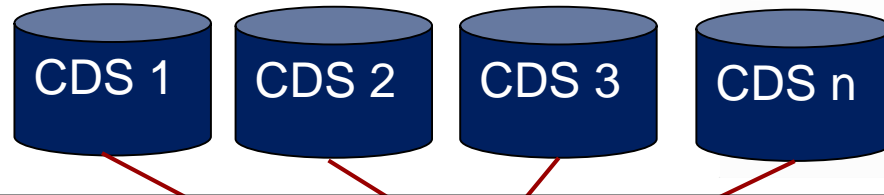


➤ Project to promote good practices of data management in a sustainable way in a « FAIR » approach to the scientific and technical communities



Current projects with CDS

➔ METACATALOG



Initialiser

Rechercher ...

Zone géographique

Intervalle temporel

De 01/12/1920

À 05/09/2019

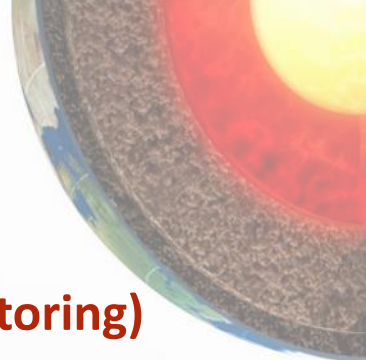
Centre de données

Variables

Résultats: 1 à 12 sur 68 (12 par page)

Trier par Titre

<p>1993 VSP at Soultz-sous-Forets Phase 1</p> <p>2 mai 1993 → 7 mai 1993</p> <p>VSP acquired in EPS1 and GPK1 wells from May 3-5, 1993.</p> <p>Sources: P and S vibrators at several locations: A2, A3, B1, B2, C3, C4, D1, D2.</p> <p>Run1: P@A3/EPS1, P@C3/GPK1, S-NS@A2/GPK1, S-EW@A2/GPK1</p> <p>Run 2: P@C3/GPK1, P@A3/EPS1, S-NS@C4/EPS1, S-EW@C4/EPS1</p> <p>Run 3: P@B2, S-NS@B1, S-EW@B1</p> <p>Run 4: P@D1, S-NS@D2, S-EW@D2</p>	<p>1993 VSP at Soultz-sous-Forets Phase 2</p> <p>14 sept. 1993 → 17 sept. 1993</p> <p>VSP acquired in EPS1 and GPK1 wells from September 15-17, 1993.</p> <p>Sources: P and S vibrators at several locations: A, D, E</p> <p>Run1: P@E/EPS1, S@E/GPK1</p> <p>Run 2: P@D/EPS1, S@D/EPS1</p> <p>Run 3: P@D/GPK1, S@D/GPK1</p> <p>Run 4: P@D/GPK1, S-NS@A/GPK1, S-EW@A/GPK1, P@A/GPK1</p>	<p>4550 well</p> <p>19 oct. 1990 → 19 oct. 1990</p> <p>In 1987, an old well, 4550 has been deepened at a depth of 1407 m and then in 1990, it has been deepened to 1414 m depth. The initial depth was of 1050 m.</p> <p>Location 4550 well WGS84: Latitude: 48.93750535 48° 56' 15" N Longitude: 7.86972203 7° 52' 10" E</p>	<p>BATHYELLI Zero hydrographique</p> <p>Le projet du Shom intitulé BATHYELLI (acronyme de « Bathymétrie rapportée à l'ellipsoïde ») a généré les modèles surfaciques des références verticales maritimes suivantes, cotées par rapport à l'ellipsoïde IAG GRS80, associé au système géodésique légal RGF93 :</p> <ul style="list-style-type: none"> - Niveau Moyen des Mers, - Niveau des Plus Basses Mers Astronomiques (PBMA), - Niveau des Plus Hautes Mers Astronomiques (PHMA).
<p>Catalogue of microseismicity using only the downhole network</p> <p>29 juin 2000 → 17 juil. 2000</p> <p>Catalogue calculated by B. Dyer</p> <p>Microseismic monitoring of the hydraulic programme at Soultz took place between 30th June and 18th July 2000. During the programme, a total of 31511 potential seismic events were recorded from which 13986 seismic events were located. Some discrepancies in the time have been</p>	<p>Collection d'interférogrammes sur la région de Grenade</p> <p>15 juin 2017 →</p> <p>Cette collection d'interférogrammes est ... en continu par le CNES en collaboration avec ISTerre et ForM@Ter.</p> <p>Elle génère, ... les produits suivants:</p> <ul style="list-style-type: none"> • INTERFEROGRAM <ul style="list-style-type: none"> ◦ WRAPPED INTERFEROGRAM ◦ UNWRAPPED INTERFEROGRAM ◦ INTERFEROGRAM APS_GLOBAL_MC ◦ SPATIAL COHERENCE 	<p>Collection d'interférogrammes sur le Piton de la Fournaise</p> <p>15 juin 1984 →</p> <p>Cette collection regroupe les interférogrammes enroulés sur le Piton de la Fournaise enregistrés dans la base de données OPGC-OI2</p>	<p>Collection de MNT Bathymétrique - Projet Homonin</p> <p>Le produit bathymétrie a été réalisé dans le cadre du projet HOMONIM.</p> <p>Le MNT est destiné à être implémenté dans les modèles hydrodynamiques afin de produire des prévisions aussi précises que possible des hauteurs d'eau et d'états de mer à la côte et donc d'améliorer la pertinence de la Vigilance Vagues-Submersion.</p> <p>Ce produit est disponible avec comme référence verticale le niveau des plus basses mers astronomiques (PBMA) ou le niveau moyen des</p>
<p>Collection des mesures du champs magnetique à Kourou Guyane</p> <p>31 déc. 1815 → 30 août 2019</p> <p>Cette collection rassemble l'ensemble des mesures de champs magnétique réalisées à l'observatoire de Kourou en Guyane Française.</p> <p>L'observatoire a été créé par l'Institut de Physique du Globe de Paris (IPGP) avec la collaboration du Centre National d'Etude Spatial (CNES) en 1995.</p> <p>Resolution 30 m</p>	<p>Dataset related to the article "Direct modelling of the influence on coda wave interferometry"</p> <p>Data used to generate the figures of the paper: J. Azzola, J. Schmittbuhl, D. Zigone, V. Magnenet, and F. Masson (2017). Direct modeling of the mechanical strain influence on coda wave interferometry. Journal of Geophysical Research. Accepted article. https://doi.org/10.1002/2017JB015162</p>	<p>Dataset related to the article "Energy partitioning during sub-heterogeneous interface"</p> <p>Data used to generate the figures of the paper: Jestin, C., Lengliné, O., Schmittbuhl, J. (2019). Energy partitioning during sub-critical mode I crack propagation through a heterogeneous interface. Journal of Geophysical Research: Solid Earth, 124. https://doi.org/10.1029/2018JB016831</p>	<p>Episode: 1988 Stimulation Soultz-sous-Forets</p> <p>13 déc. 1988 → 15 déc. 1988</p> <p>The Hot Dry Rock (HDR) site of Soultz-sous-Forets in Alsace was chosen in 1986 for scientific investigation. During the first phase of the project (1987-1988), a first borehole (GPK1) was drilled. It reached a final depth of 2000 m and various investigations were undertaken during that period. A first</p>



Projects concerning ground deformation from radar data

→ On demand processing service GDM (Ground Deformation Monitoring)

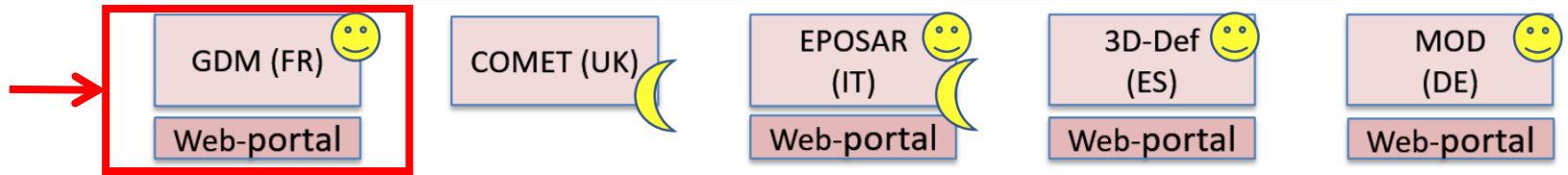
EPOS TCS Satellite Data - Services
<https://www.epos-ip.org/thematic-core-service/478/services>



TCS – Satellite Data

Proposed Governance Structure:
Consortium Agreement

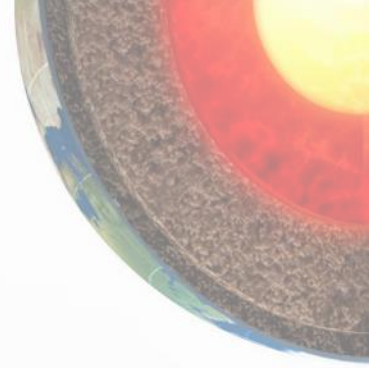
Proposed Gateway: Geohazards Exploitation Platform



Services

Systematic and periodic processing on defined areas

On demand, from a web interface



Projects concerning ground deformation from radar data

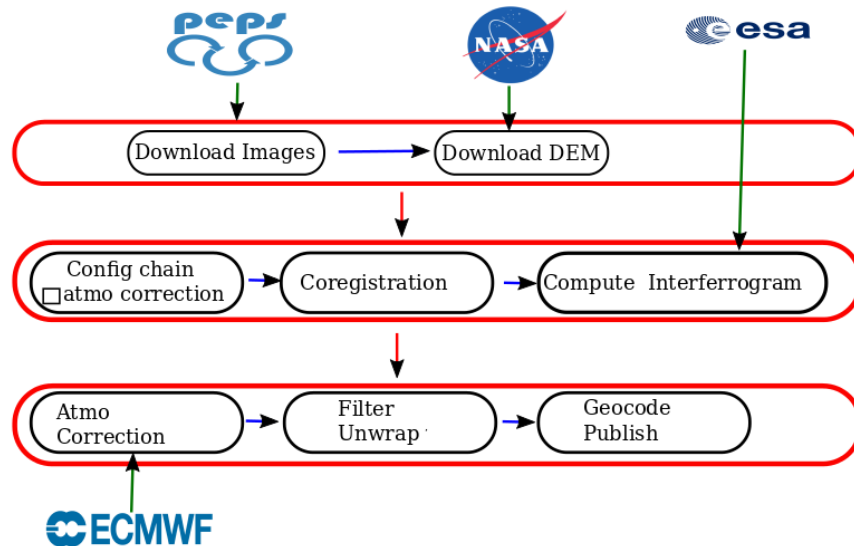
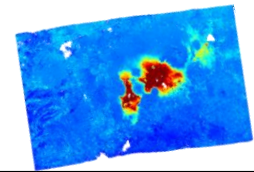
➤ Processing: NSBAS chain

New Small temporal and spatial BASelines

(NSBAS, M.-P. Marie-Pierre Doin, F.Lodge, S. Guillaso, R. Jolivet, C. Lasserre, G. Ducret, and R. Grandin (2011)

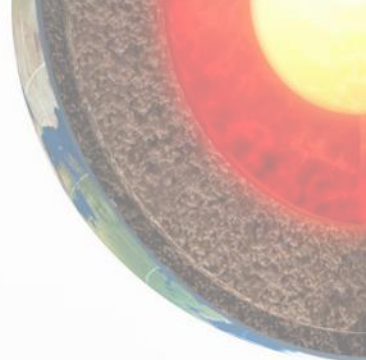
Grandin, R. (2015). Interferometric processing of SLC Sentinel-1 TOPS data, Proc. of the 2015 ESA Fringe Workshop, ESA Special Publication, Vol. 731).

Distributed products



+ Auxiliary files

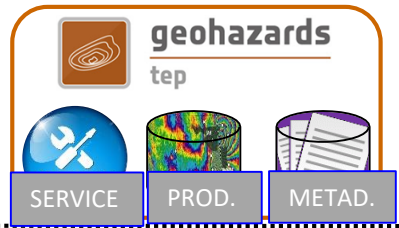
Name	DDSS
WRAPPED_INTERFEROGRAM	1
SPATIAL_COHERENCE	2
UNWRAPPED_INTERFEROGRAM	3
MAP_OF_LOS_VECTOR	4
ATMOSPHERIC_PHASE_SCREEN	5
DEM	6
LOOKUP_TABLE_RADAR2GROUND_COORDINATES	7
LOS_DISPLACEMENT_TIMESERIES	8
TEMPORAL_COHERENCE	9
NETWORK_MISCLOSURE	10
MEAN_LOC_VELOCITY	12
STACK_INTERFEROGRAMS	13



Projects concerning ground deformation from radar data

➤ Platform

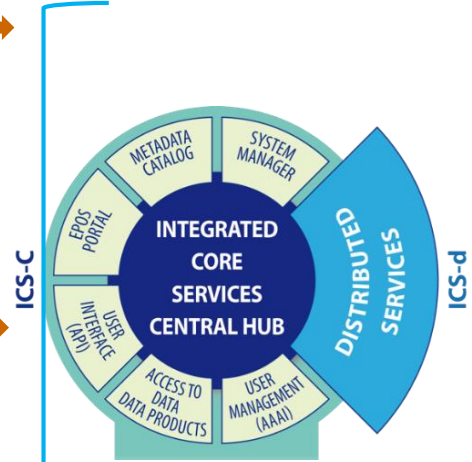
Option 1

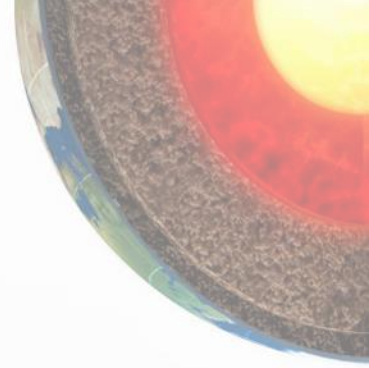


Option 2



Option 3





Projects concerning ground deformation from radar data

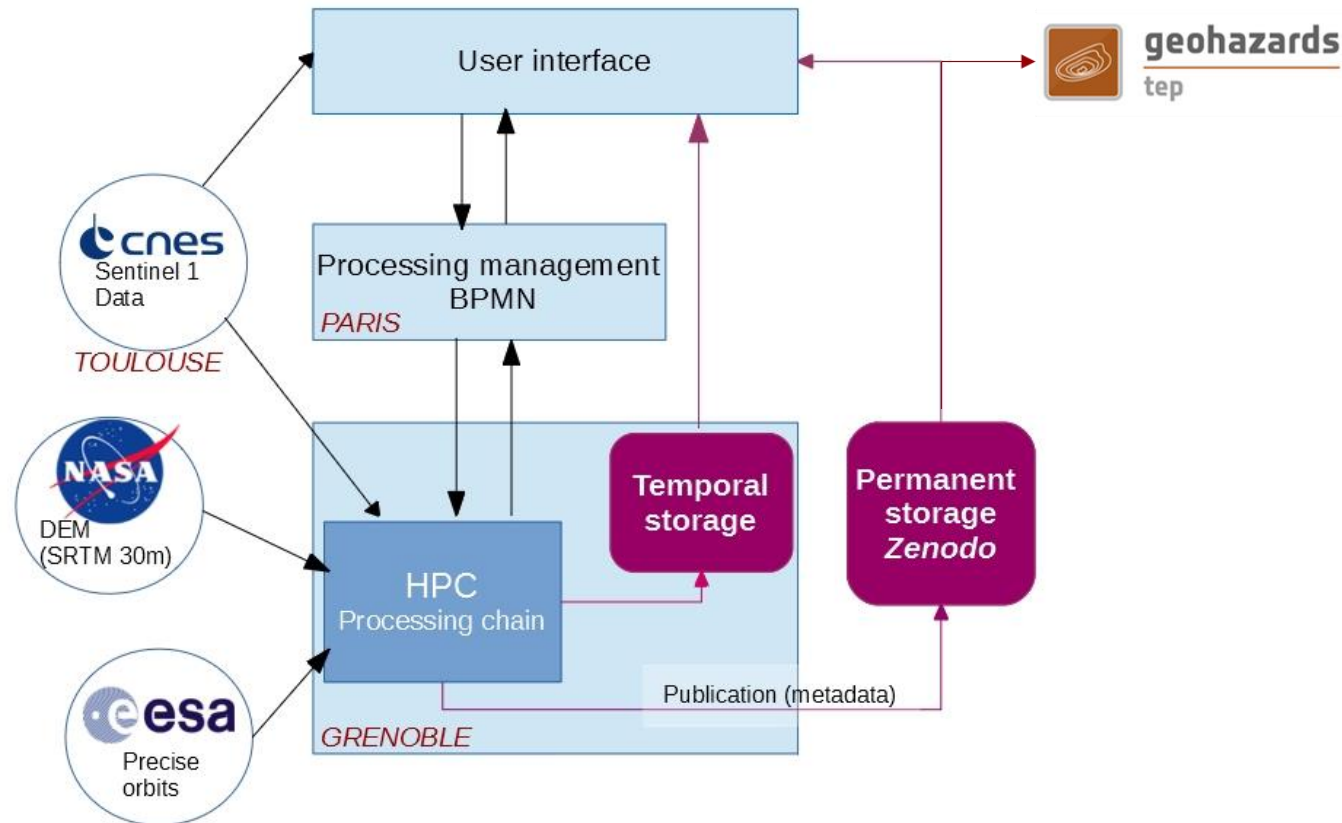
➔ ETALAB

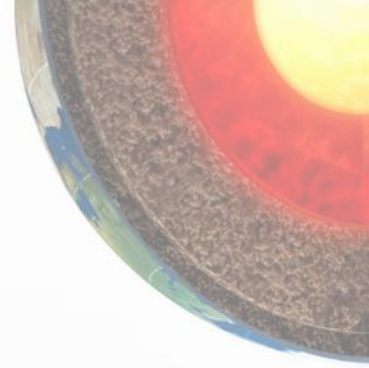


Prototype of services

Distributed architecture

User interfaces





Projects concerning ground deformation from radar data

➔ ETALAB

CHOISIR UN CALCUL CALCULS EN COURS CALCULS TERMINÉS RESULTATS DES CALCULS FRANÇAIS [franck.thollard.fr](#) [Se déconnecter](#)

CALCULS D'INTERFÉROGRAMMES A LA DEMANDE

Définir une zone géographique en cliquant possible les surfaces aquatiques et la végétation.

Periodes d'acquisition (non obligatoire)
 Début:
 Fin:

Paramètres de satellite

- SENTINEL-1
- SAR BANDE C
- LEVEL1
- SLC
- SLA S1B
- RV
- ASCENDANT

Rechercher les images
 Rechercher les images

CHOISIR UNE ORBITE RELATIVE

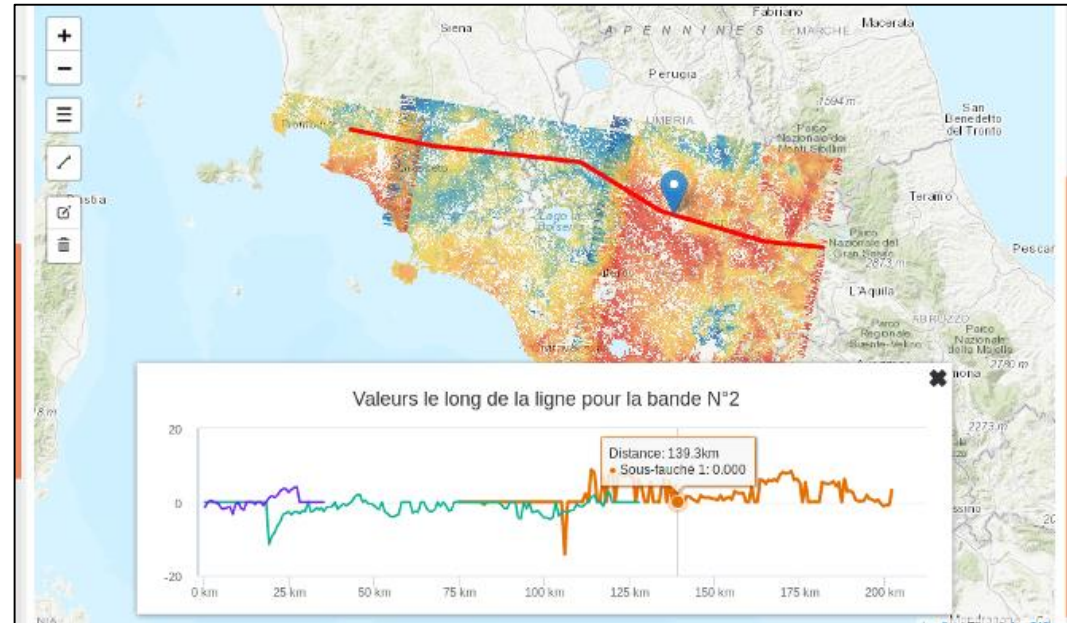
N° 44 a (14 images) N° 51 a (8 images) N° 117 a (12 images) N° 124 a (14 images) Toutes les orbites

[Voir le plus d'images Orbite 44 a...](#) [Voir toutes les images Orbite 44 a...](#)

CHOISIR UNE GEOMETRIE pour l'orbite A44

963 images trouvées, 14 images filtrées suivant les paramètres, 14 images valides pour le traitement

	Produit: img1291a_271326_0_04_481910_0000 Date: 2018-09-20T16:55:05.752Z Localisation: [Italy] Plateforme: S1B Traitement: SAR-C-0.6R	Type de produit: SLC Produit INT: 0 Niveau de traitement: LEVEL1 Mode d'acquisition: RV Polarisation: VV/VH	Sens de l'orbite: ascending Niveau de traitement: LEVEL1 Mode d'acquisition: RV Polarisation: VV/VH	<input checked="" type="checkbox"/> Afficher l'emprise Voir les images de cette géométrie...
	Produit: img1291a_546352925138_0000017000 Date: 2018-09-20T16:55:23.050Z Localisation: [Italy] Plateforme: S1B Traitement: SAR-C-0.6R	Type de produit: SLC Produit INT: 0 Niveau de traitement: LEVEL1 Mode d'acquisition: RV Polarisation: VV/VH	Sens de l'orbite: ascending Niveau de traitement: LEVEL1 Mode d'acquisition: RV Polarisation: VV/VH	<input checked="" type="checkbox"/> Afficher l'emprise Voir les images de cette géométrie...



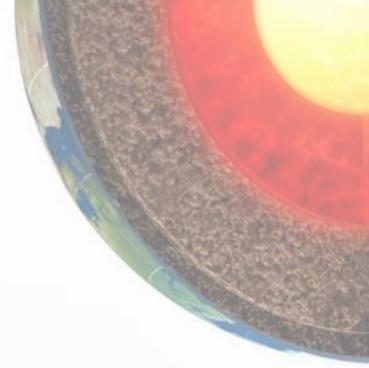
ForM@Ter

THE DEFORMATIONS OF THE EARTH SEEN FROM THE SKY

Please login before you start.

Log in

U



Projects concerning ground deformation from radar data

➔ **ETALAB**

Demonstration: <https://www.poleterresolide.fr/services/interferogrammes-a-la-demande-demo/>

CHOISIR UN CALCUL | CALCULS EN COURS | CALCULS TERMINES | RESULTATS DES CALCULS | FRANÇAIS | frank@thollard.fr | Se déconnecter

CALCULS D'INTERFEROGRAMMES A LA DEMANDE

Définir une zone géographique en cliquant sur les surfaces aquatiques et la végétation.

Periodes d'acquisition (non obligatoire)
 Début:
 Fin:

Paramètres de satellite

- SENTINEL-1
- SAR BANDE C
- LEVEL1
- SLC
- SLA S1B
- RV
- ASCENDANT

Rechercher les images
 Rechercher les images

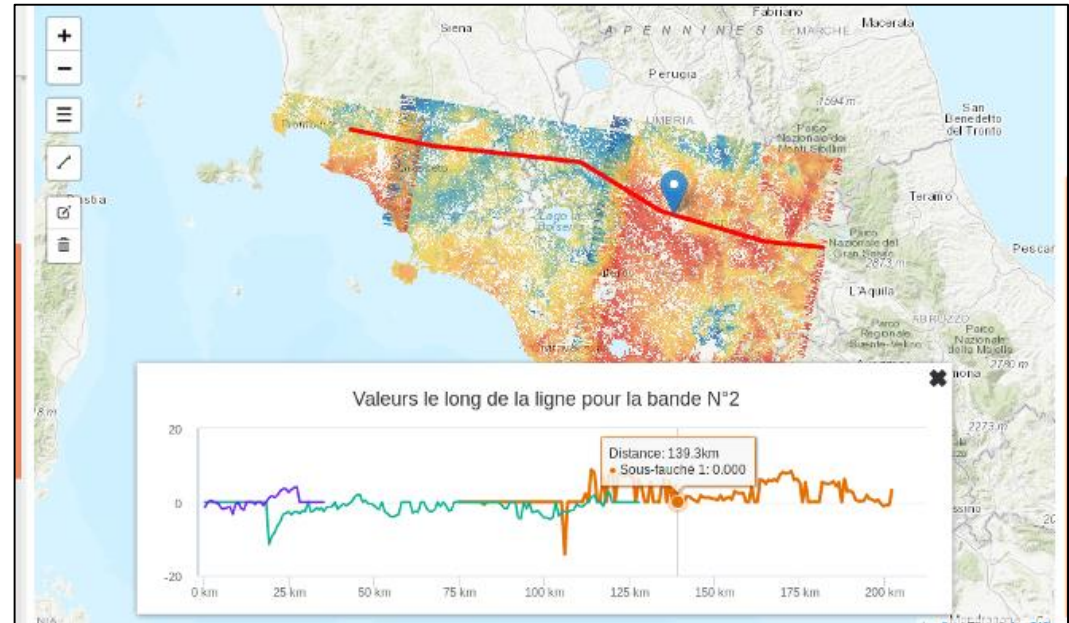
CHOISIR UNE ORBITE RELATIVE

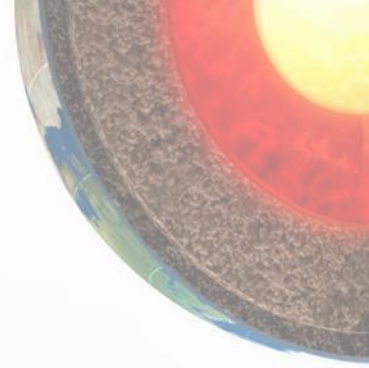
N° 44 a (14 images) | N° 51 a (8 images) | N° 117 a (12 images) | N° 124 a (14 images) | Toutes les orbites

CHOISIR UNE GEOMETRIE pour l'orbite A44

963 images trouvées, 14 images filtrées suivant les paramètres, 14 images valides pour le traitement

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Projects concerning ground deformation from radar data

➔ FLATSIM


the web interface to access the products is operational but will be open after validation of the products and discussion on data access policy

Interferogram collection on Tibet

Search Description


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
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 ProcessingLevel L2D

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
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 Instrument SENTINEL-1 C-SAR
 SensorMode IW
 Polarisation VV
 Subswath IW1_IW2_IW3
 RelativeOrbitNumber 99
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
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 Instrument SENTINEL-1 C-SAR
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 Polarisation VV
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 ProcessingLevel L2D

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
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
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 Instrument SENTINEL-1 C-SAR
 SensorMode IW
 Polarisation VV
 Subswath IW1_IW2_IW3
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
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 Instrument SENTINEL-1 C-SAR
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
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SENTINEL1_20190605-190617-000_L2D_TIBETA172NORD-VV-



Jun 5, 2019 → Jun 17, 2019
 Product Type INTERFEROGRAM
 Platform SENTINEL1
 Instrument SENTINEL-1 C-SAR
 SensorMode IW
 Polarisation VV
 Subswath IW1_IW2_IW3
 RelativeOrbitNumber 172
 OrbitDirection ASCENDING
 Resolution 120
 ProcessingLevel L2D

SENTINEL1_20190605-190617-000_L2D_TIBETA172SUD-VV-IW123-



Jun 5, 2019 → Jun 17, 2019
 Product Type INTERFEROGRAM
 Platform SENTINEL1
 Instrument SENTINEL-1 C-SAR

SENTINEL1_20190531-190624-000_L2D_TIBETA099NORD-VV-




May 31, 2019 → Jun 24, 2019
 Product Type INTERFEROGRAM
 Platform SENTINEL1
 Instrument SENTINEL-1 C-SAR

SENTINEL1_20190531-190612-000_L2D_TIBETA099NORD-VV-



May 31, 2019 → Jun 12, 2019
 Product Type INTERFEROGRAM
 Platform SENTINEL1
 Instrument SENTINEL-1 C-SAR

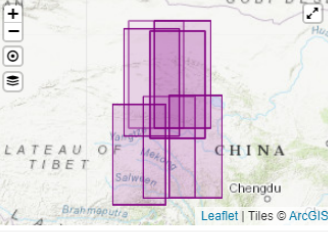
SENTINEL1_20190531-190624-000_L2D_TIBETA099SUD-VV-IW123-



May 31, 2019 → Jun 24, 2019
 Product Type INTERFEROGRAM
 Platform SENTINEL1
 Instrument SENTINEL-1 C-SAR

Reset search

Search ...



Spatial extent

Time slot

From: 01/01/2000

To: 14/10/2019

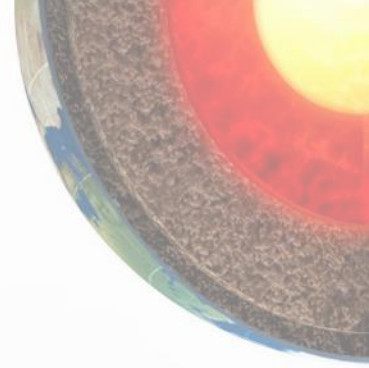
Parameters

ProductType: ---

ProcessingLevel: ---

ProcessingContext: ---

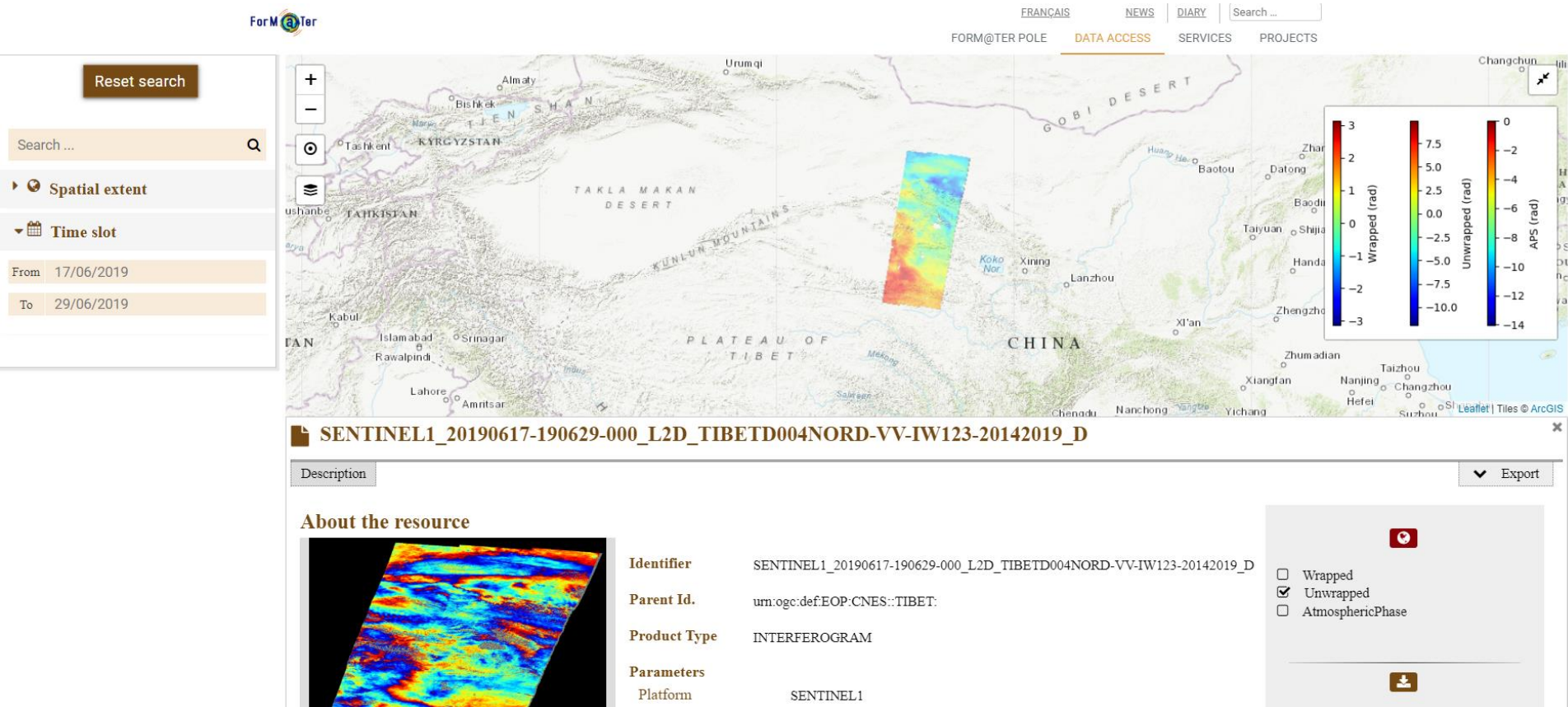
RelativeOrbitNumber: ---



Projects concerning ground deformation from radar data

➔ FLATSIM

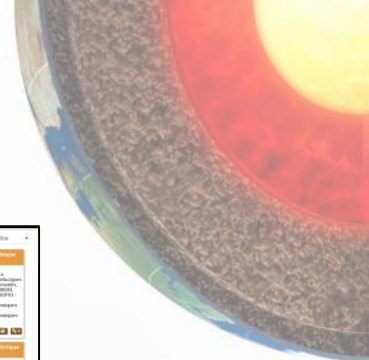
the web interface to access the products is operational but will be open after validation of the products and discussion on data access policy



The screenshot displays the ForM@Ter web interface. At the top, there are navigation links for 'FRANÇAIS', 'NEWS', 'DIARY', and a search bar. Below these are 'FORM@TER POLE', 'DATA ACCESS', 'SERVICES', and 'PROJECTS'. The main area features a map of Central Asia and China, with a color-coded radar data overlay. A legend on the right shows 'Wrapped (rad)' and 'Unwrapped (rad)' scales. On the left, there are search filters for 'Spatial extent' and 'Time slot' (From: 17/06/2019, To: 29/06/2019). Below the map, the product title is 'SENTINEL1_20190617-190629-000_L2D_TIBETD004NORD-VV-IW123-20142019_D'. The 'About the resource' section includes a thumbnail of the data and a table of metadata:

Identifier	SENTINEL1_20190617-190629-000_L2D_TIBETD004NORD-VV-IW123-20142019_D
Parent Id.	urn:ogc:def:EOP:CNES::TIBET:
Product Type	INTERFEROGRAM
Parameters	
Platform	SENTINEL1

At the bottom right, there are checkboxes for 'Wrapped', 'Unwrapped' (checked), and 'AtmosphericPhase', along with a download icon.



Conclusion & perspectives

- **Metacatalog** under construction, **will be open soon**



- Ground deformation from radar data projects

Etalab: a successful prototype, not open

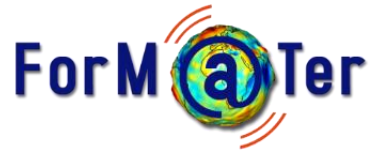
GDM-SAR : products are available from GEP catalog in EPOS framework

Flatsim: products **will be available from the ForM@Ter website** after validation and data access policy discussion

- Ground deformation from **optical data**

Under discussion, a workshop is planned on the 21/10 to identify the needs

Solutions are discussed to make the on demand processing service sustainable and operational



www.poleterresolide.fr



Thank you



Demo. Etalab prototype

https://en.poleterresolide.fr/services/interferogrammes-on-demand-demo/?noredirect=en_US#/