MDIS Training School and Workshop

14-18 October 2019 – Strasbourg and La Petite-Pierre

Programme of the training school : 14–16 October 2019

8.30 – 9.15: Registration at EOST Building / 5 rue René Descartes, F-67084 Strasbourg Cedex
9.30: Start of the training classes

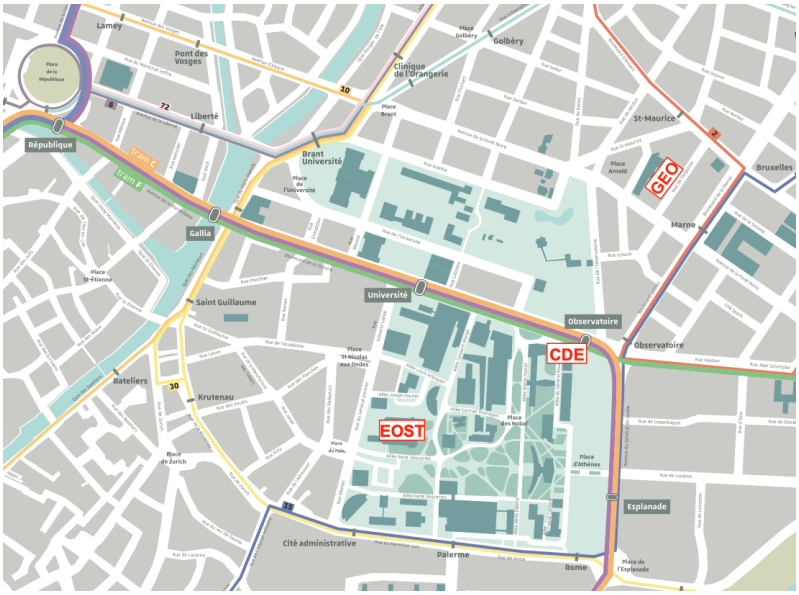
Organization of the training school

Monday 14/10			
9.30 - 12.00	Class1: The on-demand NSBAS InSAR processing chain	Group 1	Room GEO108
	Class2: The on-demand SNAP-StaMPS PSInSAR processing chain	Group 2	Room EOST
12.15 - 13.15	Lunch / EOST - Salle du Conseil	All	
13.30 - 16.00	Class3: SAR imagery processing with Orfeo Toolbox / OTB	Group 1	Room GEO108
	Class4: Optical processing for quantifying Earth surface deformation	Group 2	Room EOST
16.30 - 19.00	Class1: The on-demand NSBAS InSAR processing chain	Group 2	Room GEO108
	Class2: The on-demand SNAP-StaMPS PSInSAR processing chain	Group 1	Room EOST
Tuesday 15/10			
9.30 - 12.00	Class3: SAR imagery processing with Orfeo Toolbox / OTB	Group 2	Room GEO108
	Class4: Optical processing for quantifying Earth surface deformation	Group 1	Room EOST
12.15 - 13.15	No lunch organized / Free time	All	
13.30 - 16.00	Class6: Mining displacement times series	Group 1	Room GEO108
	Class5: The Geohazards Exploitation Platform in a nutshell	Group 2	Room EOST
16.30 - 19.00	Class6: Mining displacement times series	Group 2	Room GEO108
	Class5: The Geohazards Exploitation Platform in a nutshell	Group 1	Room EOST
Wednesday 16/10			
8.00 - 10.00	Class7: DEFVOLC - Interface for the inversion of volcanic deformation sources	All	Room CDE
10.30 - 12.30	Class8: CSI - a Python module to set up fault slip inversions	All	Room CDE

Location of the class rooms

Group 1: Building Geography – 3 rue de l'Argonne / Room 108 – First floor
Group 2: Building EOST – 5 Rue Descartes / Entresol
All: Building Collège Doctoral Européen / Amphitéatre

Building Location



EOST Building / 5 rue Descartes
https://eost.unistra.fr/acces/

Geography Building / 3 rue de l'Argonne
https://geographie.unistra.fr/acces/

Note that EOST and Geography buildings are at 10 min walking distance.

Description of the classes

— Class1: The on-demand NSBAS processing chain for S1 data

Description: The Sentinel-1 mission opens new potentialities for an intensive use of SAR interferometry to measure ground deformations. However, its default mode of acquisition (TOPSAR) and the amount of data available in near real time, require specific processing schemes, and significant computing and storage facilities not available to every researcher. ForM@Ter, the French Solid Earth data and services centre develops an on-demand service for Sentinel-1 InSAR processing using NSBAS, a French processing chain, based on ROI_Pac, starting from level-1 (SLC) Sentinel-1 data up to time-series of displacement. The tutorial (3h) will introduce the main steps of the NSBAS processing chain, and their outputs. We will also present the ForM@Ter web user-interface, allowing users to select the data to be processed, to follow the processing, and to access intermediate and final products.

— Class2: The on-demand SNAP-StaMPS PSI processing chain for S1 data

Description: In this class, open source tools will be utilized to analyze ground displacement using Copernicus Sentinel-1 data. The aim is to apply Persistent Scatterer Interferometry (PSI) in a semi-automatic processing scheme for land deformation monitoring using the ESAs SentiNel Application Platform (SNAP) and Stanford Method for Persistent Scatterers (StaMPS). For the demonstration of SNAP-StaMPS integrated PSI processing, a site with well-known ground deformation signal shall be selected. Hands-on exercise will be performed using both local and cloud-based processing resources.

— Class3: SAR imagery processing with the Orfeo Toolbox / OTB

Description: Orfeo ToolBox (OTB) is an open-source project for remote sensing. It can process high resolution optical, multispectral and radar images. Many applications are available: from orthorectification, classification, SAR processing, and more. Since 2018 new modules for InSAR processing are progressively implemented ingesting Sentinel1 (SM, IW), CosmoSkymed (StripMap, SpotLight) sensors. All of OTB's algorithms are accessible from Monteverdi, QGIS, Python, the command line or C++. Monteverdi is an easy to use visualization tool with an emphasis on hardware accelerated rendering for high resolution imagery (optical and SAR). With it, end-users can visualize huge raw imagery products and access all of the applications in the toolbox. From resource limited laptops to high performance MPI clusters, OTB is available on Linux, macOS and Windows. It is community driven, extensible and heavily documented. Orfeo ToolBox is not a black box! According to the expectations of the attendees, the following topics will be presented: Introduction to SAR imagery with Monteverdi, radiometric calibration, geometric corrections, speckle filtering, polarimetry, InSAR processing with OTB (DiapOTB) and scripting OTB from Python.

Installation

prepare for the workshop, please install OTB by downloading it from this website:
https://www.orfeo-toolbox.org/packages/

#and take version *7.0 release candidate*, a more recent version that will help us test the upcoming 7.0 release, and has more SAR processing features. For example, if you are on windows download and unzip the file called OTB-7.0.0-rc1-Win64.zip.

#If you are new to OTB, you can find the main documentation here: https://www.orfeo-toolbox.org/CookBook/

#We'll be working with the DiapOTB module of OTB. You can find some documentation about it here:
https://gitlab.orfeo-toolbox.org/remote_modules/diapotb/wikis/home
This module is included in the OTB binary package you download from the main website.

— Class4: Optical processing services for quantifying Earth surface deformation: the MPIC, DSM-OPT and ALADIM processing chains

Description: Optical (e.g. multi-spectral) satellite imagery (S2, Landsat, Spot, Pléiades) are interesting sensors to quantify Earth Surface deformation in terms of horizontal motion (e.g. MPIC processing chain based on multi-temporal image correlation), in terms of vertical motion (e.g. DSM-OPT with the calculation of high resolution surface models from satellite with stereographic capacity), and in terms of change detection to locate geomorphological processes in pre/post event imagery (e.g. ALADIM processing chain). In order to allow the Earth science community to easily and quickly process multi-spectral images, fully automated processing chains have been developed, and have been implemented for distributed computation on high performances infrastructures. The objective of this class will be to present the three processing chains through practical example with case studies on a variety of geological objects (earthquake, volcano, landslide, glaciers).

— Class5: The Geohazards Exploitation Platform in a nutshell

Description: The Geohazards Thematic Exploitation Platform (GEP) is part of the Thematic Exploitation Platforms (TEP) initiative set up by ESA to provide an environment to process EO data and support the user community concerning data exploitation through cloud-based services. The platform is in pre-operations with an Early Adopter programme, supporting approximately 100 user organisations in 35 countries whose access is sponsored by ESA. The aim of this course is to present the operational capabilities of the GEP platform through the use of APIs within Jupyter Notebooks. The examples will consist in: 1) discovering and staging-in Sentinel data; 2) discovering the GEP processing services and invoking them; 3) analysing/post-processing the results produced and, 4) publishing the analysis/post-process to GEP as community shared objects.

— Class6: Mining displacement times series

Description: This class will present tools for the mining of the displacement field time series (DFTS) to extract relevant information from complex spatio-temporal datasets. It will start with an overview of confidence measures associated to the computation of displacement fields using optical or radar images. The practical part will address the problem of the exploratory mining of DFTS using sequential patterns.

Installation

Use of DFT-p2miner - https://sites.google.com/view/dfts-miner-tutorial

Login: dfts-p2miner (automatic login) / Password: mdis

— Class7: DEFVOLC - Interface for the Inversion of volcanic deformation sources

Description: Sources of deformation in volcanic context can be of multiple origins: massive magma reservoirs, sheets intrusions or faults. These sources are sometimes deforming simultaneously, which makes the analysis of surface displacements complex. To analyse the InSAR displacements at volcanoes or in a tectonic setting, we combine 3D elastostatic boundary element models which take topographies into account and a neighbourhood optimization algorithm. We simultaneously determine non-linear model parameters (source geometry and location) and linear model parameters (source stress drop), and assess mean model parameters and confidence intervals. In order to speed up inversions set ups, we developed a graphical interface. In order to accelerate the inversions, they run on clusters. In the workshop, we will present the model and inversion method used, as well as the interface. A practical example of a Piton de la Fournaise eruption will be presented.

— Class8: CSI - a Python module to set up fault slip inversions —

Description: Geodetic and seismological data can inform us about a wide range of slip behaviors along active faults. CSI stands for Classic Slip Inversion. It has been designed to handle data preparation and fault parameterization for slip inversions. CSI also includes tools to conduct simple slip inversions to quickly come up with slip models. In this tutorial, we

present the main features of the module and how to make the different classes work together. Practical examples of slip inversions for actual earthquakes will be presented.

Installation

To all participants in the CSI class: please install csi & okada4py modules according to the following instructions.
Feel free to contact romain.jolivet@ens.fr and zacharie.duputel@unistra.fr if any help is required

Download the modules
git clone https://github.com/jolivetr/csi.git
git clone https://github.com/jolivetr/okada4py

Note 1: csi should be cloned in a directory pointed by the PYTHONPATH environment variable.
Note 2: Okada4py should not be cloned in a directory pointed by PYTHONPATH variable (otherwise python will mix up the compiled module with the local repository).
Dependencies (to be installed with your favorite package manager)

- Better to use python3
- gcc
- numpy
- spicy
- pyproj
- matplotlib
- cartopy
- multiprocessing
- h5py
- okada4py

Note: the module has only been tested on Linux & MacOS.
Install okada4py:
export CC=gcc
python setup.py build
Link in a user module directory (on MacOS it is usually in *~/Library/Python/3.7/lib/python/site-packages/*):
python setup.py install --user
On some OS, it is sometimes better to run :
python setup.py install --user --prefix=

Check that everything works
Open a python console
python -c “import csi"
###

List of participants to the training school

Group 1		
Aati	Saif	*California Institute of Technology / Los Angeles*
Aslan	Gokhan	*BRGM - French Geological Survey*
Badoc	Gabriel	*Université de Strasbourg*
Barnoud	Anne	*Université Clermont-Auvergne*
Bascou	Pascale	*ISTerre / Université Savoie-Mont-Blanc*
Bouchant	Clémentine	*Université de Strasbourg*
Cantraine	Manon	*ISTerre / Université Grenoble-Alpes*
Carette	Charles	*Université de Strasbourg*
Chlieh	Mohamed	*ISTerre / Université Grenoble-Alpes*
Coutrix	Maxime	*Université de Strasbourg*
Cusicanqui	Diego	*ISTerre / Université Grenoble-Alpes*
Daeron	Florian	*Université de Strasbourg*
Dalaison	Manon	*Ecole Normale Supérieure / Paris*
Daout	Simon	*University of Oxford*
De Michele	Marcello	*BRGM - French Geological Survey*
Delgado	Francisco	*IPG / Paris*
Dille	Antoine	*Université Libre de Bruxelles*
Diouf	Berthe	*Université de Strasbourg*

Doubre	Cécile	*EOST - CNRS / Université de Strasbourg*
Dumont	Quentin	*Université Clermont-Auvergne*
Froger	Jean-Luc	*Université Clermont Auvergne & Université Jean Monnet*
Fruneau	Bénédicte	*Université Paris-Est Marne-la-Vallée*
Gay	Michel	*Gipsa-Lab - CNRS/Université Grenoble-Alpes*
Haas	Benjamin	*Université de Strasbourg*
Ho Tong Minh	Dinh	*IRSTEA / Montpellier*
Hrysiewicz	Alexis	*Université Clermont-Auvergne*
Huang	Yue	*University of Rennes 1*

Group 2

Huber García	Verena	*Ludwig-Maximilians-Universität Munich*
Jacquet	Martin	*Université de Strasbourg*
Kias	Katia	*Université de Strasbourg*
Lê	Thu Trang	*Université Clermont-Auvergne*
Lemrabet	Laëtitia	*Université Lyon 1*
Marchandon	Mathilde	*ISTerre / Université Grenoble-Alpes*
Mathey	Marguerite	*ISTerre / Université Grenoble-Alpes*
Maubant	Louise	*ISTerre / Université Grenoble-Alpes*
McGrath	Jack	*University of Leeds*
Meriaux	Anne-Sophie	*University of Newcastle*
Michel	Sylvain	*Ecole Normale Supérieure / Paris*
Nahli	Abdeljalil	*ESGT - Université du Mans*
Papadopoulou	Theodora	*Argans / Sophia-Antipolis*
Parker	Alex	*University of Leeds*
Perier	Jeremy	*Université de Strasbourg*
Periollat	Axel	*ISTerre / Université Grenoble-Alpes*
Pons	Thibaut	*Université de Strasbourg*
Proy	Catherine	*CNES*
Roinsolle	Elias	*Université de Strasbourg*
Saleh	Mohamed	*EOST - CNRS / Université de Strasbourg*
Shreve	Tara	*IPG / Paris*
Smittarello	Delphine	*Université Savoie-Mont-Blanc*
Svigkas	Nikos	*INGV / Roma*
Tsai	Chia-Hsin	*University of Oxford*
Watson	Andrew	*University of Leeds*
Wenger	Romain	*Université de Strasbourg / LIVE*
Wilkinson	Roberta	*University of Oxford*
Zaegel	Laura	*Université de Strasbourg*

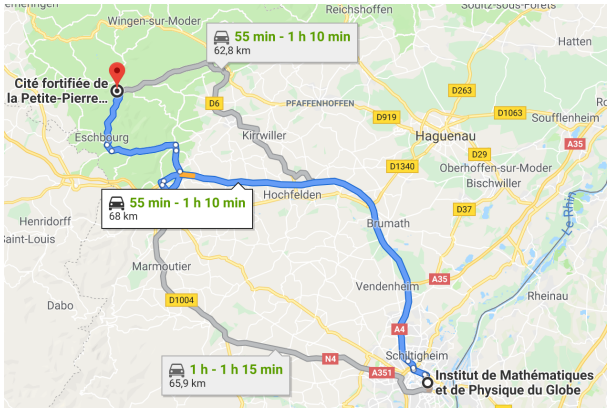
Teacher

Déprez	Aline	*EOST - CNRS / Université de Strasbourg*
Provost	Floriane	*ESA/Esrin*
Michéa	David	*EOST - CNRS / Université de Strasbourg*
Malet	Jean-Philippe	*EOST - CNRS / Université de Strasbourg*
Poughon	Victor	*CNES / Toulouse*
Durand	Philippe	*CNES / Toulouse*
Thollard	Franck	*ISTerre / Université Grenoble-Alpes*
Pathier	Erwan	*ISTerre / Université Grenoble-Alpes*
Lasserre	Cécile	*Université Lyon 1*
Doin	Marie-Pierre	*ISTerre / Université Grenoble-Alpes*
Foumelis	Michael	*BRGM - French Geological Survey*
Cayol	Valérie	*Université Clermont Auvergne*
Dabaghi	Farshid	*Université Jean Monnet*
Duputel	Zacharie	*EOST - CNRS/Université de Strasbourg*
Jolivet	Romain	*Ecole Normale Supérieure / Paris*
Brito	Fabrice	*TerraDue / Roma*
Rigotti	Christophe	*INSA / Lyon*
Yan	Yajing	*Listic / Université Savoie-Mont-Blanc*
Méger	Nicolas	*Listic / Université Savoie-Mont-Blanc*

Programme of the MDIS-2019 Conference: 16 -18 October 2019

12.45: Shuttle departure to La Petite Pierre in front of EOST Building
13.45: Arrival at La Petite Pierre / Hôtel Aux Trois Roses
14.00: Lunch

Location



Transfer Strasbourg – La Petite Pierre

Location Hôtel Aux Trois Roses

Schedule of the MDIS 2019 Conference

Wednesday 16 October 2019

15:30 - 17:00: Session 1 / Satellite signal processing for information retrieval.

15:30 - 16:00: Closure phases and biases in InSAR products - *Francesco De Zan et al.*
16:00 - 16:15: Random walk and bias in INSAR time series of Sentinel-1 data associated with decorrelation: impact on ground deformation measurements and mitigation - *Marie-Pierre Doin et al.*
16:15 - 16:30: An algorithm for automatic phase unwrapping errors correction : PhaCo – *Béatrice Puyssegur*
16:30 - 16:45: Gap-filling of InSAR displacement time series - *Alexandre Hippert-Ferrer et al.*
16:45 - 17:00 : Coherence-Change Detection Matrix For Change Analysis From Repeat-Pass SAR images: A case study For volcanic eruption monitoring and forest fire damage assessment - *Thu Trang Le et al.*

17:30 - 18:15: Round-table - Issues in the topographic modelling of the Earth surface: opportunities of the CO3D satellite mission and of on-line DSM production services - *Laurent Boisnard (CNES), Catherine Proy (CNES), Jean-Philippe Malet (EOST), Yann Klinger (IPGP)*

18:15 - 19:30: Poster Session and Cocktail

20:00 - 21:00: Dinner

21:15 - 22:00 Copernicus Sentinel-2 mission status - *Ferran Gascon*

Tuesday 17 October 2019

08:30 - 10:30: Session 2a / Geophysical interpretation of the deformation I
08:30 - 09:00: What have we learned about faults from three decades of tectonic InSAR? - *Tim Wright*

09:00 - 09:15: The temporal variability of aseismic slip along the San Andreas Fault - *Sylvain Michel et al.*
09:15 - 09:30: Separating transient tectonic signal from atmospheric signal in InSAR time-series, the case of the 2017-2018 Slow slip event in Guerrero (Mexico) - *Louise Maubant et al.*
09:30 - 09:45: Long-term deformation transients and their possible relation with subduction earthquakes - *Anne Socquet et al.*

09:45 - 10:15: Coffee break

10:15 - 11:45: Session 2a / Geophysical interpretation of the deformation I.

10:15 - 10:30: Surface deformation during the 2018/2019 Mayotte seismo-volcanic crisis from GNSS, SAR and seafloor geodesy - *Raphaël Grandin et al.*
10:30 - 10:45: The December 2018 eruption of Ambrym volcano: Constraints on the magma plumbing system through the joint analysis of remote sensing, seismicity, and field observations - *Tara Shreve et al.*
10:45 - 11:00: Transient ground deformation in silicic volcanoes imaged with InSAR: evidence for episodic magma injection at Cordon Caulle and Yellowstone volcanoes - *Francisco Delgado et al.*
11:00 - 11:15: Using multi-sensor data to characterize the dynamic of magmatic systems along the East African Rift - *Fabien Albino et al.*
11:15 - 11:30: Combining InSAR and GNSS to model magma transport during the May 2016 eruption of Piton de la Fournaise Volcano (La Réunion Island) - *Delphine Smittarello et al.*
11:30 - 11:45: Insight on the magma shallow plumbing system of Volcán de Colima, Mexico and its physical properties, from remote sensing - *Virginie Pinel et al.*

12:00 - 13:30: Lunch

13:30 - 14:30: Poster Session

14:30 - 17:15: Session 2b / Geophysical interpretation of the deformation II

14:30 - 15:00: Status and challenges for monitoring ice motion and deformation with satellite constellations - *Ludivine Libert et al.*
15:00 - 15:15: Long-term ground subsidence of the permafrost basins of the Tibetan plateau revealed by 16-years of ESA SAR missions. - *Simon Daout et al.*
15:15 - 15:30: Grounding zone mapping in Antarctica using radar interferometry - Laurane Charrier et al.
15:30 - 16:00 › Dynamics of slow-moving landslides from dense InSAR time series: insights from a tropical urban environment - *Antoine Dille et al.*
16:00 - 16:15: Rapid detection of triggered landslides using satellite radar coherence - Katy Burrows et al.
16:15 - 16:30: ImClass: A generic machine learning IMage CLASSification algorithm for land surface mapping - *Aline Déprez et al.*
16:30 - 16:45: What do we learn from storm-induced landslide inventories from space? The role of total rainfall, landscape steepness and extreme climatology - *Odin Marc et al.*
16:45 - 17:00: Optical image correlation: exploiting the Sentinel-2 archive for Earth Surface Deformation monitoring - *Floriane Provost et al.*
17:00 - 17:15: Measuring earth surface deformation, glacier dynamics and geomorphic changes from times series of optical satellite images with COSI-Corr - *Saif Aati et al.*

17:15 - 17:45: Coffee break

17:45 - 19:00: Session 2 / Geophysical interpretation of the deformation III

17:45 - 18:15: InSAR for reservoir geomechanical analyses - *Alessio Rucci et al.*
18:15 - 18:30: InSAR monitoring of surface displacements and detection of abnormal behaviour for a geothermal operation, case of the Landau power plant (Germany) - *Eric Henrion et al.*
18:30 - 18:45: Subsidence associated with oil extraction, measured from time-series analysis of Sentinel-1 data : case study of the Patos-Marinza oil field, Albania - *Marianne Métois et al.*
18:45 - 19:00: Mining subsidence detection by remote measurements over the MDPA - *Guillaume Modeste et al.*

19:30 - 20:30: Dinner

21:30: Meeting on ISTE books "Surface Displacement Measurement" and "Inversion and Data Assimilation"- *E. Trouvé, O. Cavallié, Y. Yan*

21.30: Meeting on CIEST / GeoHazards Initiative - *C. Proy*

Friday 18 October 2019

08:45 - 10:00: Session 3 / Platforms for massive big data processing

08:45 - 09:15: Towards the Automatic Detection of Volcanic Unrest using Sentinel-1 InSAR data and Machine Learning - *Juliet Biggs et al.*

09:15 - 09:30: Study on the technique Interferometry SAR Sentinel-1 Big Data for large scale: Mekong Delta case - *Dinh Ho Tong Minh et al.*

09:30 - 09:45: Large-scale spatial and temporal interferometry processing results and products. Status of PEPS processing services - *Philippe Durand et al.*

09:45 - 10:00: Monitoring significant earthquakes and volcanic activity with Earth Observation data processing pipelines - *Fabrice Brito et al.*

10:00 - 10:30 Coffee break

10:30 - 12:15: Session 3 / Platforms for massive big data processing

10:30 - 11:00: Massive EO big data processing: the future of exploitation platforms - *Francesco Barchetta et al.*

11:00 - 11:15: PEPS - Sentinel Products Exploitation Platform - *Catherine Proy et al.*

11:15 - 11:30: ForM@Ter, solid Earth data and services center - *Emilie Deschamps-Ostanciaux et al.*

11:30 - 11:45: Application Satellite Survey - A2S: Challenges in the automated processing of massive satellite data streams (HPC architecture, workflow management and databases) - *David Michéa et al.*

11:45 - 12:00: Geohazards Lab: Satellite EO exploitation and processing services to support the geohazards community - *Theodora Papadopoulou et al.*

12:00 - 12:15: French community united to bring geophysical information after a geological hazard: the revival of « La Cellule d'Intervention Scientifique et Technique » (CIEST) ? - *Marcello De Michele et al.*

12:30 - 13:30: Lunch

14:00 - 15:00: Round-table - The French initiative for the Copernicus Ground Motion Service. - *Philippe Durand (CNES), Anne Urdiroz (TRE-Altamira), Vincent Pischer (MEDD), Daniel Raucoules (BRGM)*

15:00: Shuttle departure to Strasbourg (main station)

List of posters

› A Kalman filter time series analysis tool for InSAR - *Manon Dalaison*
› Atmospheric Corrections for Satellite Measurements of Deformation at Tropical Island Volcanoes - Fabien Albino,
› Determination of fracture pressure distribution based on fictitious domain - *Farshid Dabaghi et al.*
› Differential Interferometry and Signal Identification for SWE Computation. Application: SAR Satellite - *Michel Gay*
› Orbital pass weighting of InSAR data for displacement inversion: Application to Piton de la Fournaise eruption - *Quentin Dumont*
› Post-seismic deformation following the 2016 Norcia earthquake (Italy), as revealed by InSAR time series - Lea Pousse-Beltran
› Pushing cross-correlation of optical imagery further: bathymetry from space and volcanic-cloud elevations - *Marcello De Michele et al.*
› Quantifying Earth's surface deformation caused by moderate earthquakes using InSAR techniques - *Sihem Miloudi and Mustapha Meghraoui*
› Spatial and Temporal Variations in coherence: A Focus on the Southern Alps, New Zealand - *Jack McGrath et al.*
› Study of the early postseismic phase of Tohoku-Oki earthquake (2011) with kinematics solutions - *Axel Periollat et al.*

› Systematic detection and characterization of slow slip events along the Mexican subduction zone from 2000 to 2019 - *Mathilde Radiguet*
› Towards Platform-based Georisk Assessment using Earth Observation data and Scientific Workflows - *Michael Foumelis*
› Understanding the co-evolution of mountain building and seismic hazard in regions of continental convergence - *Andrew Watson et al.*
› French initiative for the Ground Motion Service. Potential for surface motion-related geohazards on the National territory- *Daniel Raucoules et al.*
› How does the substratum deform under lava flows at Piton de la Fournaise? (La Réunion Island) - *Alexis Hrysiewicz et al.*
› How is the deformation accommodated and distributed within active fault zones? Insights from satellite geodesy and realistic fault modeling - *Mathilde Marchandon et al.*
› InSAR monitoring of surface displacements for a natural gas storage in salt caverns, case of the Tersanne and Hauterives operations (France). - *Eric Henrion et al.*
› Large scale observations and modeling of strain partitioning in Guatemala from SAR interferometry - *Cécile Lasserre et al.*
› New evidences for active folding in SW Taiwan from Sentinel-1 InSAR - Erwan Pathier et al.
› PS-InSAR Landslide deformation monitoring in the French Alps – *Gokhan Aslan et al.*
› Quantification and modelling of post-seismic results of the 24/09/2013 MW 7.7 Earthquake in Makran region - *Pascale Bascou et al.*
› Spatiotemporal Variation of Surface Creep Along the Chaman Fault System (Pakistan, Afghanistan) from time series analysis of Sentinel 1 TOPS data - *Gokhan Aslan et al.*
› The Xian Shui He fault system: Deformation mechanisms constrained by time series analysis of Sentinel-1 InSAR data - *Laëtitia Lemrabet et al.*
› Towards joint modelling and inversion of surface displacements and microgravimetric temporal variations for the characterization of eruptive sources at the Piton de la Fournaise volcano - *Anne Barnoud et al.*
› Tracking the evolution of the Merapi volcano crater area by high-resolution satellite imagery - *Virginie Pinel et al.*

List of participants to the MDIS-2019 Conference

Aati	Saif	*California Institute of Technology / Los Angeles*
Albino	Fabien	*Universitry of Bristol*
Aslan	Goghan	*BRGM - French Geological Survey*
Barchetta	Francesco	*RHEA Group / Roma*
Barnoud	Anne	*Université Clermont-Auvergne*
Bascou	Pascale	*ISTerre / Université Savoie-Mont-Blanc*
Biggs	Juliet	*University of Bristol*
Bodart	Olivier	*Université Jean Monnet*
Boisnard	Laurent	*CNES / Toulouse*
Brito	Fabrice	*TerraDue / Roma*
Burrows	Katy	*University of Durham*
Cantraine	Manon	*ISTerre / Université Grenoble-Alpes*
Cavalié	Olivier	*GeoAzur / Université de Nice Sophia-Antipolis*
Cayol	Valérie	*Université Clermont-Auvergne*
Charrier	Lauranne	*University of California / Irvine*
Cusicanqui	Diego	*ISTerre / Université Grenoble-Alpes*
Dabaghi	Farshid	*Université Jean Monnet*
Dalaison	Manon	*Ecole Normale Supérieure / Paris*
Daout	Simon	*University of Oxford*
De Michele	Marcello	*BRGM - French Geological Survey*
De Zan	Francesco	*German Aerospace Center/DLR, Oberpfaffenhofen*
Delgado	Francisco	*IPG / Paris*
Déprez	Aline	*EOST - CNRS / Université de Strasbourg*
Deschamps-Ostanciaux	Emilie	*IPG / Paris*
Desrues	Mathilde	*EOST - CNRS / Université de Strasbourg*
Dille	Antoine	*Université Libre de Bruxelles*
Doin	Marie-Pierre	*ISTerre / Université Grenoble-Alpes*
Doubre	Cécile	*EOST - CNRS / Université de Strasbourg*
Dumont	Quentin	*Université Clermont-Auvergne*
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Faivre	Robin	*ICube - CNRS / Université de Strasbourg*

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