6th Joint
International Symposium
on Deformation Monitoring
07.-09.04.2025

6th Joint International Symposium on Deformation Monitoring

Preliminary Programme

Major changes possible

07.– 09.04.2025

Programme – Overview

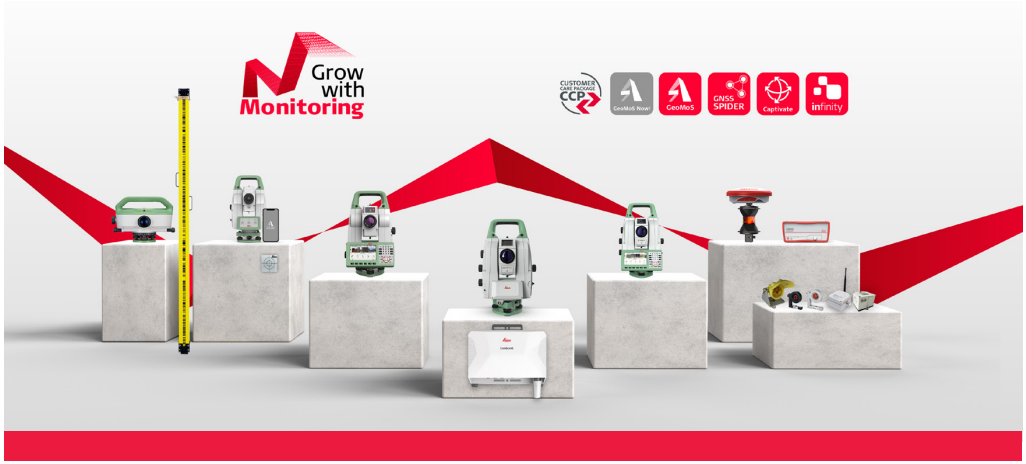
	Monday, 07.04.2025	
08:00 - 09:00	Registration	
09:00 - 10:00	Opening Ceremony	
10:00 - 10:45	Keynote: "The role of stress for safe water reservoir operation"	
10:50 - 12:20	Trends in deformation analysis	Enhanced deformation monitoring by means of data fusion I
12:20 - 13:15	Lunch break	
13:15 - 14:45	Research Unit "TLS-Defo": An holistic approach for TLS-based dam monitoring	Enhanced deformation monitoring by means of data fusion II
14:45 - 15:15	Coffee break	
15:15 - 17:15	Remote structural health monitoring	Dynamic structural health monitoring
20:00	Ice breaker party	

	Tuesday, 08.04.2025	
08:30 - 10:00	Quality assurance in deformation monitoring	Machine learning for deformation analysis
10:05 - 10:35	Teaser presentations A (poster)	
10:35 - 11:15	Poster session (with coffee break)	
11:15 - 12:45	Surface reconstruction as a basis for deformation analysis	Sponsors' presentations
12:45 - 13:45	Lunch break	
13:45 - 14:30	Keynote: "Why geodesy is needed for monitoring, or why not"	
14:35 - 16:05	Advanced point cloud analysis strategies for deformation analysis	InSAR for deformation monitoring I
16:05 - 16:30	Coffee break	
16:30 - 18:00	Alpine geomonitoring with TLS	InSAR for deformation monitoring II
20:00	Dinner	

	Wednesday, 09.04.2025	
08:30 - 10:00	About the importance of stochastic information in deformation analysis	Terrestrial radar for deformation monitoring
10:05 - 10:35	Teaser presentations B (poster)	
10:35 - 11:15	Poster session (with coffee break)	
11:15 - 12:45	Feasibility studies: New sensors for deformation monitoring	Innovative approaches for deformation monitoring
12:45 - 13:45	Lunch break	
13:45 - 15:15	Advanced approaches for total station-based deformation monitoring	Challenges in GNSS-based deformation monitoring
15:20 - 16:05	Keynote: "Combination for simulation models and deformation monitoring in structural dynamics"	
16:05 - 16:30	Closing	

- when it has to be **right**

Leica Geosystems



Enhance safety with scalable deformation monitoring

- Buildings And Structures
- Transporation Infrastructure
- Environmental Monitoring
- Energy Infrastructure
- Mining

Learn more about Leica Geosystems Monitoring Solutions:
leica-geosystems.com/monitoring

Keynotes

Monday, 07.04.2025, 10:00 - 10:45, Room A

"The role of stress for safe water reservoir operation"

Frank R. Schilling, Birgit I. R. Mueller

The Enguri-high-dam was chosen for the study of water level induced seismicity due to its height of 271 m and extraordinary water level variations. On site-research allows to quantify underlying processes and mechanisms of dam-environment interactions – to reduce risks for public and the environmental impact. The interdisciplinary collaborative effort www.DAMAST-caucasus.de initiated a transfer to enhance the lifetime of Enguri-High-Dam supplying 40% of Georgian electricity demand.
THE CHALLENGE(S): Earthquakes are triggered by stress modifications in the underground. Hence the question arises, how is induced seismicity connected to water level changes? What are potential risks of water dams for environment and population? The answers require an improved understanding of processes in the underground. What is the share of sedimentation into a reservoir and pore-pressure stress coupling through water level variations on induced seismicity?
METHODOLOGIES: In the DAMAST projects research on methods for a comprehensive deformation monitoring system around, at and within the Enguri Arch Dam, has been ongoing since 2019. To study the seismicity a dedicated seismological network was established at the dam which is able to detect even micro-seismic events. Historical and operational data as well as the results of the new observations serve as basis for the analysis. This allows to identify correlations between different processes and mechanisms as well as to derive recommendations for a safer operation of the facility.
RESULTS In addition to established methods, new concepts such as the successful testing of GB-SAR for dam deformation monitoring have been implemented and Artificial Intelligence (AI) methods were used. Numerous, up to 300 m deep drill holes had been drilled in the vicinity of the dam and have been monitored with modern borehole logging tools as well as with hydraulic fracturing to deduce the state of stress, which turned out to be manly influenced by local topography. The influence of periodic water level fluctuations on the regional deformation as well as the structural deformation of the dam could be shown using PSInSAR, 3D terrain and dam models

and GB-SAR measurements. Increasing water levels lead to subsidence and sideway displacement of the lake shores and deformation of the dam itself. Large-scale numerical models provide information on the deformation behavior of the dam embankment and enable to calculate the distribution of shear and Coulomb Failure stresses based on the compiled stress data. Modelling results have been compared with the time series and location of the micro-seismicity. Model data, geometries and measurement data are then used to train a Convolutional Neural Network (CNN).

The projects focus on the SDGs of clean energy, environment and climate protection which are linked to SDGs of innovation and infrastructure, good jobs, economic growth and poverty reduction. Inherent are contributions to the quality of education. he trained young researchers have the potential to play a decisive role within future authorities, e.g. for project approval and control. This is extremely relevant to achieve the SDGs and for the direct users such as owners of hydropower and irrigation reservoirs.

Tuesday, 08.04.2025, 13:45 - 14:30, Room A

"Why geodesy is needed for monitoring, or why not"

Andreas Wieser

Deformation monitoring based on multi-epoch network measurements and statistically strict testing for differences of network geometry was an important contribution of (engineering) geodesy to many application fields. It still is. But for many applications, data acquisition with a variety of sensors has become easy and cost effective. Solutions range from embedded and in-situ sensing via classical geodetic methods to air- and spaceborne remote sensing with sometimes highly automated processing pipelines. Machine learning already supports the data analysis and may soon bridge the gap between data processing and interpretation. What does this mean for geodesist? Should they "go with the flow"? Are their key competences not unique enough anymore or even becoming obsolete? In this presentation, I will try a high-level look at the development of the fields of deformation monitoring, and the role of geodesy.

Wednesday, 09.04.2025, 15:20 - 16:05, Room A

"Combination of simulation models and deformation monitoring in structural mechanics"

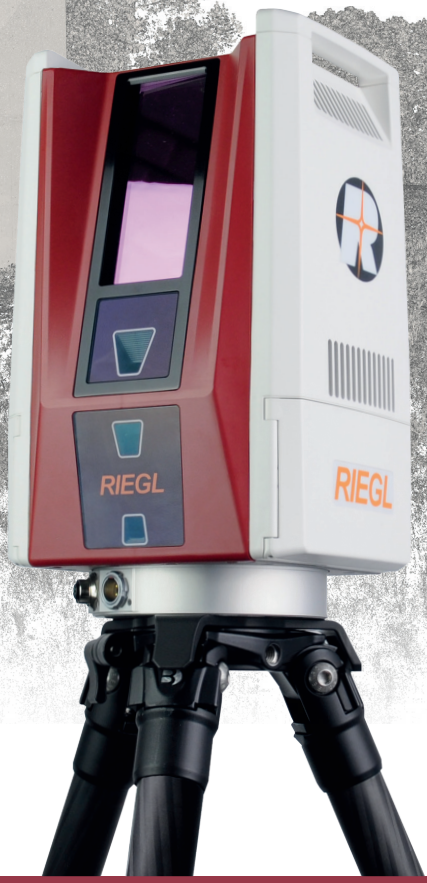
Steffen Freitag, Ba Trung Cao, Nicola Gottardi, Anastasiia Volovikova, Günther Meschke

The performance and the reliability of engineering structures, e.g. bridges, tunnels or buildings, have to be assessed by structural models, which are used to compute the structural response (e.g. displacements and stresses of the structural components) according to the expected loads and environmental conditions. This includes not only the final structural state but also the construction process. Additionally, the health state of the structure may change during its lifetime, which needs to be considered within the reliability and safety assessment. In general, the structural response can be represented as time-variant processes of structural quantities of interest, which are dependent on the time-variant loads and material parameters.
Deformation monitoring is an important approach to observe the structural state during construction and during the service life of the structure. Real-time applications enable to compare continuously monitored deformation data with a priori computed deformations and to check specific threshold values, e.g. within a structural warning system. In addition to structural inspections, deformation monitoring can help to assess the structural health state or to identify unknown load and boundary conditions of the structural models. This requires to combine deformation monitoring with structural simulation models, which is the focus of this presentation. To achieve real-time performance of computational expensive simulation models, surrogate modeling strategies based on artificial neural networks will be presented. Additionally, the consideration of uncertainties will be discussed.

RIEGL VZ-600i

RIEGL's New Era of Terrestrial Laser Scanners

- 3D position accuracy up to 3 mm @ 50 m
- scan time with image acquisition: < 30 sec. / scan with 6 mm resolution @ 10 m distance
- up to 60 scan positions per hour
- broad range capability (0.5 m up to 1000 m)
- precise real-time on-board registration
- internal cameras & GNSS receiver
- RTK-GNSS receiver, full format system camera, etc. (optional)
- weight 6 kg / 13 lbs
- prepared for mobile use



extreme versatility | high productivity | ultimate performance

RIEGL VZ-600i Video
www.riegl.com

RIEGL®

Austria | USA | Japan | China | Australia | Canada | United Kingdom | South America | Asia Pacific | Germany

Technical programme

Monday, 07.04.2025, 10:50 - 12:20, Room A

Trends in deformation analysis – Extensive solutions for deformation monitoring

W. Niemeier 50 Years of Deformation Monitoring - What has been achieved?
H. Kutterer, M. Even, A. Seidel, J. Weisgerber Bridging the scales - Earth observation infrastructure and geodetic deformation monitoring
D. Czerwonka-Schröder, F. Schulte, W. Albert, K. Hosseini, R. Tabernig, Y. Yang, B. Höfle, Ch. Holst, K. Zimmermann AImon5.0 - Real-time monitoring of gravitational mass movements for critical infrastructure risk management with AI-assisted 3D metrology
K. Karsznia, E. Świerczyńska, K. Książek, W. Odziemczyk Development of an expert system for the deformation monitoring of historical sites using Artificial Intelligence (AI)

Monday, 07.04.2025, 10:50 - 12:20, Room B

Enhanced deformation monitoring by means of data fusion I

D. Bolkas, M. Olsen, E. Che, C. Simpson First steps towards creating multi-sensor DEMs using optimal weighting for monitoring applications
N. Dal Santo, A. Michelini A data fusion approach for combined Terrestrial Radar Interferometry (TRI) and Robotic Total Station (RTS) monitoring
T. V. Pattela, L. Disperati, E. D'Addario, D. Rappouli Multi-Temporal GNSS, RTS, and InSAR for Very Slow-Moving Landslide Displacement Analysis
A. Seidel, M. Even, M. Westerhaus, H. Kutterer Surface displacement monitoring and geophysical source modeling at the gas storage cavern field Epe

Monday, 07.04.2025, 13:15 - 14:45, Room A

Research Unit "TLS-Defo": An holistic approach for TLS-based dam monitoring

E. Koller, B. Jost, H. Kuhlmann
Towards the calibration of terrestrial laser scanners – A case study at a concrete water dam

O. Abdelgafar, Ch. Holst
An efficient strategy for determining (scaled) intensity-based range variances of terrestrial laser scanners for rigorous deformation analyses

E. Ötsch, C. Harmening, H. Neuner
Employing variance component estimation for point cloud based geometric surface representation by b-splines

S. Sadiq, C. Harmening
Investigating the potential of stochastic relationships to model deformations

Monday, 07.04.2025, 13:15 - 14:45, Room B

Enhanced deformation monitoring by means of data fusion II

M. Scaioni, E. Realini, L. Ferrario, F. Roncoroni, S. Barindelli, D. Ravasi, R. Eskandari, F. Sansò, L. Barazzetti, M. Garramone, M. Previtali
HeMOC: a Project for integrated Monitoring of Cultural Heritage in Como Town, Italy

N. Wielgocka, G. Jóźków, D. Teodorczyk
Classifying surface displacements in mining regions using differential terrain models and coherence analysis

F. Grassi, P. Rossi, B. Brunelli, F. Mancini, C. Castagnetti, L. Vincenzi, E. Bassoli, A. Capra
Ensembling satellite monitoring and numerical cartography towards the safety assessment of infrastructures

M. Montuori
Digital elevation model and the enhancement of out-of-plane masonry deformation assessment

Monday, 07.04.2025, 15:15 - 17:15, Room A

Remote structural health monitoring

V. Belloni, N. E. Deresse, A. Nascetti, E. Verstrynge
Crack monitoring of masonry walls with enhanced Digital Image Correlation methods

Ch. Gaus, B. Jost, T. Piert, Ch. Hesse, K. Holste, H. Kuhlmann
Analysis and optimization of the reliable hole detection in sheet pile walls

A. Algadhi, P. Psimoulis, A. Grizi, L. Neves
Impact of surface orientation of structures on their seasonal deformation: a case-study in the UK

J. Backhaus, V. De Arriba Lopez, P. M. Achanccaray Diaz, M. Maboudi, B. Riedel, U. Bestmann, M. Gerke
Signalization-free coregistration methods of multiscale and multitemporal survey and image information for structural monitoring

N. C. Meyer, T. Medic, E. Friedli, A. Wieser
Investigation of different registration methods for TLS-based deformation analysis of hydroelectric dams – A case study

Monday, 07.04.2025, 15:15 - 17:15, Room B

Dynamic structural health monitoring

R. Gao, B. Zhang
Real-Time Deformation Monitoring of the Long-span Bridge Using GNSS PPP-RTK

X. An, X. Meng, L. Hu, Y. Xie, F. Zhang
Integrated GNSS Positioning and Attitude Determination for Structural Health Monitoring of Large-span Bridges

G. Piniotis, T. Mpimis, V. Gikas
Dynamic Behavior Monitoring and Condition Assessment of a Multi-span Beam Bridge Complex Based on Long-Period Sensing Data

C. Xue, G. Li, J. Geng, P. Psimoulis
Evaluation of GNSS-smartphone performance in monitoring dynamic motion

J. M. O. Jayamanne, P. Psimoulis, J. Owen, N. Penna, C. Xue
Incorporating Low-Cost GNSS Receivers for Deformation Monitoring in High-Rise Buildings

Tuesday, 08.04.2025, 08:30 - 10:00, Room A

Quality assurance in deformation monitoring

Th. Pfaffinger, M. A. Ortiz Rincón, A. Nothnagel, Ph. Mey, Ch. Holst
Strategies for quality-controlled deformation analysis of radio telescopes' main reflectors applied to SARAO Hartebeesthoek site

F. Schill, M. Horn, Th. Moser, W. Lienhart
Investigating the precision of remote geodetic sensors for bridge monitoring: a large-scale field study

R. Maalek
Digital Twin Model Calibration of Prefabricated Structural Systems under Visible Deformation: Recovering the Joint Fixity of a Cantilever Steel Space Frame Structure subjected to Static Displacement using Laser Scanning

M. Wagner, B. Jost, L. Klingbeil, H. Kuhlmann
Efficient and accurate? – Evaluation of a mobile mapping system in the context of road surface monitoring

Tuesday, 08.04.2025, 08:30 - 10:00, Room B

Machine learning for deformation analysis

J. Stähle, A. Volovikova, S. Freitag, A. Stark
Artificial Intelligence-Based Deformation Analysis for Damage Identification in Structural Health Monitoring

K. Wang
A deep learning bridge deformation prediction model based on generative AI

C. Hancock, C. Hill, P. Bhatia, J. Starkey, A. Athab, L. Yang, A. Arcia, A. Wong
Low-Cost GNSS Ground Monitoring for Land Planning: AI-Integrated Geospatial Solutions

S. Mitra
Identification and Active Deformation Analysis of Landslides Using Statistical Approaches, Machine Learning Algorithms based on SAR Interferometry results: A Case Study of Manutuke and Xiongba Landslides

Tuesday, 08.04.2025, 11:15 - 12:45, Room A

Surface reconstruction as a basis for deformation analysis

L. M. Stausberg, N. Quadt, B. Jost, H. Kuhlmann Investigating of the applicability of surface models for laser scanner-based deformation analyses
R. Lindenbergh, D. Thomas, H. Daan Assessing 3D morphological dune changes using ridge-, through- and curve skeleton lines
L. Winiwarter, K. Anders, B. Jutzi Assessing the Potential of Neural Radiance Fields and Gaussian Splatting for Change Detection and Change Quantification
Ch. Michel, M. Ulrich Automatic Inspection of Punched Metal Plate Fasteners on Timber-to-Timber Joints with Image-Based 3D-Reconstruction

Tuesday, 08.04.2025, 11:15 - 12:45, Room B

Sponsors' presentations

M. Rutschmann (Senior Product Manager, Leica Geosystems AG) Autonomous and Automated Railway Deformation Monitoring
E. Burth (Managing Director RIEGL Germany) Efficient infrastructure and deformation monitoring using laser scanning
Daniel Blersch (Senior Application Engineer, Zoller + Fröhlich GmbH) Efficient data capturing for high demands

Tuesday, 08.04.2025, 14:35 - 16:05, Room A

Advanced point cloud analysis strategies for deformation analysis

O. Geißendörfer, Ch. Holst
Vibration monitoring based on LiDAR by observation fusion and spatio-temporal processing of point clouds

R. Tabernig, W. Albert, H. Weiser, B. Höfle
A hierarchical approach for reliable, fast, and near real-time 3D surface change analysis of permanent laser scanning point clouds

A. Voordendag, D. Haener, A. Wieser
Plane-based deformation analysis of railway tracks using airborne laser scanning data

M. E. Kowalska, J. Zaczek-Peplinska
Exploring Planar Projection of Point Clouds: A Case Study with Cylindrical Objects

Tuesday, 08.04.2025, 14:35 - 16:05, Room B

InSAR for deformation monitoring I

M. Omidalizarandi, P. K. Kirui, A. C. Kalia
Advanced Regional-Scale Anomaly Detection Using Persistent and Distributed Scatterer Interferometry with Vector-Autoregressive Time Series Analysis

K. Shahryarinia, M. Omidalizarandi, M. Heidarianbaei, M. A. Sharifi, I. Neumann
Detecting Change Points in Time Series of InSAR Persistent Scatterers Using Deep Learning Models

J. Hu, W. Wu, Q. Sun
Deformation Monitoring for Buildings with Time-series InSAR Point Cloud

D. Liu, J. Guo, J. Wang
Development of a satellite-based InSAR processing platform and its application in the mountainous region of Southwest China

Tuesday, 08.04.2025, 16:30 - 18:00, Room A

Alpine geomonitoring with TLS

N. Shi, T. Medic, N. Meyer, A. Voordendag, A. Wieser
Quantifying and reducing uncertainty of 3D displacement estimates from terrestrial laser scanner point clouds: A case study in Alpine geomonitoring

Y. Yang, D. Czerwonka-Schröder, Ch. Holst
Using point cloud registration to mitigate systematic errors in permanent laser scanning-based landslide monitoring

K. Hosseini, J. Hummelsberger, S. Zubareva, Ch. Holst
Advanced Real-Time 4D Landslide Monitoring Using Point Cloud Data with Contour Line Application and Feature Tracking for Predicting Future Movements

Z. Wang, J. A. Butt, A. Wieser
Efficient RGB Image-Based 3D Displacement Estimation for Landslide Deformation Monitoring

Tuesday, 08.04.2025, 16:30 - 18:00 Room B

InSAR for deformation monitoring II

M. Crosetto, S. Shahbazi, A. Barra
Mapping building differential deformations over wide areas

R. Eskandari, M. Scaioni
Joint Use of EGMS and Cosmo-SkyMed InSAR for Assessment of Ground and Structural Deformations: The Case of Como, Northern Italy

V. K. Maurya, S. Mitra, R. Dwivedi
Investigating surface deformation kinematics of Stromboli volcano using Multi-Temporal SAR Interferometry

A. Piter, M. Haghighi, M. Motagh
Temporary coherent scatterer selection for transport infrastructure monitoring with Sentinel-1 InSAR

Wednesday, 09.04.2025, 08:30 - 10:00, Room A

About the importance of stochastic information in deformation analysis

J. A. Butt, A. Wieser Building and Solving Deep Stochastic Instrument Models with CaliPy
M. Lösler, C. Eschelbach, R. Lehmann Impact of mathematical correlations in industrial applications
G. Kerekes, V. Schwieger Correlations in TLS point clouds: Should we care about them?
K. Snow, B. Schaffrin Total Least-Squares Collocation for Deformation Analysis

Wednesday, 09.04.2025, 08:30 - 10:00, Room B

Terrestrial radar for deformation monitoring

A. Michelini, N. Dal Santo, G. Alli, C. Testa Water multipath effect in Terrestrial Radar Interferometry (TRI) for open-pit mine monitoring
A. Schenk, M. Rebmeister, R. Dujardin, A. Zarate Uribe, R. Zorn A neural network approach to estimate the contribution of atmospheric variance in GBSAR time series
M. Rebmeister, A. Schenk, S. Hinz, F. Andrian, M. Vonié Ground-Based InSAR and GNSS integration for enhanced dam monitoring

Wednesday, 09.04.2025, 11:15 - 12:45, Room A

Feasibility studies: New sensors for deformation monitoring

P. Krnjak, A. Kosor, H. Tomić, A. Marendić, R. Paar Comparative Analysis of Volume Estimation Accuracy Using Low-Cost Mobile Phone Lidar and Traditional Geodetic Methods
A. Boney, S. Nishiyama, O. Murakami, S. Akita A Feasibility Study to Monitor Crack Width Displacement using Images Taken with PTZ Cameras
V. Kostjak, H. Neuner Investigation of a PLS for its use in static deformation measurements
F. Pollinger (GKGM) GKGM-Award ceremony (J. Guillory) *J. Guillory* Field measurements over kilometres with sub-millimeter uncertainties using the Arpent two-wavelength EDM

Wednesday, 09.04.2025, 11:15 - 12:45, Room B

Innovative approaches for deformation monitoring

C. Qiu, S. Pytharouli, J. Souter Ground motion baseline analysis using tilt sensors
X. Liu, J. Wang, C. Hancock IMU based structural health monitoring of floodlights
E. Barnefske, C. Semmelroth, A. Scheider, H. Sternberg Determination of the coordinates of a circle using distributed fibre-optic length changes
F.-B. Cartiaux, J. Semiao, A. Mege-Ythier Deformation monitoring and model updating: three case studies on the Paris Metro

Wednesday, 09.04.2025, 13:45 - 15:15, Room A

Advanced approaches for total station-based deformation monitoring

L. García-Asenjo, R. Luján, S. Baselga
Mitigation of the refraction error in surveying techniques by using a network of meteorological sensors and a 3D refractivity model

A. Knöpfler
Deformation measurements on emergency sites

F. Schulte, D. Czerwonka-Schröder, M. Lösler
Automatic geodetic monitoring with total stations based on open source software library JAG3D - Case study of a rockfall in Trier/Germany

J. Zaczek-Peplinska, M. E. Kowalska
Principles and Case Study of IMSGeo: Automatic Displacement Monitoring System for Construction Sites

Wednesday, 09.04.2025, 13:45 - 15:15, Room B

Challenges in GNSS-based deformation monitoring

R. Xi, Q. Chen, W. Jiang, X. Meng
Numerical modeling and analysis of GNSS diffraction error in complex environments

Q. Huang, W. Yu, W. Dai
A machine learning-based approach in outlier detection for GNSS bridge deformation monitoring

W. Dai, Y. Wen, W. Yu
The usability evaluation and data processing methods of GNSS deformation monitoring in challenging environment

G. Ferhat, X. Wanner, M. Vidal, J.-P. Malet
Challenges and limitations in geodetic monitoring of landslides, case-study of Viella (Pyrenees mountains) and La Valette (Southern Alps), France

Poster sessions

Tuesday, 08.04.2025, 10:05 - 11:15, Room A + Room C

M. Ulm, M. Elias, A. Eltner, E. Lotsari, K. Anders
Automated change detection in photogrammetric 4D point clouds – Transferability and extension of 4D objects-by-change for monitoring riverbank dynamics using low-cost cameras

S. Łapiński, P. Mąkowski
Detection analysis of displaced connection points for a different type of engineering survey networks connections

P. Wyszkowska, R. Duchnowski
Sliding window algorithm applied to Msplit estimation for seasonal change detection from LiDAR data

J. Steinbach, C. Harmening
Laser scanning based deformation analysis of a wooden dome under load

M. C. Ramlie, P. Olea Encina, Ch. Magnard, T. Strozzi, O. Monserrat, M. Crosetto, Ch. McDermott
The Potential of PSI Time Series Analysis for the Monitoring of the Geobattery Project

P. Olea Encina, M. Ramlie, M. Crosetto, O. Monserrat
Analyzing the Impact of Soil Moisture Dynamics on Ground Deformation in Salar de Atacama Using PSI and Sentinel Imagery

J. Paziewski, R. Sieradzki, J. Koscielski, H. Szczepanik, D. Tomaszewski, K. Stepniak
Validation of mass-market GNSS and IMU MEMS sensors for millimeter-level displacement retrieval under simulated vibrations

R. Naeimaei, S. Schön
Deterministic Uncertainty for Terrestrial Laser Scanning Observations Based on Intervals

C. Ito, S. Nishiyama
UAV Measurement Methods for Monitoring of Volume Reduction at Dredged Sediment Disposal Sites

R. Palamà, A. Barra, M. Cuevas-González, K. Pawłuszek-Filipiak, J. Navarro, O. Monserrat, M. Crosetto
Wide-Area Supervised Classification of Ground Deformation Phenomena from European Ground Motion Service Products

G. Ferhat
Evaluation of several GNSS receivers: from low-cost to high-end geodetic receivers

Wednesday, 09.04.2025, 10:05 - 11:15, Room A + Room C

G. Ferhat, M. Ajrouche, C. Fontaine, L. Krangnes, M. Meroni
Some examples of landslide monitoring using Trimble equipement in Europe

A. M. Ruiz-Armenteros, M. Marchamalo-Sacristán, F. Lamas-Fernández, Á. Hernández-Cabezudo, A. Fernández-Landa, J. M. Delgado-Blasco, M. Bakon, M. Lazecky, D. Perissin, J. Papco, G. Corral, J. L. Mesa-Mingorance, J. L. García-Balboa, A. Da Penha Pacheco, J. M. Jurado-Rodríguez, J. J. Sousa
Integrated Monitoring of Dams and Large Ponds: The Role of Satellite Radar Interferometry and the European Ground Motion Service

L. Hu, X. Meng, X. An, Y. Xie, C. Hancock, Y. Bao
A New Method for Discriminating and Mitigating GNSS Multipath Errors in Bridge Structure Health Monitoring

J. Li, X. Meng, L. Hu, Y. Bao, S. Zhao
A New Method for Intelligent Bridge Crack Identification and Measurement through Integrating YOLOv8 and U-Net3+

J. Kapłon, A. Kaczmarek, I. Kudłacik, H. Romanik, Z. Zięba
The evaluation of high-rate displacements' detection using Septentrio mosaic X5 low-cost GNSS receiver supported with external clock signal

Y. Dai, W. Dai
Automated Stability Assessment Framework for Rock Slopes Driven by Deformation Monitoring Data and Physical-Mechanical Model

D. Pan, W. Dai, L. Xing, Y. Zhang
Scheimpflug Camera-Based Deformation Monitoring Technology and Applications

S. Benyahia, B. Rouissat, N. Smail, F. Touati, N. Benaraba
Monitoring of an embankment dam in northwestern Algeria based on Sentinel-1 Time-series InSAR

Z. Muszynski, M. Wyjadlowski, P. Kujawa, K. Gorska
Application of terrestrial laser scanning and inclinometer for comprehensive monitoring of deep excavation

Q. Zhang, Z. Wu, D. Zhao, B. Chen
Time-aware TCN–LSTM-based approach for the early warning of temperature-induced bearing displacement of suspension bridges

J. E. Blanco, M. C. DeLacy, M. A. Gomez
Bayesian and frequentist significance of vertical displacements from high-precision geodetic observations: case study in an earth fill dam placed in southern Spain