LECHNER TUDÁSKÖZPONT



Current practices of EO data for DRM

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FÖLDMEGFIGYELÉSI OPERATÍV KÖZPONT

18/07/2023

LECHNER KNOWLEDGE CENTER (LTK)

- Professional background institution to the Prime Minister's Office
- State organization of surveying and geoinformatics
- More than **500 people**: researchers, geoscientists, engineers, GIS experts, software developers
- Managing the largest and most complete collection of spatial datasets in Hungary
- Spatial data related to the **natural environment**
- Official registers of the **built environment**
- Databases of the **socio-economic environment**
- Specific processing, analysis and geoinformatical development skills and capacities in-house
- New organizational unit from 1st of January, 2022:
 Earth Observation Center





Remote Sensing capabilities

- Balanced use of quantitative and visual methods
- Combined use of different data sources
 - RS:
 - airborne/space-borne
 - Field surveys
 - Official: LPIS, cadastre, topography
- Processing of big geospatial data (national, EU)



LAND COVER MONITORING





Land take









European Environment Agency European Topic Centre Data integration and digitalisation









Jelkulcs







SATELLITE GEODETIC OBSERVATORY SERVICES AND RESEARCH RELATED TO RISK ESTIMATION AND MITIGATION









GNSS POSITIONING SERVICE & GEOKINEMATIC INVESTIGATIONS

Operational contribution

- 35+19 CORS & 23 campaign sites
- operational since 2004 (1991)
- multi-GN SS service, <2000 users

Science contribution

- support tectonic hazard estimation
- primary input for recent geokinematic investigations
- continental scale results





Geodetic infrastructures by SGO



GNSS GEOKINEMATIC INVESTIGATIONS



RADAR INTERFEROMETRY History and examples



Kolontar red mud reservoir collapse - 2011







Insar Recent Investigations

GeoSES InSAR Web Viewer

Neszmély – red mud reservoir

Csincse – nearby village to Bükkábrány open-pit mine **Effect of water extraction**

Agricultural Risk Management System (MKR)

Operational since 2014

- Integrated governmental system to assess loss compensation requests The role of LTK: operationally provide thematic maps based on satellite data: Waterlogging/inundation maps (individual dates/certain periods, relative frequency map)
 - **Drought maps (certain periods, frequency map)**
 - High resolution crop condition maps (new achievements from 2022)

Waterlogging/inundation maps

One-date waterlogging map (inland excess water on arable land)

Waterlog
Soil seriously affected
Soil moderately affected
Soil slightly affected
Vegetation standing in water
Not affected areas
Areas non-eligible for agricultural subsidies
Cloud, missing data

Relative waterlogging frequency map (1998-2021)

National drought frequency map for the period of second half of August based on a time series of MODIS satellite images between 2003 and 2022

High resolution crop condition maps

High resolution crop condition maps

height: 200cm 27 corncob/ 5m no lack of plants

Not and

welland

height: 100 cm a few tiny corncob lack of plants

height: 200cm 27 corncob/ 5m no lack of plants

Earth Observation Information System (FIR)

- KÖFOP-1.0.0-VEKOP-15-2017-00050 project (KIFÜ-LTK-NISZ) ESA Collaborative Ground segment node
- Hardware and software infrastructure for NRT access, processing and archiving of Sentinel data over Hungary
- Earth Observation Operations Centre at LTK
- Automatized processing chains to support governmental processes, specific modules supporting:
 - **Civil protection**
 - Fire risk assessment
 - Monitoring of critical water management infrastructure (InSAR)
 - Water authorities
 - Monitoring of inland excess water
 - Forestry
 - Agriculture

The FIR Architecture

Hardware architecture

CPU core	1128 core
GPU core	2*5120
CUDA cores	Up to 7 TFLO
Memory	8000 GB
Disk storage	2200 TB
Archive storage	4800 TB

General Processing Workflow

The eFöld portal

- **Publicly available**
- Search and download Sentinel products
- Advanced search with area, date of recording, cloud cover etc.
- **Display Sentinel-2 images**
- **Band combination and index calculation**
- Image comparison
- **API service**

Water Management Service

- Dedicated monitoring service for the Water Management Directorate
- Sentinel-1 and Sentinel-2 based flood and inland water detection workflow
- Excess water statistics for various water management and administrative polygons
- With sftp server connection for automatic file transfer

Fire Risk Assesment Service

- Dedicated monitoring service for the National Directorate for Disaster
 Management
- Monitor, analyse and detect fire events
- Supporting EO-based layers: NDVI, Biomass loss, Soil moisture, fire severity (RDB, DNBR, RDNBR, RBR)

259° É: 21.225243° K

Monitoring of Critical Water Infrastructure

- Dedicated monitoring service for the National Directorate for Disaster
 Management
- InSar-based motion detection near critical water facalities
- Prevent catastrophic situations, and to increase resilience
- Dashboard showing the degree of displacement and artifact details
- Advanced administration and reporting

Contact

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