UNITED NATIONS AGENDA 2030 AND SENDAI FRAMEWORK EFFORTS: CHALLENGES FOR CARTOGRAPHY AND GEOINFORMATION SCIENCES

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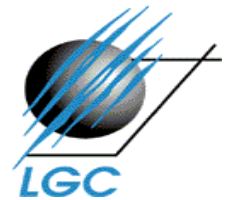
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1. Introduction

2. Sustainable Development (SDG's) goals, targets, and indicators

3. Disasters Risk Reduction Agenda: Sendai Framework, targets and global indicators

4. Data and Information Support: U.N. GGIM and DBAR

5. The Challenges of Cartography and Geospatial Sciences

6. Conclusions

1. INTRODUCTION

World Global Challenges:

Sustainable Development Approach and Disaster Risk Reduction

„Information Society” is the term that is used to capture the increasing contemporary influence of information and communication technologies (ICTs).

Knowledge-based society enhances content of the processes based on data, information and knowledge.

Information Society

Sustainable Information Society

The linkage between sustainability

and information society development

is still poorly understood.

Sustainable Development:

a set of the equal important aspects:

- economic,
- ecological,
- technological,
- social,
- cultural,
- ethical.

2. Sustainable Development (SDG’s) goals, targets and indicators

UNEP 2030 Agenda

DEVELOPMENT GOALS

UN disaster risk reduction Agenda

Snowstorm, Drought , Earthquake, Flood, Hurricanes, Cyclones and typhoons, Landslide, Tornado , Tsunami, Volcanic eruption, Wildfires

UNISDR

2018 AMCDRR

1-6

- POVERTY
- HUNGER AND FOOD SECURITY
- HEALTH
- EDUCATION
- GENDER EQUALITY AND WOMEN'S EMPOWERMENT
- WATER AND SANITATION

7-12

- ENERGY
- ECONOMIC GROWTH
- INFRASTRUCTURE, INDUSTRIALIZATION
- INEQUALITY
- CITIES
- SUSTAINABLE CONSUMPTION AND PRODUCTION

13-17

- CLIMATE CHANGE
- OCEANS
- BIODIVERSITY, FORESTS, DESERTIFICATION
- PEACE, JUSTICE AND STRONG INSTITUTIONS
- PARTNERSHIPS

2030 Agenda: Goals, targets, indicators

17 SDGs

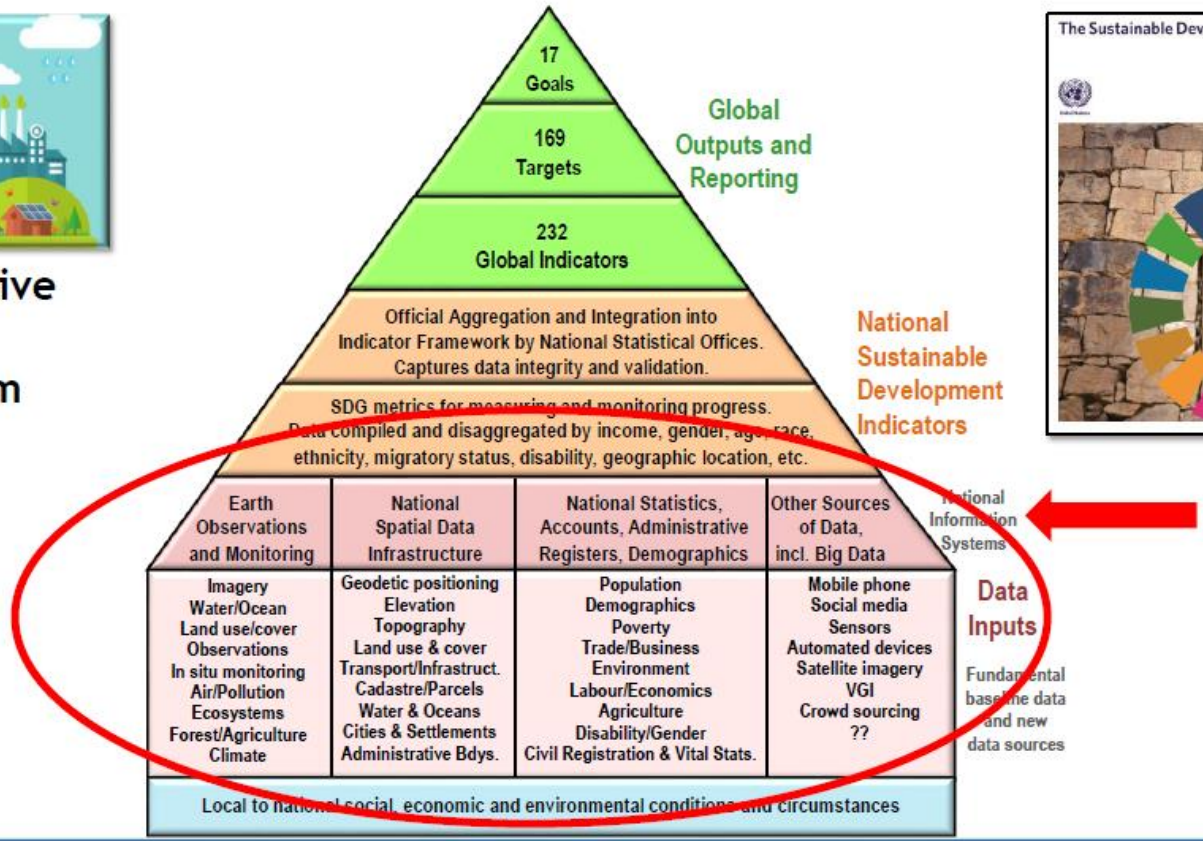
169 Targets

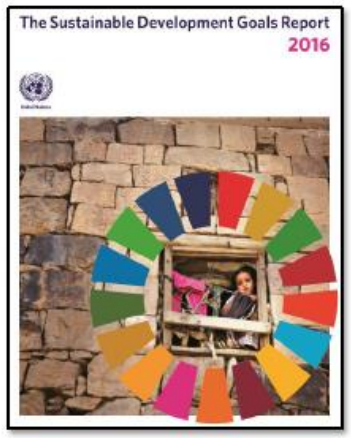
232 global indicators to follow-up and review progress

Implementation via national planning processes, policies, strategies and frameworks

Measuring and monitoring: Statistics, geospatial information, Earth observations and other Big Data

An integrative data ecosystem





Global development policy framework

Indicators for SDGs

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

- **11.1** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

- **11.2** By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

- **11.1.1**Proportion of urban population living in slums, informal settlements or inadequate housing
- **11.2.1**Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

The critical step ahead is a fact that ***17th goals are accompanied by 169 targets, 232 global indicators*** to follow-up and review progress to know real state of the art of our planet according to measured characteristics.

Implementation of these efforts is expected by implementation via ***national planning processes***, policies, strategies and frameworks.

Measuring and monitoring will be done by statistics, geospatial information, Earth observations and other Big Data.

United NationsA/RES/71/313
General AssemblyDistr.: General
10 July 2017Seventy-firstsessionAgenda items 13 and 11717-11371(E)*1711371*Pleaserecycle

Resolution adopted by the General Assembly on6July2017

[without reference to a Main Committee (A/71/L.75)]

71/313. Work of the Statistical Commission pertaining to the2030 Agenda for Sustainable Development

Annex

Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development

Tier Classification Criteria/Definitions:

Tier 1: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant.
Tier 2: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.
Tier 3: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

Supportive activities

Pilot study of OECD "Measuring the distance to the goals of sustainable development". OECD-Organization for Economic Co-operation and Development

OECD A SGDs

As part of the OECD Action Plan, a reporting methodology entitled **"Measuring Distance to the SDG Targets"** was developed in 2016, 2017 and 2019.

Their aim was to assist Member States in implementing the 2030 Agenda for Sustainable Development.

The report **uses a unique methodology** for assessing the amount of work that OECD countries have yet to do to meet all the objectives of the SDGs.

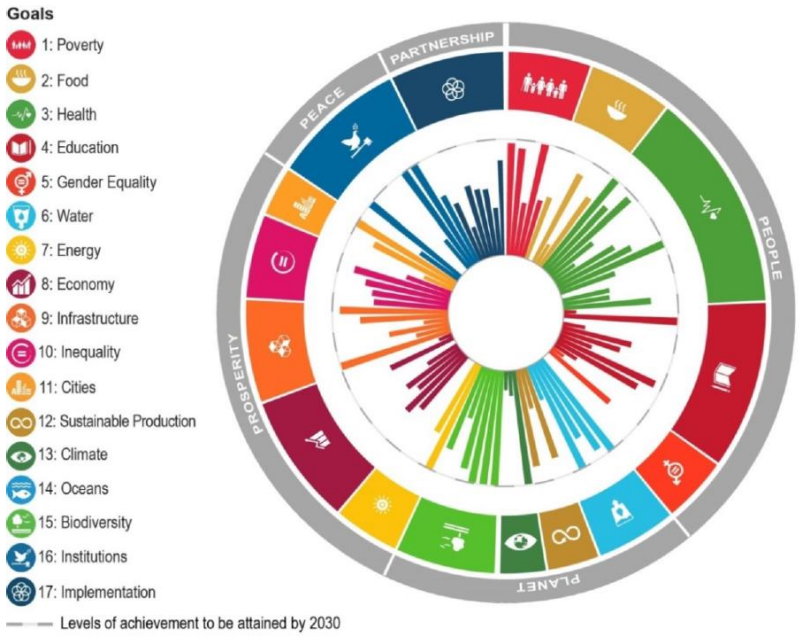
The procedure is based on the UN IAEG Global List of Indicators and uses publicly available data from OECD and UN SDG databases.

The results are visualized using special graphs on the status of SDGs solutions in individual countries and allow their comparison.

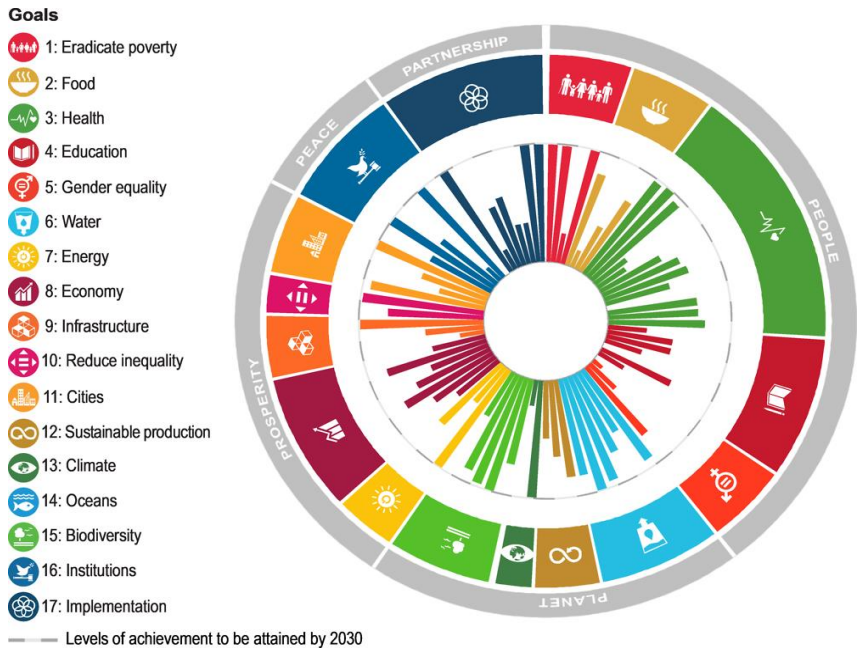
Trends since 2005 are assessed according to **76 indicators**.

The OECD measurement - distance to meet SDGs targets

ČR 2017



ČR 2019



3. Disasters Risk Reduction Agenda: Sendai Framework, targets and global indicators

DISASTER RISK REDUCTION SENDAI GOALS AND GLOBAL INDICATORS

In the Third U.N. World Conference on DRR, March 14, 2015, in Sendai, Japan. As never before the conference in its materials mentioned the role of ICTs, GIS, remote sensing, mapping, sensors, volunteer geographic information, etc.

In the Sendai framework, **four new priorities** of action are defined:

Priority 1: **Understanding disaster risk;**

Priority 2: **Strengthening disaster risk governance to manage disaster risk;**

Priority 3: **Investing in disaster risk reduction for resilience;**

Priority 4: **Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction (United Nations General Assembly, 2015).**

Resolution adopted by the General Assembly on 2 February 2017

[without reference to a Main Committee (A/71/L.54and Add.1)]

71/276.Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction

71/644 ***IV. Recommendations of the open-ended intergovernmental expert working group on global indicators for the global targets of the Sendai Framework for Disaster Risk Reduction 2015-2030 and on the follow-up to and operationalization of the indicators (Global Targets A-G, see next slides)***

Global indicators for the global targets of the Sendai Framework aim to operationalisate **seven targets (A-G).**

They have been selected and as well as related and reflected to the SDGs items **no. 1 - Poverty, 11 – Sustainable Cities and 13 – Climate Action** (Figures 1 and 2)**.**

Sendai Framework Indicators

A set of 38 indicators was identified to measure global progress in the implementation of the Sendai Framework for Disaster Risk Reduction. The indicators will measure progress in achieving the global targets of the Sendai Framework, and determine global trends in the reduction of risk and losses.

Seven Global Targets of Sendai Framework for Disaster Risk Reduction. Source: Policy Area Secure (2018).

Global target D: Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030

D-1 (compound) Damage to critical infrastructure attributed to disasters.

D-2 Number of destroyed or damaged health facilities attributed to disasters.

D-3 Number of destroyed or damaged educational facilities attributed to disasters.

D-4 Number of other destroyed or damaged critical infrastructure units and facilities attributed to disasters.
The decision regarding those elements of critical infrastructure to be included in the calculation will be left to the Member States and described in the accompanying metadata. Protective infrastructure and green infrastructure should be included where relevant.

Global target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.

E-1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.

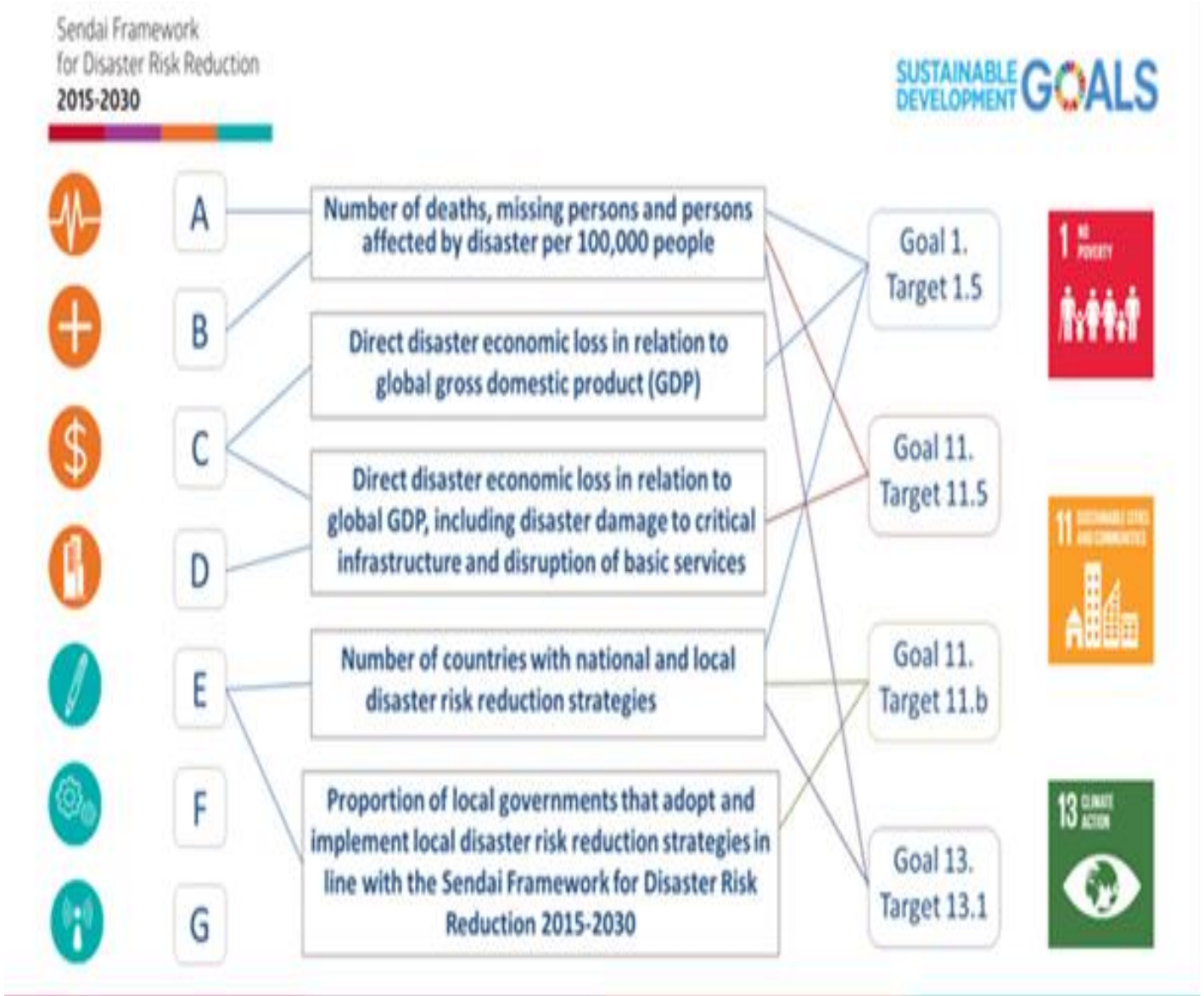
E-2 Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies.
Information should be provided on the appropriate levels of government below the national level with responsibility for disaster risk reduction.

Integration of SDGs and Sendai Framework Indicators

INTEGRATED MONITORING OF THE GLOBAL TARGETS OF THE SENDAI FRAMEWORK AND THE SUSTAINABLE DEVELOPMENT GOALS

The Sendai Framework targets and indicators contribute to measuring disaster-related goals and targets of the 2030 Agenda for Sustainable Development of above mentioned SDGs.

Outcomes are a product of complex and interconnected social and economic processes with overlap across the two agendas.



Integrated Monitoring of the Global Targets of the Sendai Framework and the Sustainable Development Goals. Source: PreventionWeb (2020).

4. Data and Information Support:

U.N. GGIM and DBAR

Digital Earth Alliance

In U.N. GGIM case G. Scott defined data needs for the 2030 Agenda by following way (Scott, 2018):

„The scope of the 2030 Agenda requires high-quality and disaggregated data that are ***timely, open, accessible, understandable and easy to use for a large range of users, including for decision making at all levels.***

There is a need for a reporting system on the SDGs that would have benefit from the sub-national (local) to the national level; and allow for global reporting that builds directly on the data shared by countries.

Strengthening the Global Data Ecosystem

UN-GGIM

2017-2021 Strategic Framework

CONTEXT						
	VISION	*Positioning geospatial information to address global challenges*				
	MISSION	*Operating within agreed policies and institutional arrangements, and as an interconnected global community of practice, the Committee of Experts will ensure that geospatial information and resources are coordinated, maintained, accessible, and able to be used effectively and efficiently by Member States and society to address key global challenges in a timely manner*				
	MANDATED STRATEGIC OBJECTIVES	Provide leadership in setting the agenda for the development of global geospatial information and to promote its use to address key global challenges	Provide a forum for coordination and dialogue with and among Member States and relevant international organizations on enhanced cooperation	Provide a platform for the development of effective strategies to build and strengthen national capacity and capability concerning geospatial information, especially in developing countries	Propose work-plans, frameworks and guidelines to promote common principles, policies, methods, standards and mechanisms for the interoperability and use of geospatial data and services	Make joint decisions and set the direction for the production and use of geospatial information within and across national, regional and global policy frameworks

Digital Evolution

Digital Earth

Global Data Ecosystem

Digital Transformation

Digital Maturity

Digital Divide

Implementing Nationally Integrated Information Systems

Integrated Geospatial Information Framework (IGIF)- part of UN GGIM

The Integrated Geospatial Information Framework (IGIF) provides a basis and guide for developing, integrating, strengthening and maximizing geospatial information management and related resources in all countries. It will assist countries in **bridging the geospatial digital divide, secure socio-economic prosperity, and to leave no one behind.**

The Integrated Geospatial Information Framework provides a basis and guide for developing, integrating and strengthening geospatial information management.

Governance

Technology

People

Knowledge • Decisions • Development

Technology • Applications • Value

Users • Citizens • Access

Society • Economy • Environment

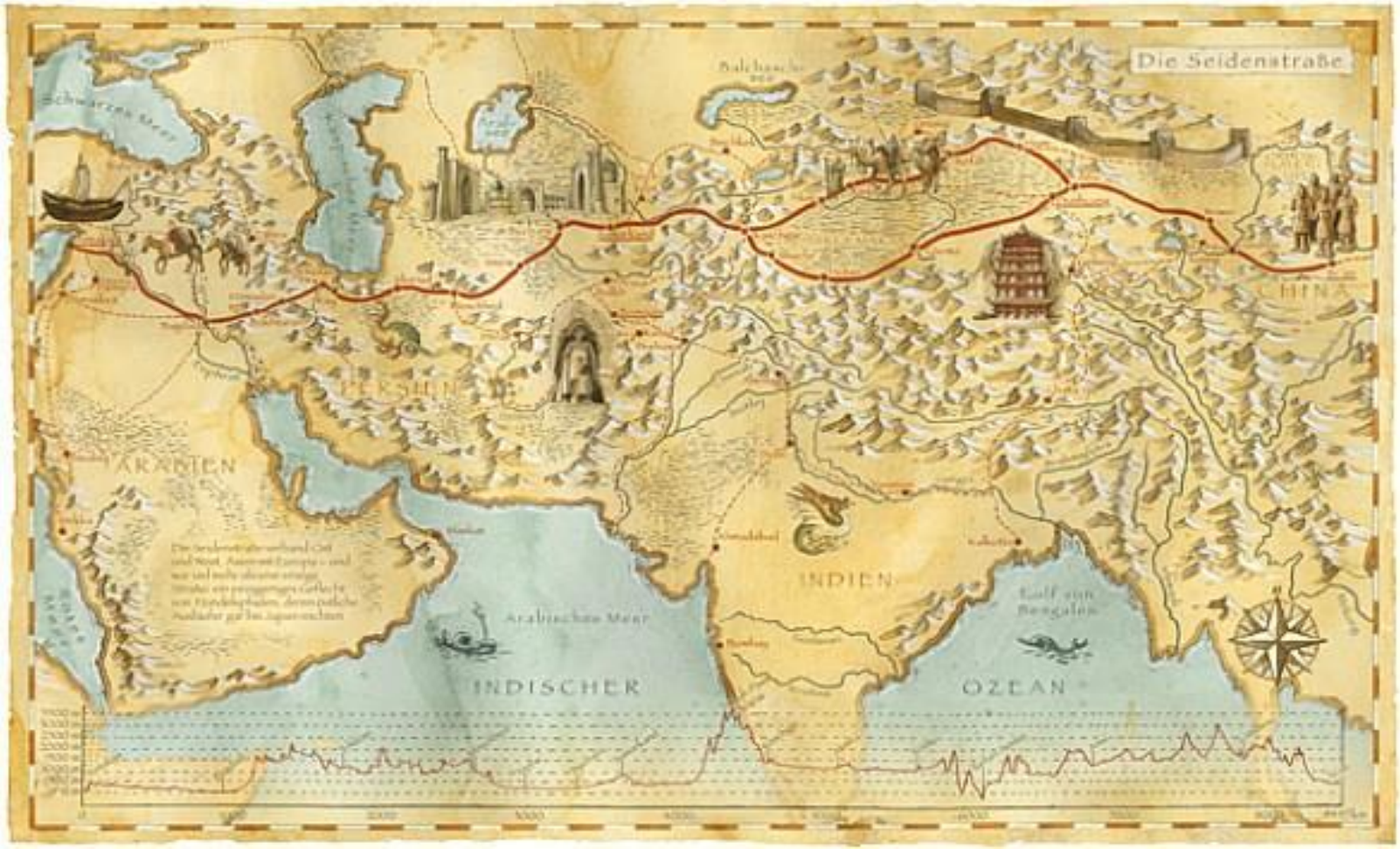
Governance and Institutions	Policy and Legal	Financial
Data	Innovation	Standards
Partnerships	Capacity and Education	Communication and Engagement

Anchored by 9 Strategic Pathways, the Framework is a mechanism for articulating and demonstrating national leadership in geospatial information, and the capacity to take positive steps.

Digital Belt and Road Program (DBAR)

and

Digital Silk Road Alliance (DSRA)



Ferdinand von Richthofen’s Map of the Silk Road in 1877. Source: http://www.silkroutes.net/orient/mapssilkroutestrade.htm

GUO Huadong-1:

Scientific Big Data and Earth Big one

As a branch of big data, **SCIENTIFIC Big Data** is a typical representative of data-intensive science.

Scientific big data has a number of characteristics, including

complexity, comprehensiveness, and global coverage, as well as high degree of integration with information and communication technology.

GUO Huadong-2:
Earth science research, like atmosphere, land and ocean, has produced huge data-sets derived from satellite observations, ground sensor networks, and other sources. This is collectively called **Big Earth data**.

It has features in common with scientific big data, but also has its own particular characteristics. ….
as ***being massive, multi-source, heterogeneous, multi-temporal, multi-scale, high-dimensional, highly complex, nonstationary, and unstructured.*** It provides support for data-intensive research in the Earth sciences

Commons and differences

between

U.N. GGIM and DBAR

At this moment it looks like that **U.N. GGIM** is mature project connected with stabile governmental and public infrastructures tending to solve SDG's and Sendai DRR needs. Covering needs of civil society and its organization.

DBAR has similar ambitious but coming mainly to the countries where SDI still was not fully developed according to Silk Belt and Road.

5. The Challenges of Geospatial Sciences
(ICA results, agenda, outputs)

ICA: working group **2003** , commission **2005**, conference with Gi4DM in Prague **2009** and Beijing on behalf of Czech Republic Presidency of EU with ICA and ISPRS people.
In last 4 years ICA commission Cartography for EW and Crises Management realized 25 events over the World.

ISPRS: Gi4DM **2005**, important conference **2007** in Delft, other conferences (Istanbul) with cooperation with UNOOSA, ***Orhan Altan*** represented geospatial organizations in Geneve conference, membership in U.N. DRR conference.

Selected Publications




Joint Board of Geospatial Information Societies

United Nations Office for Outer Space Affairs

Geoinformation for Disaster and Risk Management

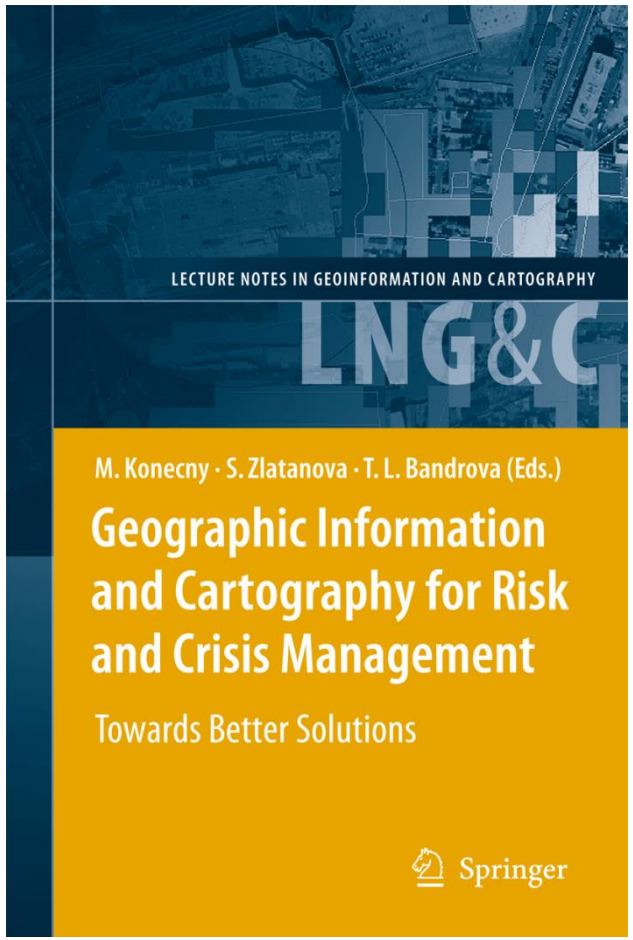
Examples and Best Practices




Orhan ALTAN, Robert BACKHAUS, Piero BOCCARDO, Sisi ZLATANOVA (2010)

ICA: KONEČNÝ, Milan - CARTWRIGHT, William. International Cartographic Association

More books and proceedings:



The Value of Geoinformation for Disaster and Risk Management (VALID)

Benefit Analysis and Stakeholder Assessment

International Council for Science - GeoUnions

Joint Board of Geospatial Information Societies

United Nations Office for Outer Space Affairs

A lot a lot, but,…..

Where is our place now?

What are challenges in particularly items and all together?

Enhancement of integration.

ADAPTIVE CARTOGRAPHY
in Current Emergency Management:

- **Analogue maps or static digital sources.**
- **No real time cartographic support in emergency situation.**
- **Insufficient cartographic legibility for particular emergency situation.**
- **Maps for user needed (not user for maps)=personalisation of cartographic output.**

ADAPTIVE CARTOGRAPHY

Adaptability of Cartographic Representation

1. **User level–operational units, dispatching units and stakeholders need different scales, themes and map extent, but over the same data.**

2. **User background–different educational and map use bias.**

3. **Theme importance – different features in map content and variable significance with changing emergency situation.**

Context-Based Cartography

The subject-matter of adaptive cartography is **automatic creation of correct geodata visualization with regard to situation, purpose and the user.**

Adaptive maps are still maps in the conventional sense – they are correct and well-readable medium for transfer of spatial information. The user controls map modifications ***indirectly via modification of context***.

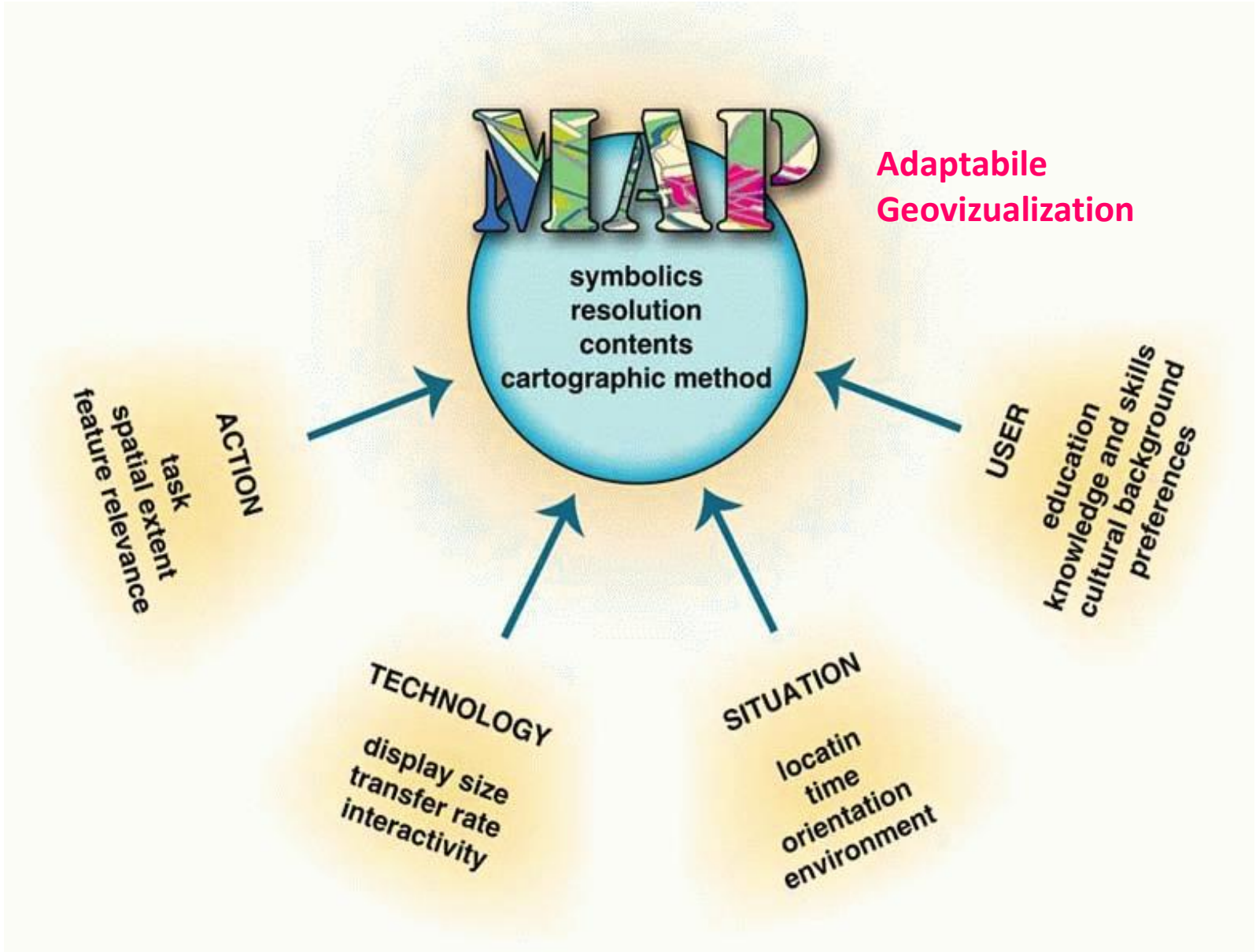
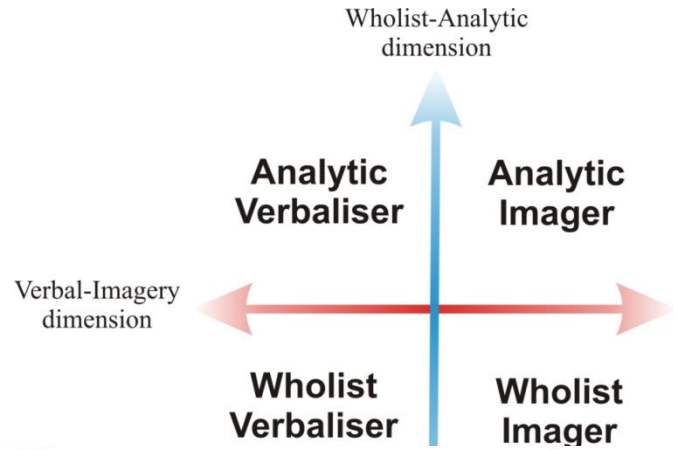
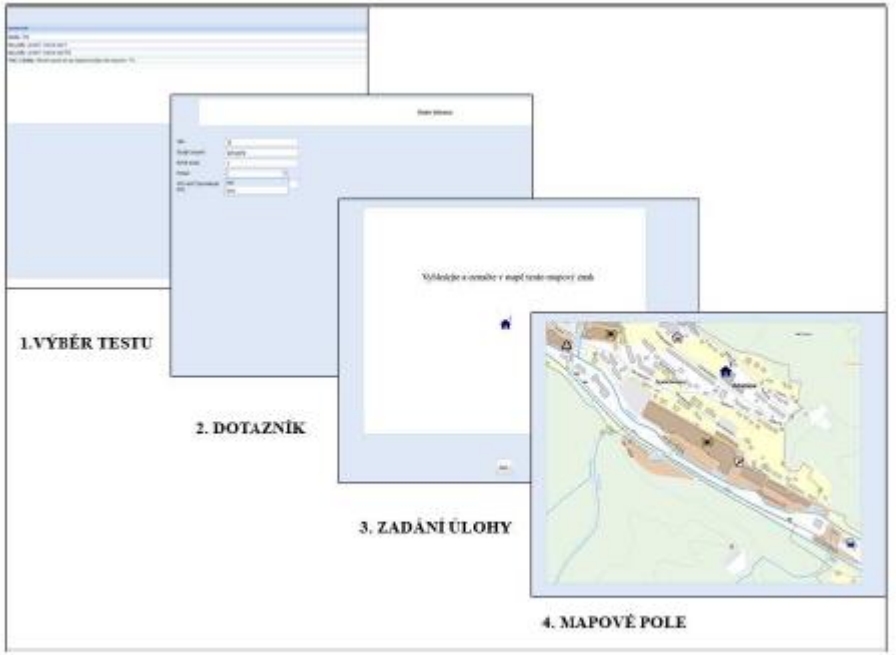


Figure: Examples of changes in visualization according to change of context (Friedmanová, Konečný and Staněk 2006)

Cognitive aspects geovisualization

- Interdisciplinary research
- (psychologists, etc.)
- Theory of cognitive styles
- Concept and design of a testing environment (MuTeP).
- International cooperation





Obr. 11.7: Posloupnost jednotlivých snímků testu v programu MUTEP – výbě testu, dotazník, zadání, úkol (upraveno podle ŠTĚRBA et al., 2011)

China-Czech Intergovernmental Science and Technology Cooperation Project 2017.4-2019.12

Dynamic mapping for risk and crisis management in big data era

Heterogenous data

- Different characteristics
- Different density of sensor network
- Different time intervals of mesurements
- Different formats (CSV, XLS, XML, TXT…)
- Different ways of data providing

- **Data collected by volunteers (VGI data)**
  - Data verification needs to be solved

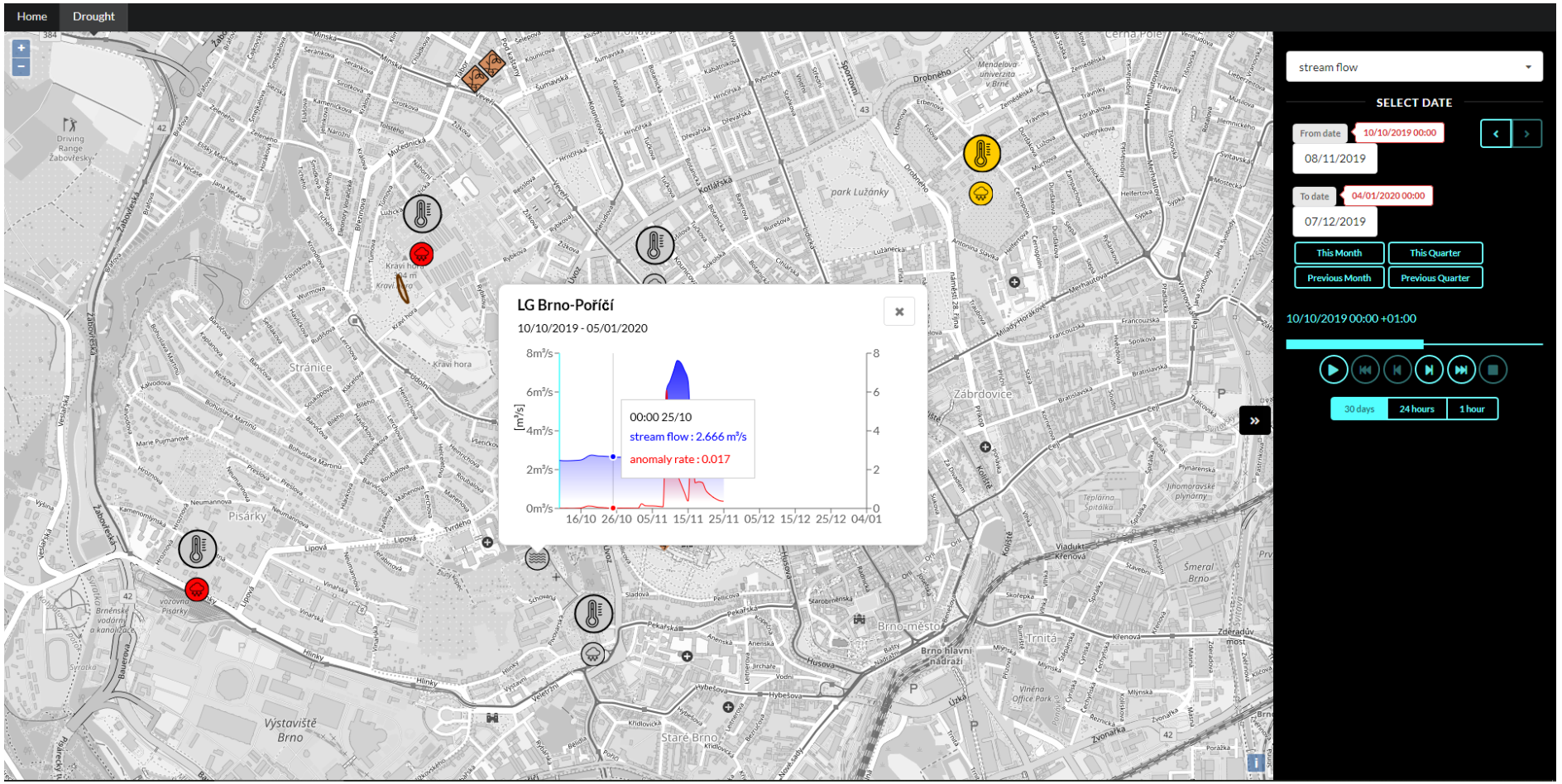
System of interactive map for disaster management

- **harmonisation** of heterogenous data from various sources
- different characteristics, different formats, different ways of data providing, different spatial and time resolution…
- Heterogenous data are transformed to database structure inspired by ISO 19156 Geographic information – Observations and measurements.
- Some values are pre-calculated (e.g. daily or monthly average) that will be used for subsequent data processing.

System of interactive map for disaster management

- Map compositon is prepared from harmonised data stored in database.
- Possibility of interactive exploration of data.
- Set of time windows can be defined and aggregated values (e.g. averages) can be calculated.
- **Anomalies** in time series are identified and visualised.
    - It allows **identification** and **analysis** of abnormal situation which could trigger a crisis situation (e.g. extreme rainfall).

System of interactive map for disaster management



DĚKUJI!!!!

THANK YOU

SPASIBO
RACHMED
Muchas Gracias
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Kammsa Hamida
Aligator
SHUKRAN
BLAGODARJA