



Current Trends in Making Data-driven Decisions to Address Natural Hazard and Climate Change Risks

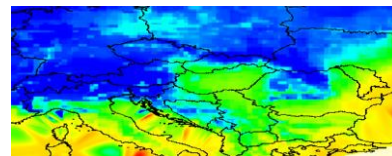
13 June 2024 Sarajevo

Ladislav Garassy, Director of Natural Hazards Modelling & Risk Engineering

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- Presenter: **Ladislav Garassy**,
Director, Natural Hazards Modeling & Risk Engineering
 - *Mr. Garassy leads the team of experts for risk engineering, insurance, and reinsurance solutions at Intermap Technologies, located in Prague, Czechia. In the last 17 years, he and his team have been providing multiple insurance companies in the Central and Eastern Europe, Southeast Asia, Latin America and the United States with risk assessment applications, flood hazard maps, geocoding solutions, and other analytical tools and maps for underwriters, risk engineers, actuaries, claims adjusters and reinsurance specialists. He holds master's degrees in nuclear physics and environmental engineering and in social geography and demography, and a bachelor's degree in electro-material science.*
- Participant: **Richard Šálek**,
Director, Business Development & Sales, Europe
 - *Mr. Šálek holds a master's degree in system engineering and engineering informatics at the Czech Technical University in Prague. During his more than 27 years of experience in multinational companies, he has gained extensive experience in selling complex software, analytics and data solutions in various verticals and market segments. Since 2017 he has been managing the business activities of Intermap Technologies for Central and Eastern Europe in the European representation of the Canadian-American company Intermap Technologies based in Prague.*

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About Intermap Technologies

Geo-Spatial Service Provider



Intermap Technologies

- Acquisition of digital elevation models
- Data, analytical and SW products and services for:
 - Insurance, banking, real estate, telecommunications, transport, aviation
- Intermap is a global company
 - Prague – Denver – Calgary – Jakarta
- Intermap is a publicly traded company listed on:
 - Toronto Stock Exchange (TSX), OTC Markets (OTCQX)



Hazard mapping

- **Europe**
 - Cooperation with OEs of Generali, KBC, Allianz, VIG, Uniqa, BNP Paribas
 - Czech Rep & Slovakia – flood maps since 1997, other hazards since 2011
 - Flood maps of Hungary, Slovenia, Romania, Serbia, Bulgaria, Croatia, England, Wales, Switzerland, Ukraine
- **Americas**
 - USA river & pluvial flood, wildfire map; flood maps of Brazil, Colombia
- **Asia**
 - Southeast Asia – flood maps of Malaysia, Indonesia
- **Globally**
 - CatNet flood zones v1 of Swiss-Re; Intermap's WorldFlood
 - Other present and forward-looking natural hazard maps around the globe



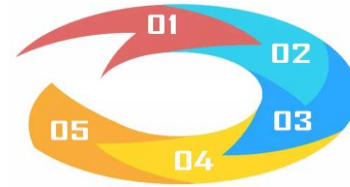
Trends in Data-driven Decisions

Addressing Natural Hazard and Climate Change Risks



- Service along the whole policy life-cycle

- Providing services for underwriters, risk engineers, actuaries, reinsurance specialists, claim adjusters etc.



- Using appropriate tools and analytics

- Map-based applications in corporate insurance
- API-based integration to policy management systems in retail



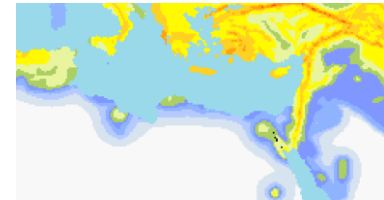
- Accurate localization

- Address & parcel geocoding, area analysis (building footprint, parcel shape), multi-locations, floaters redistribution



- High-resolution natural hazard maps

- Flood, earthquake, other acute meteorologic perils, chronic climatic perils, geo-physical perils, (fire, social / political risk)



- Climate change-based, forward-looking hazard maps

- Drought, flood, fire weather etc
- Climate change scenarios, different time-horizons



- Multi-risk evaluation

- Building a single risk score across all natural and social risks
- AI helping to simulate a multi-disciplinary team of experts



Flood Hazard – Present Day

Fluvial and Pluvial Flood



- **Fluvial (River) Flood:** increase of water level in a river and an overflow causing a temporary inundation of a normally dry land



- **Pluvial (Torrential) Flood:** accumulation or flow of water on a surface caused by extreme rainfall; Flash Flood is a special case of extreme raise of the discharge in minor streams due to torrential rainfall











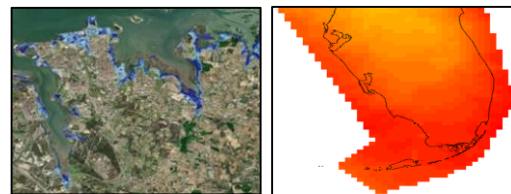
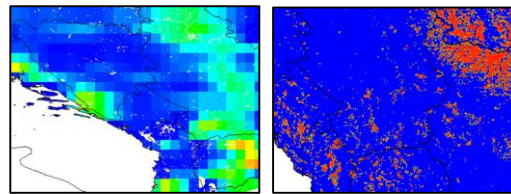
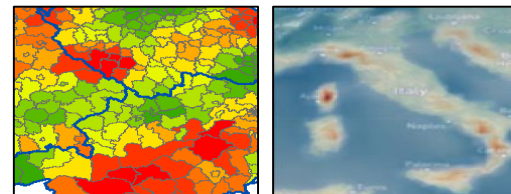
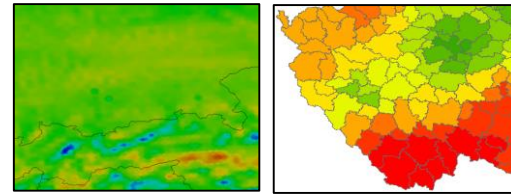
- Hazard rating: Flood Extent and Flood Depth corresponding to several return periods, e.g. 100-years (sometimes also Flood Velocity)
- Traffic light-styled **Flood Insurance Rating Zones** to synthesize all information: red = extreme threat, green = negligible threat
- Inputs: N-year discharge quantiles at flow gauges, N-year rainfall quantiles at precipitation gauges, Land Cover data to derive terrain Roughness, Hydrologic Soil Groups to estimate Infiltration, known Flood Protection measures, Hydraulic simulation of the water movement through the urban fabric (Digital Terrain Model)






Other Present Day Natural Hazard Maps

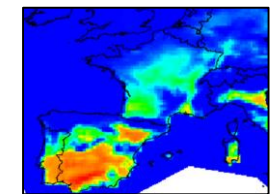
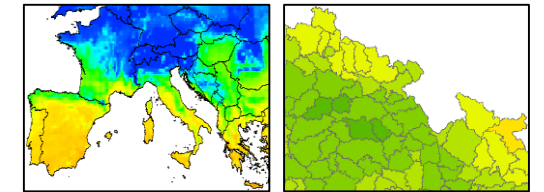
Acute:

-  Windstorm
-  Hail
-  Lightning
-  Tornado
-  Fire Weather
-  Wildfire
-  Coastal Surge / Tidal Flood
-  Tropical Cyclone / Hurricane



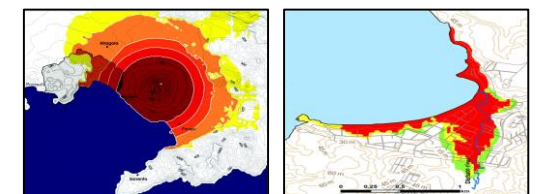
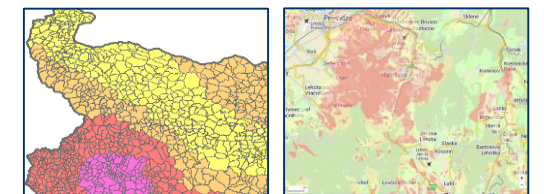
Chronic:

-  Drought Stress
-  Precipitation Stress
-  Heat Stress



Geo-Physical:

-  Earthquake
-  Landslide
-  Volcano
-  Tsunami



Forward-looking Natural Hazard Maps

Acute:



River Flood



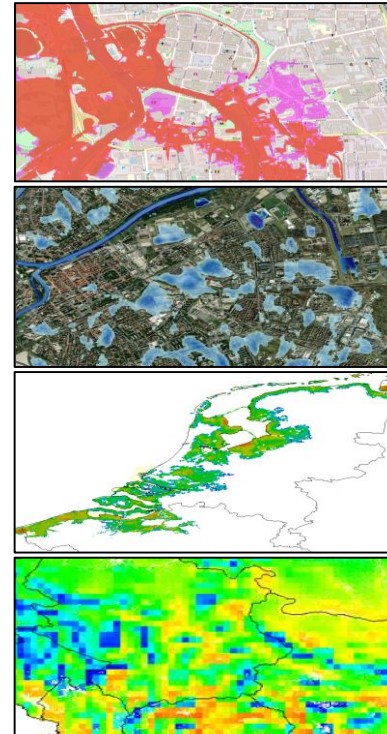
Pluvial Flood



Surge / Tidal Flood



Fire Weather



Chronic:



Sea Level Rise



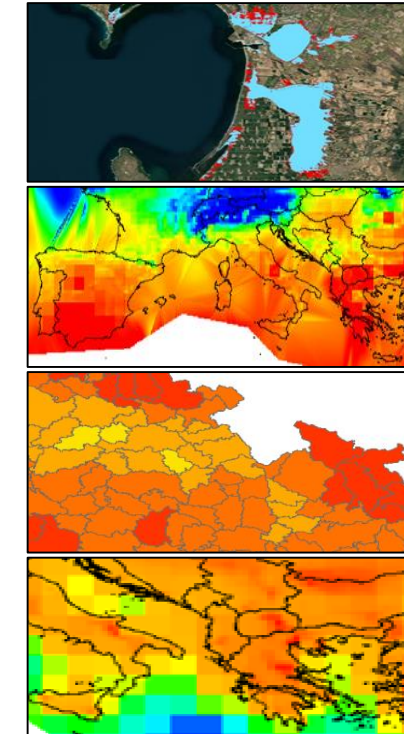
Drought Stress



Precipitation Stress



Heat Stress



1. Climate change scenarios: SSP / Shared Socioeconomic Pathways

defined by the Intergovernmental Panel on Climate Change 6th Assessment Report (IPCC-AR6) in 2021, according to radiative forcing [W/m²]:

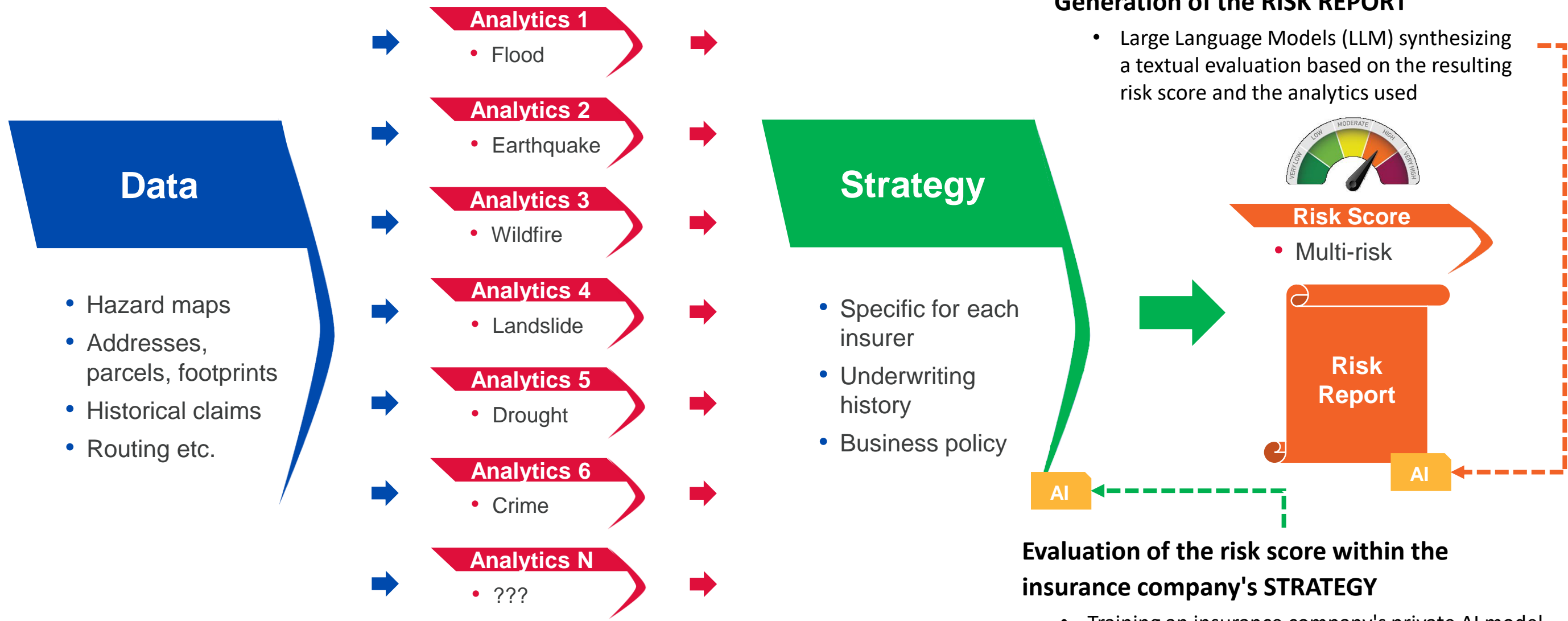
- **SSP 1-2.6** Sustainability (Taking the Green Road)
- **SSP 2-4.5** Middle of the road
- **SSP 3-7.0** Regional rivalry (A Rocky Road)
- **SSP 5-8.5** Fossil-Fueled Development (Taking the Highway)

2. Time horizons used for modeling:

- **Near** (2023-48)
- **Medium** (2049-74)
- **Far** (2075-2100)

Risk Assistant: cautiously, but confidently

Automated multi-risk assessment supported by AI





Thank you for your attention!

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