

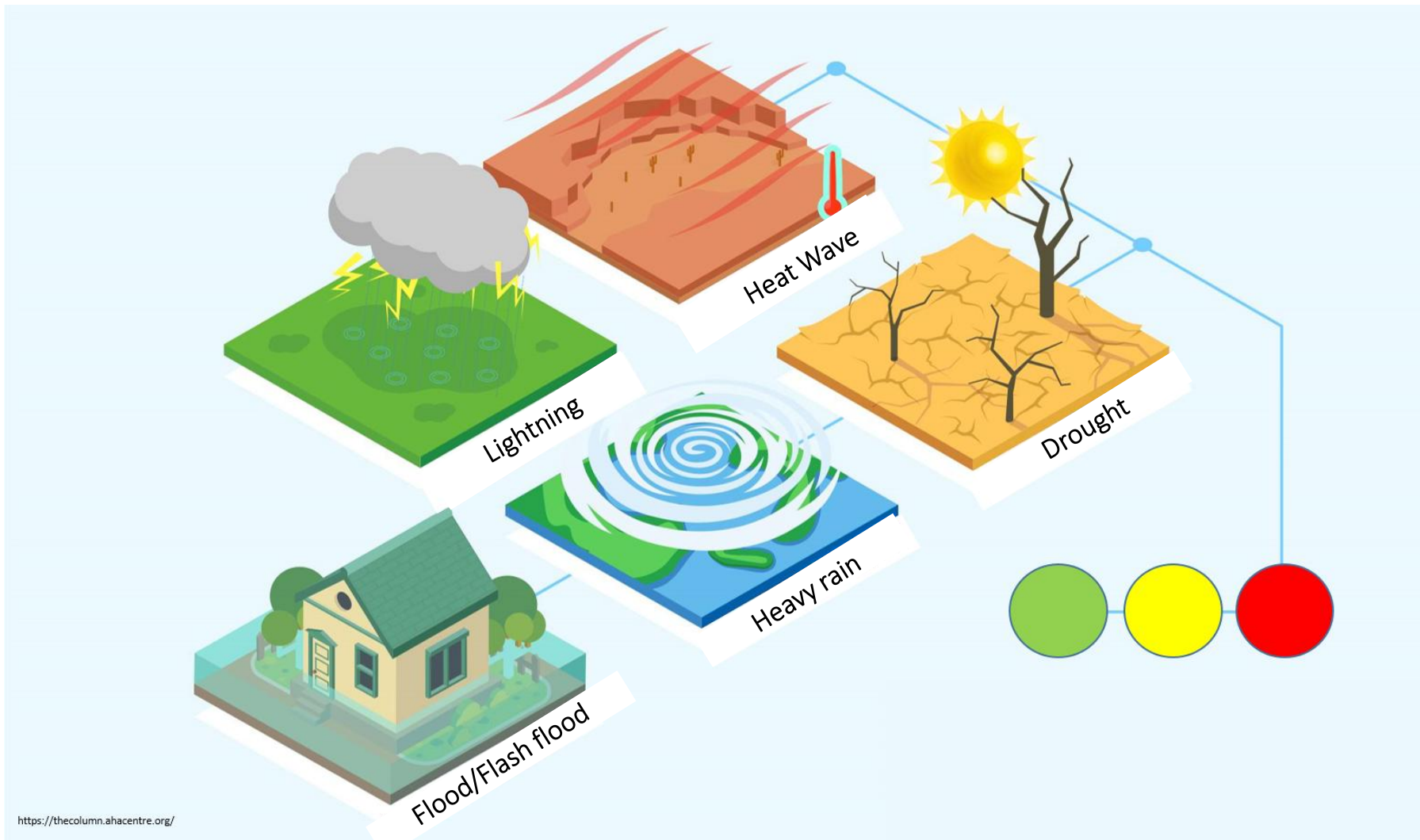


National Environmental
Agency

Hydrometeorological Hazard Monitoring And Early Warning Systems



Meteorological Department





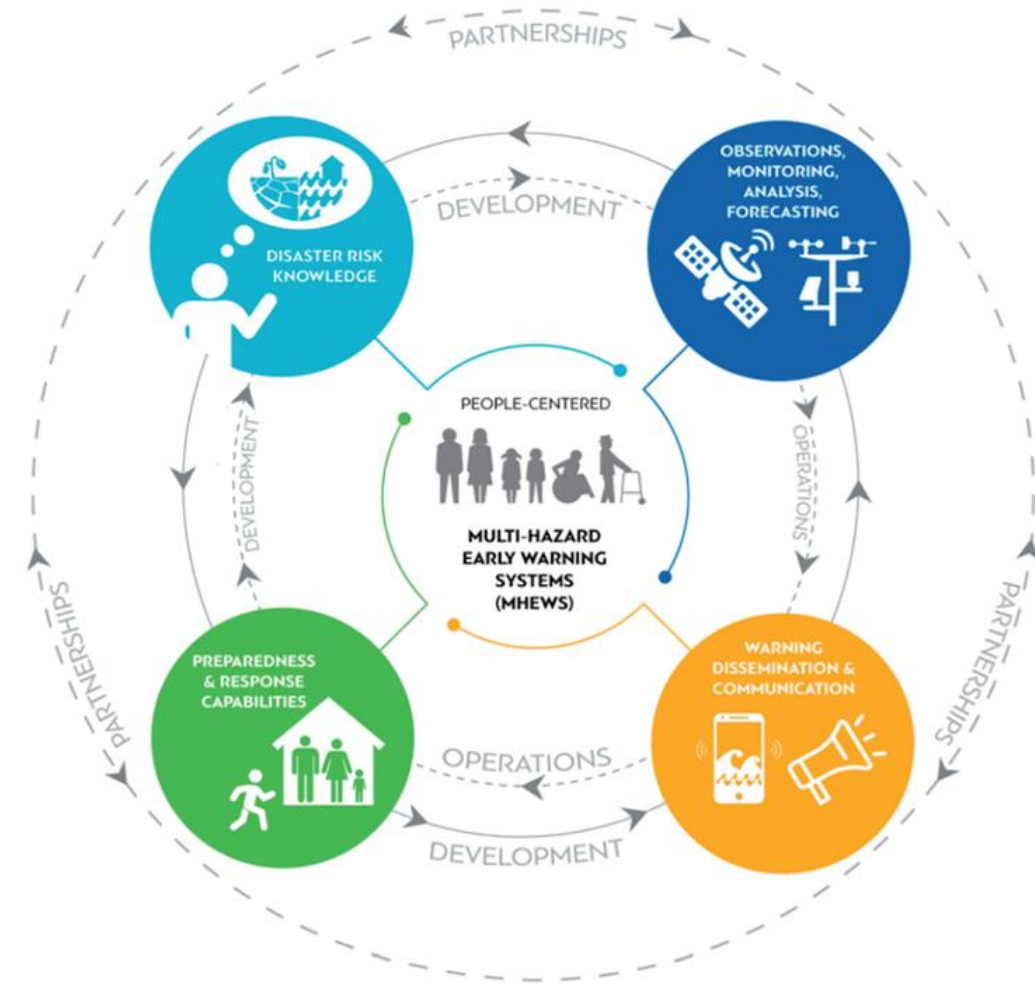
Early Warnings for ALL



The **Early Warnings for All (EW4All) initiative** aims to ensure universal protection from hazardous hydrometeorological, climatological and related environmental events through life-saving multi-hazard early warning systems, anticipatory action and resilience efforts by the end of 2027, as called for by the United Nations Secretary-General António Guterres in 2022.

How do Early Warning Systems Work

1. Identification of hydrometeorological and geological hazards.
2. Monitoring and forecasting:
3. Expansion of meteorological, hydrological, and geological monitoring networks.
4. Operation of numerical weather and hydrological prediction/forecasting systems.
5. Data collection and dissemination:
6. Receiving data from the hydrometeorological network, conducting quality control, and updating the database.
7. Weather forecasting and early warning using modern technologies.
8. Forecasting and dissemination of potential hazardous events using modern technologies





National Environmental
Agency

The role of the National Environmental Agency in the system





National Environmental
Agency

Hydrometeorological and geological hazards

Flooding-Flash flood



Mudflow



Landslide



Extreme Temperatures



Snow avalanches



Strong Winds



Hail



Sea Storms



Droughts



Dust



Tornado



Forest Fires

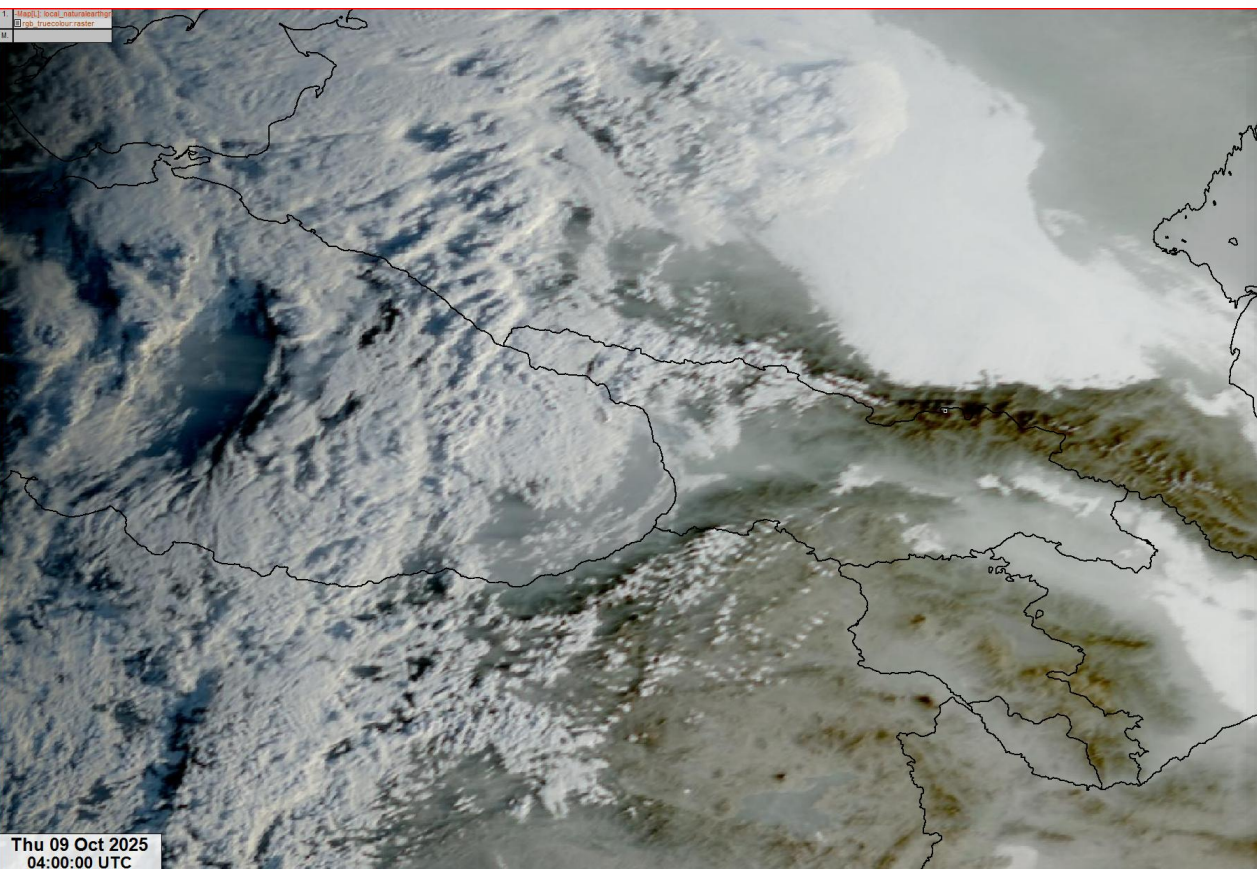




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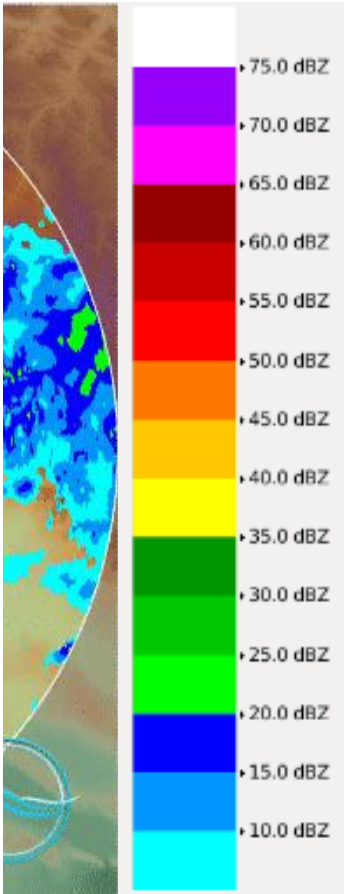
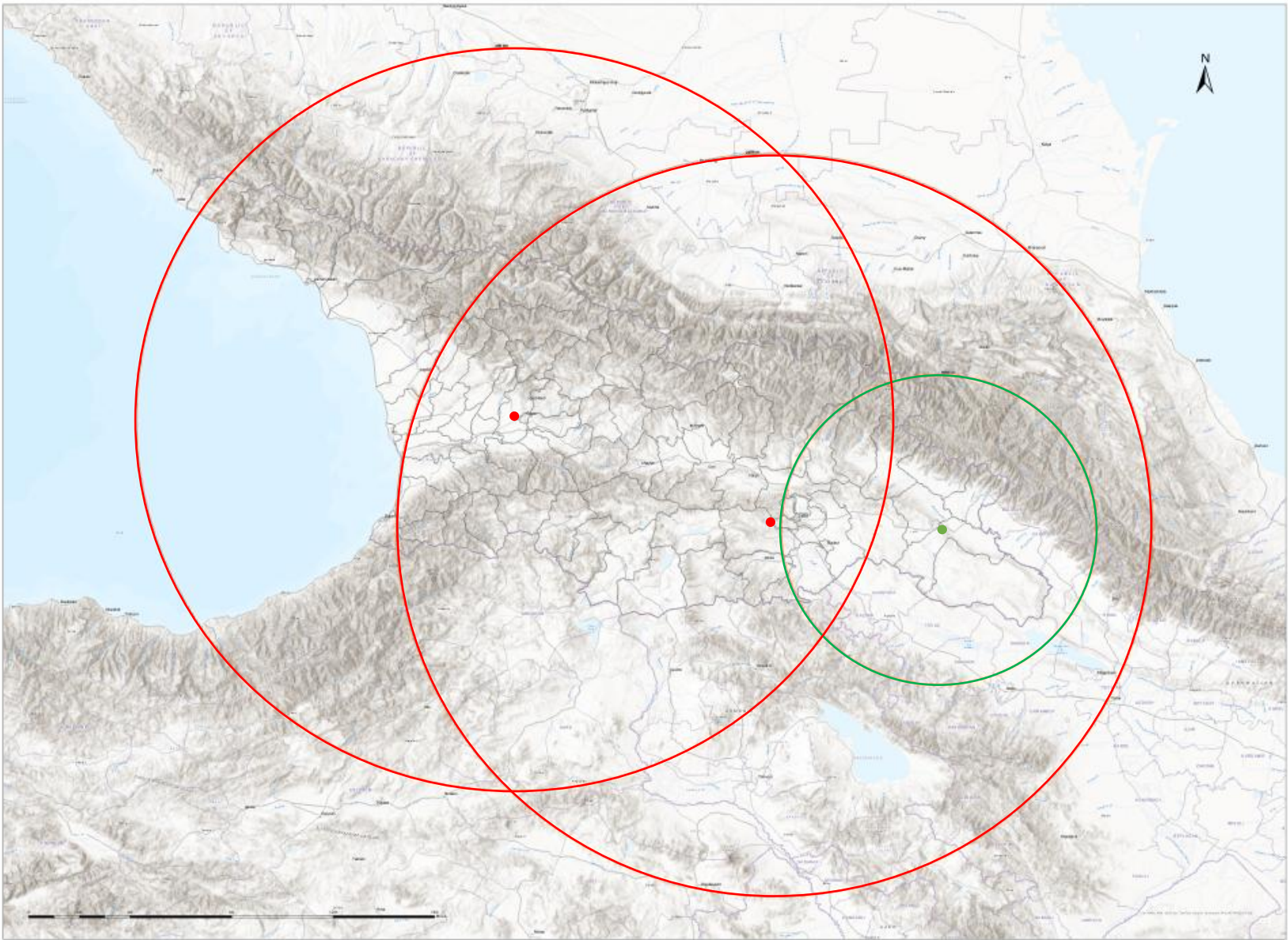
Hydrometeorological Observations

- Surface Hydrometeorological Stations
- Aerological
- Satellite
- Radar



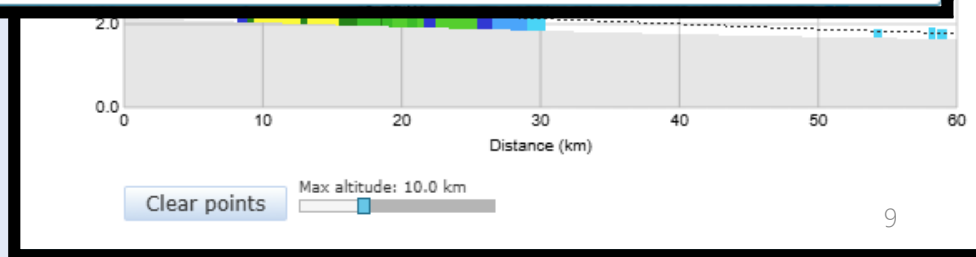
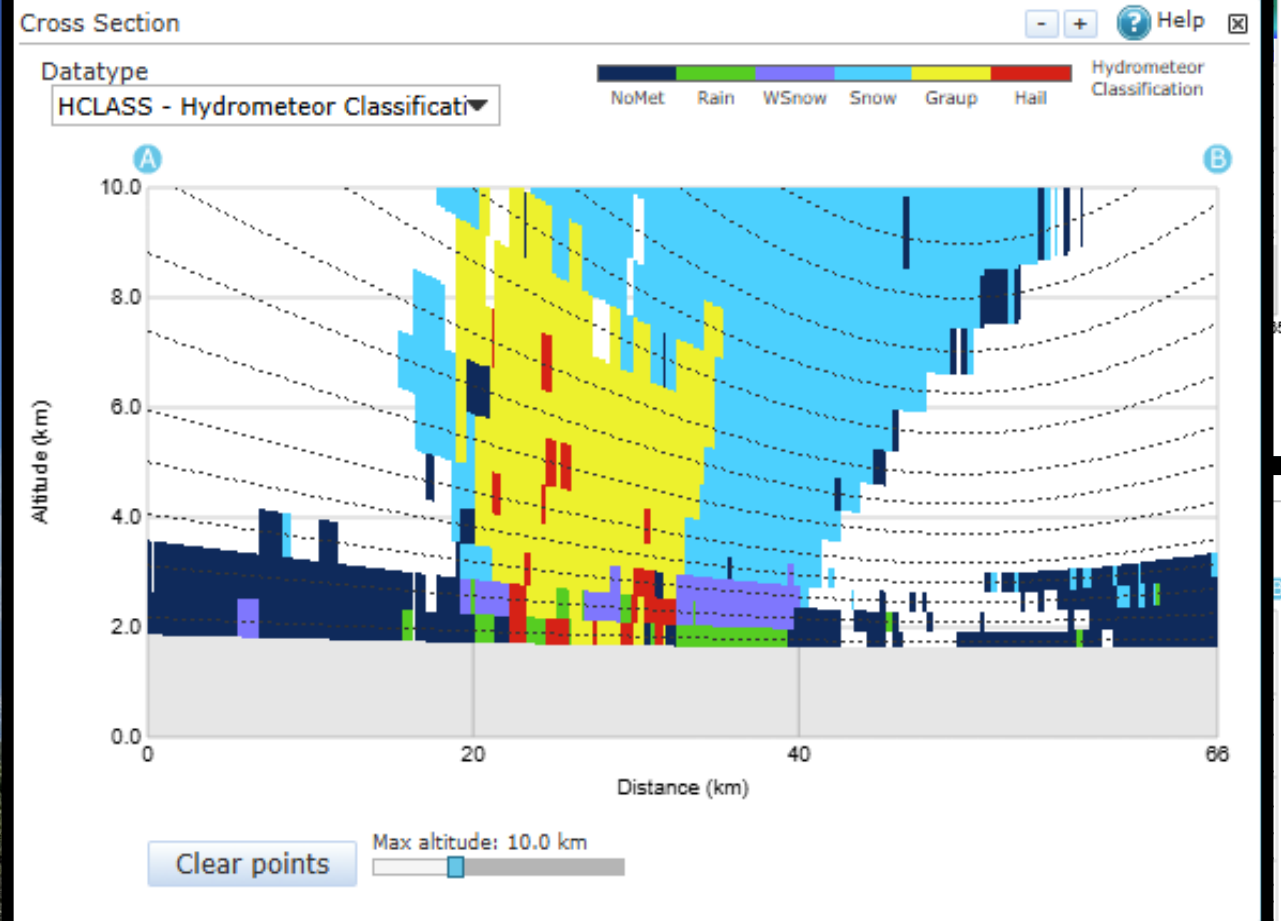
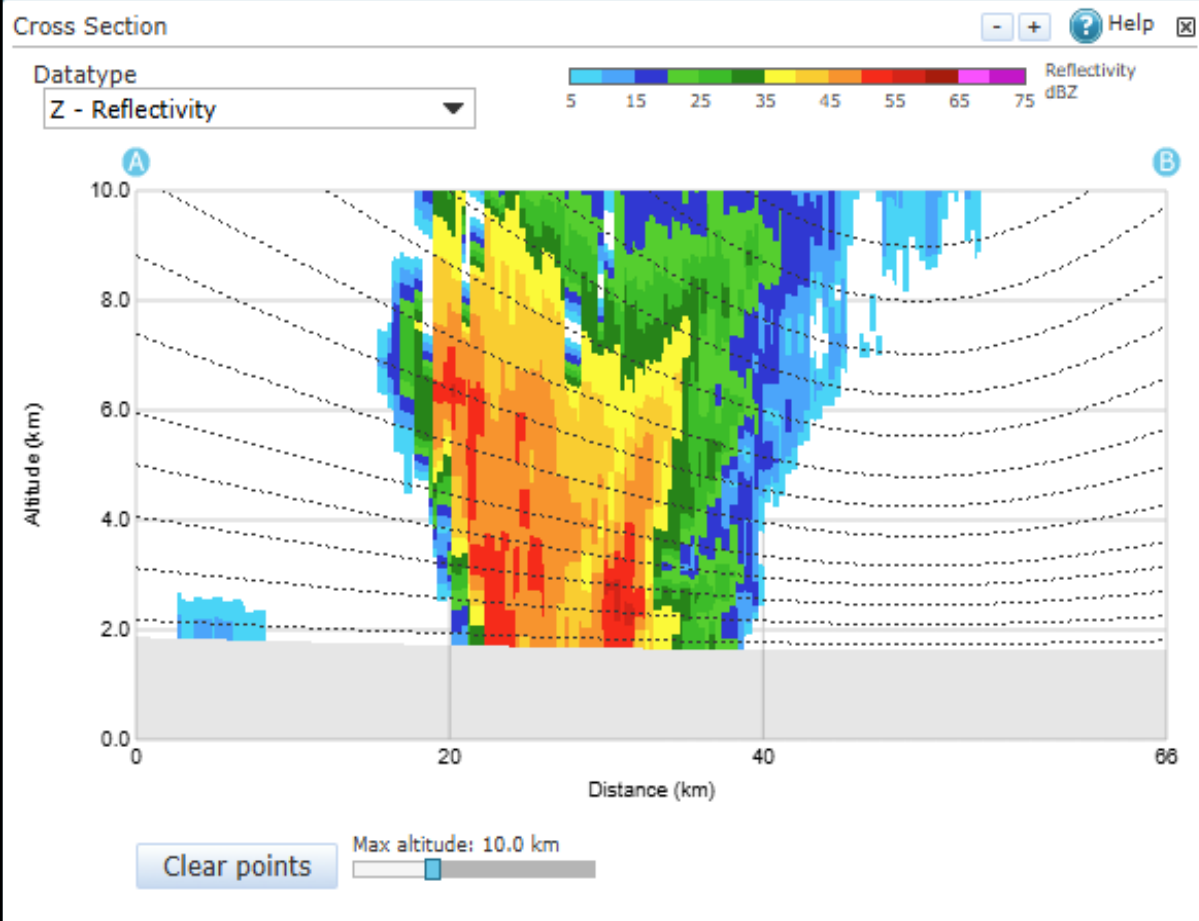
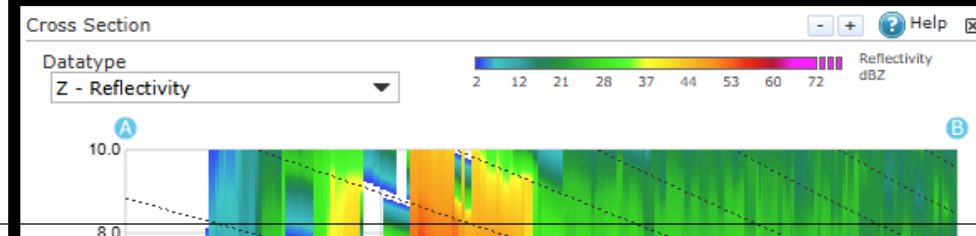


Weather Radar Network



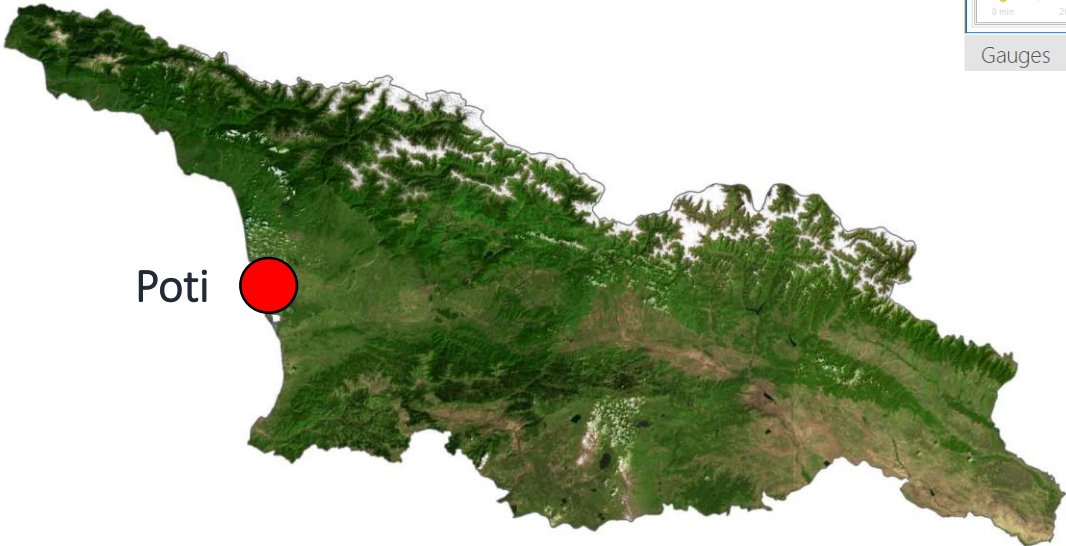
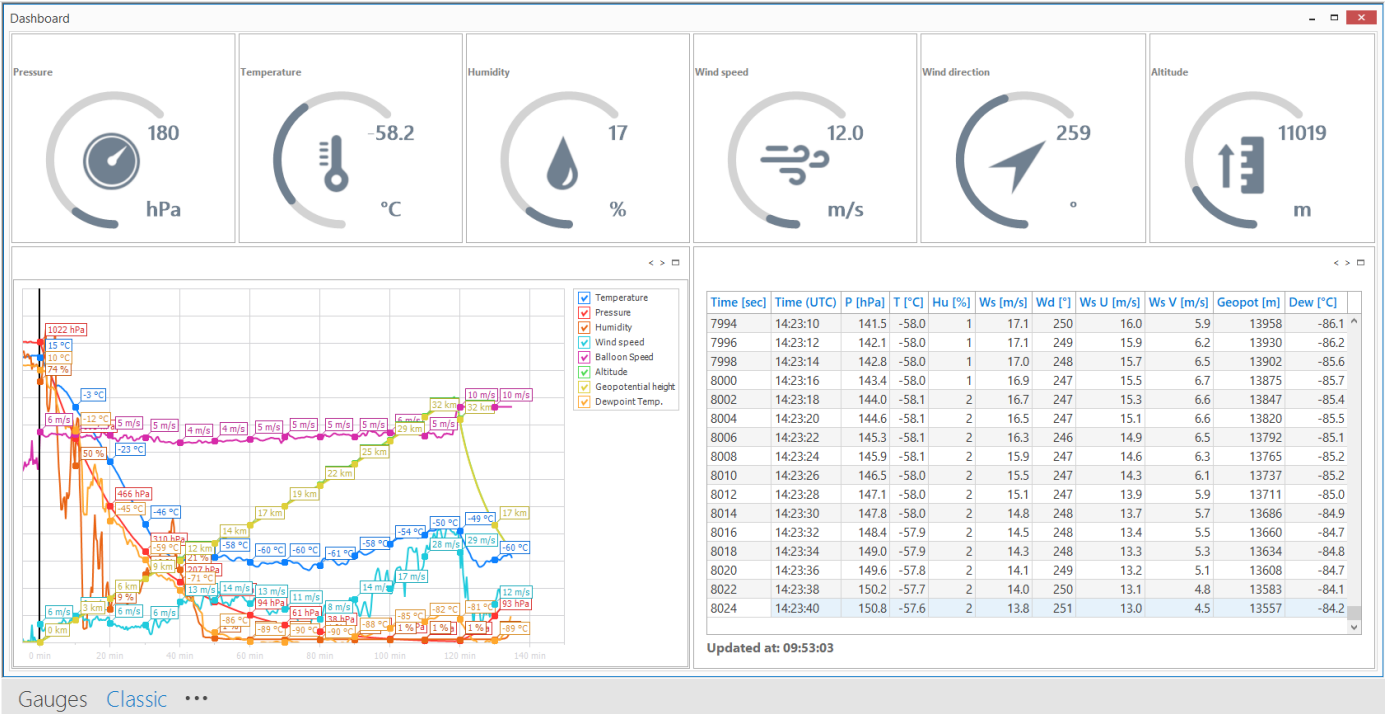


Radar Data Interpretation





Aerological Observation (Radiosonde)





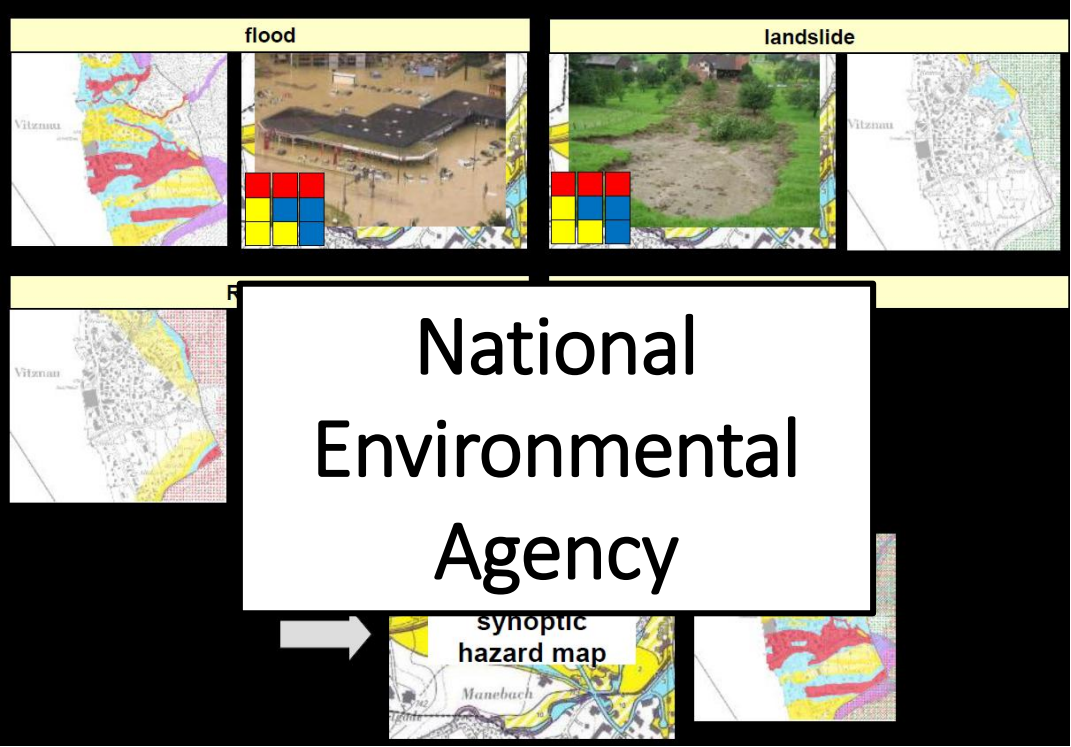
Hydrometeorological and Geological hazard maps

- Development of a unified methodology for multi-hazard and risk maps;
- Creation of an institutional and legal framework
- Preparation of hazard and risk maps for river basins

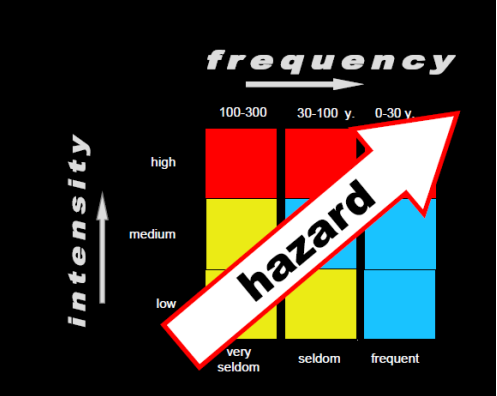




Hazard map



- Return period e.g: 100 years
- Intensity e.g: Avalanche impact force



Risk map



- Settlements
- Infrastructure (roads, power lines, railways)
- Cultural heritage sites and etc.



Types of Floods/Flashfloods and the main trigger

Urban flooding



- Intense rainfall (0.5 mm/m and more)

Flash Flood



- Intense rainfall
- Snow-Glacier melting
- Outburst/outflow of natural lakes in periglacial zones

Flooding



- Intense and continuous rainfall
- Snow melt with the heavy rainfall
- Snow-glacier intense melting



Minutes

Hours

Days



Hazard Mapping Methodology

METHODOLOGY FOR
FLOOD HAZARD
MODELLING AND MAPPING
FOR GEORGIA
(HYDRAULIC MODELLING)



METHODOLOGY FOR
DROUGHT HAZARD
ASSESSMENT, MODELLING,
AND MAPPING FOR GEORGIA



METHODOLOGY FOR
SNOW AVALANCHE
MODELLING AND
MAPPING FOR GEORGIA



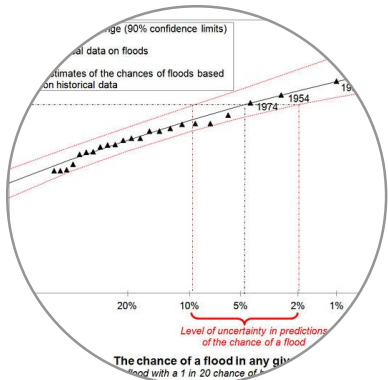
METHODOLOGY FOR
**WINDSTORM AND
HAILSTORM HAZARD**
MODELLING AND MAPPING
FOR GEORGIA



Hazard maps have been prepared for 7 hazards
***Flood/Flash flood, Snow Avalanche, Droughts, Windstorm, Hailstorm,
Landslide, Debris Flow/Mudflow***



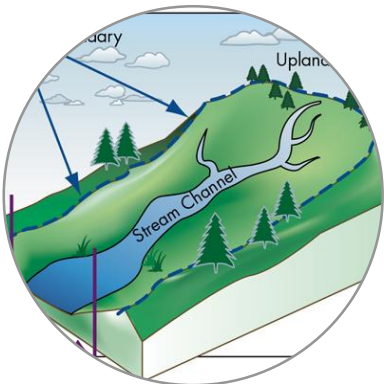
Components for the hazard mapping



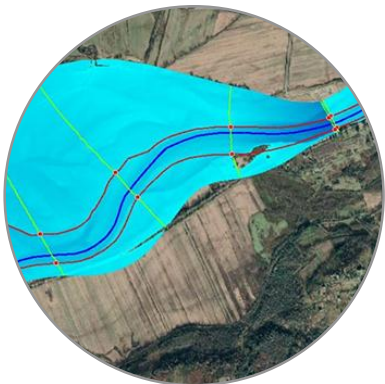
Statistical analysis



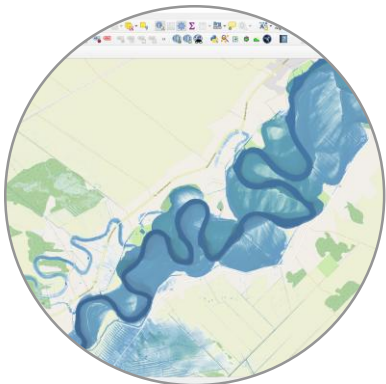
Topographic and
bathymetric
researches



Modeling



GIS analysis



Preparation of the
hazard maps





Flood Hazard Maps

- Return periods (Years)
2, 5, 25, 50, 100, 500

- Maps
- Absolute water level
 - Water depth
 - Water velocity
 - Development time
 - Duration



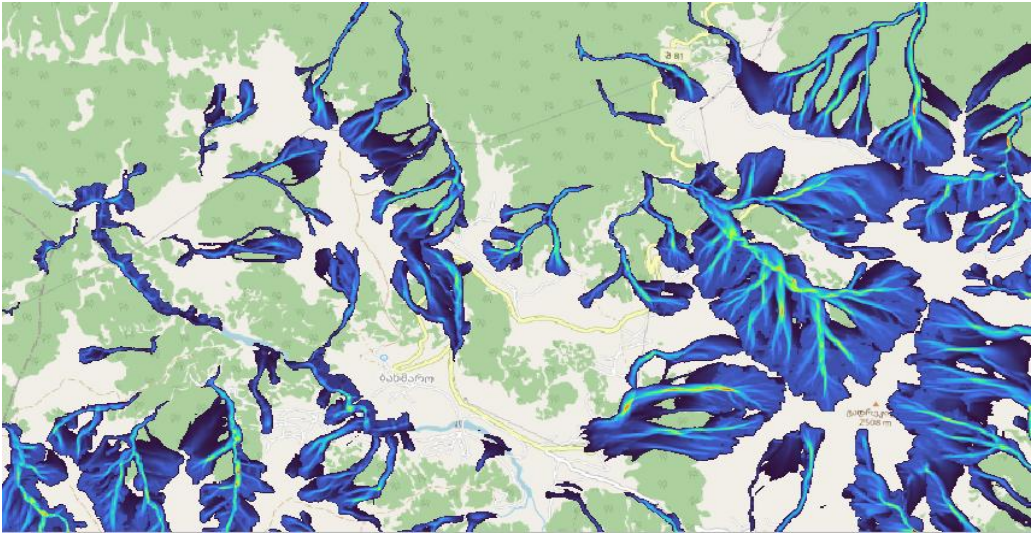


Snow Avalanche Hazard Maps

Mount Gomi



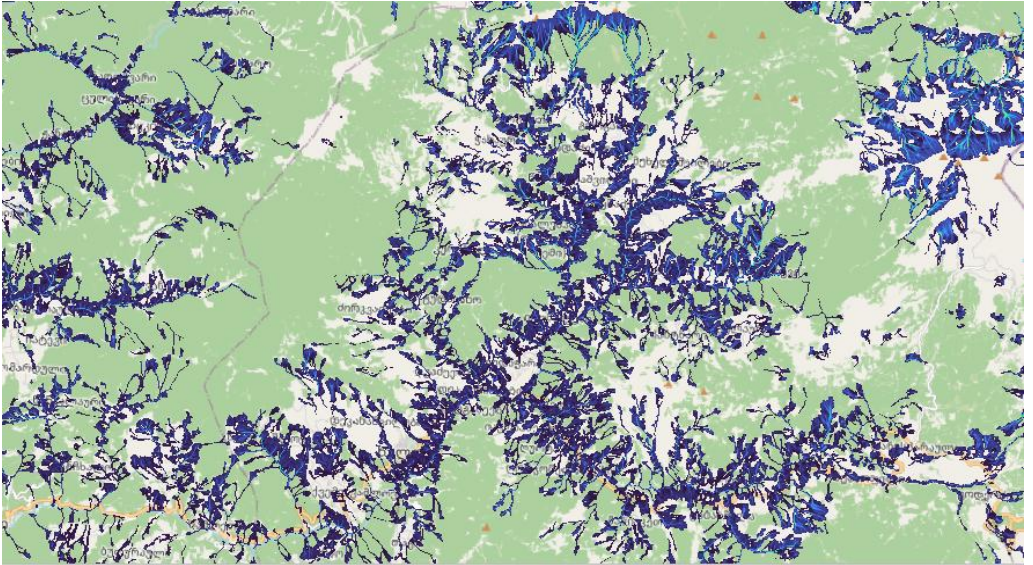
Bakhmaro Resort



Upper stream of the Rv. Kintrishi basin



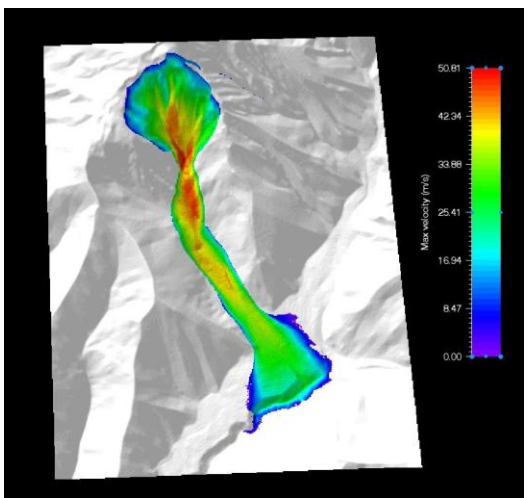
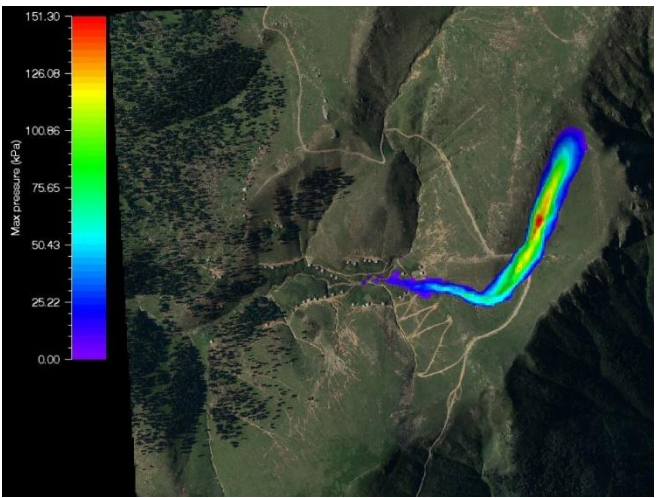
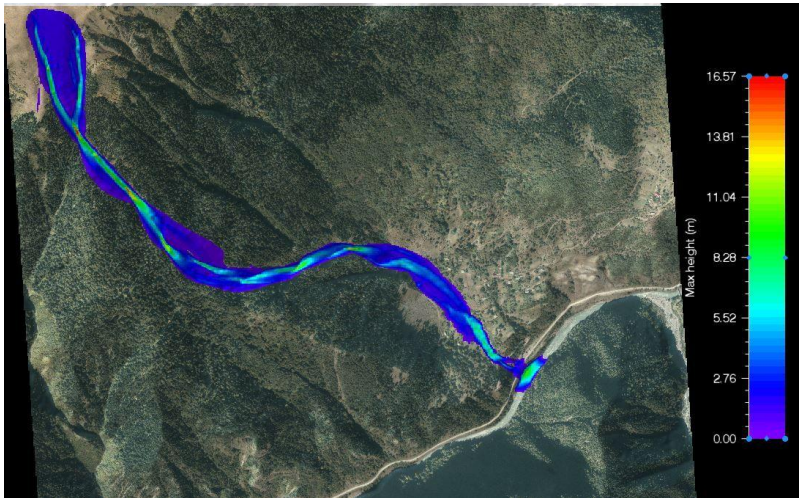
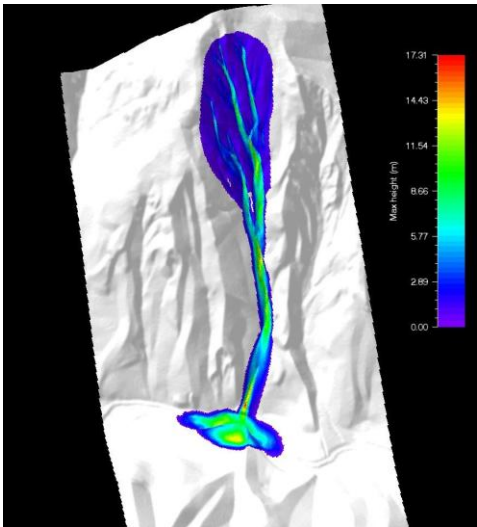
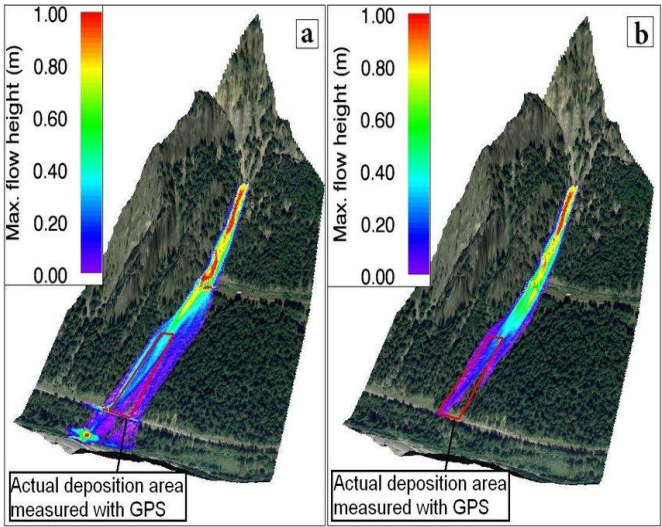
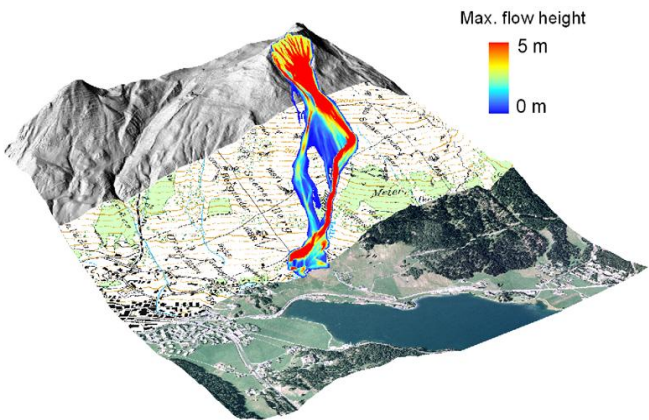
Khulo Municipality





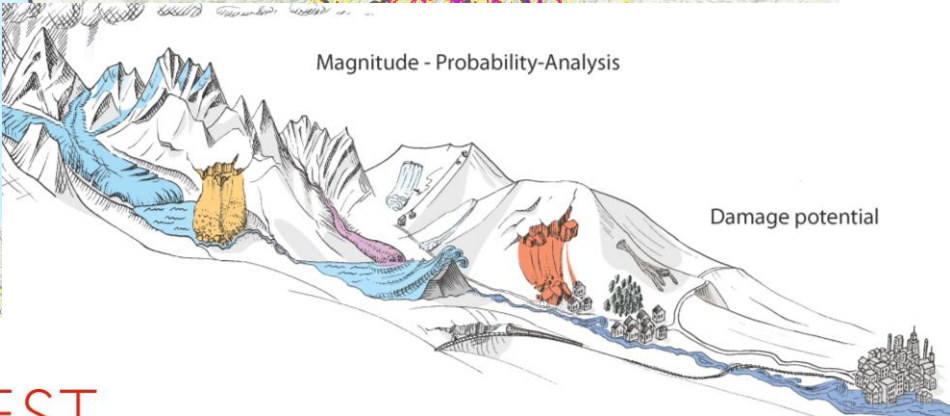
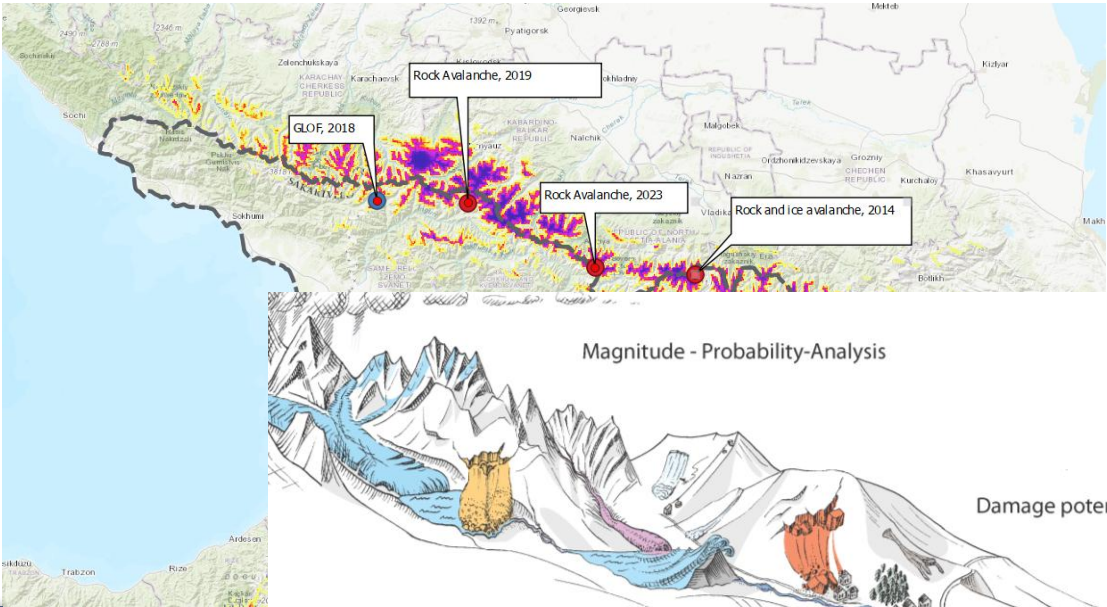
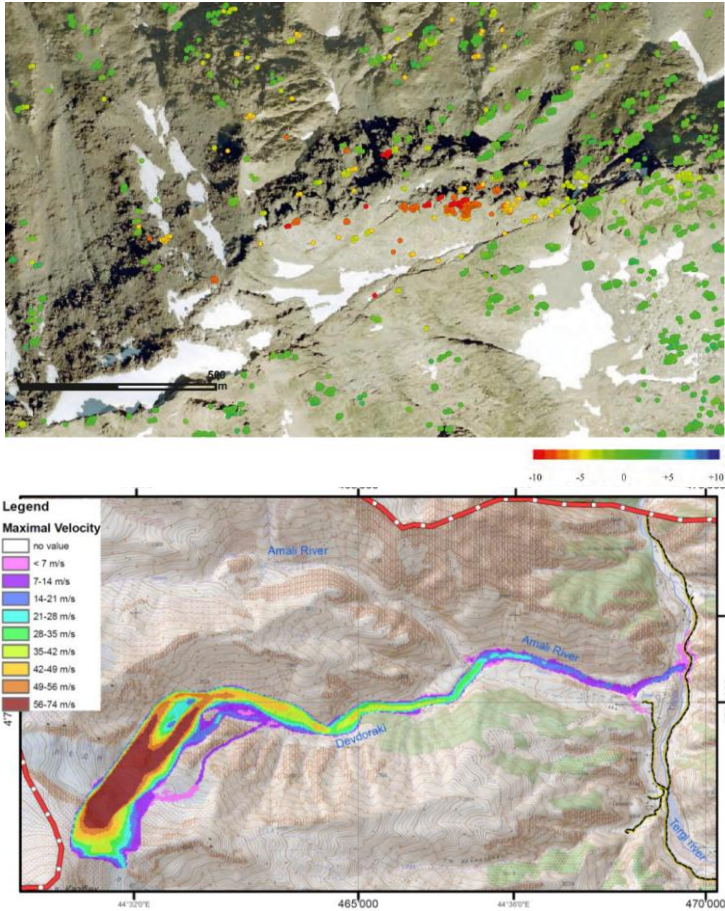
Snow Avalanche modeling

➤ Individual avalanche modeling using RAMMS software





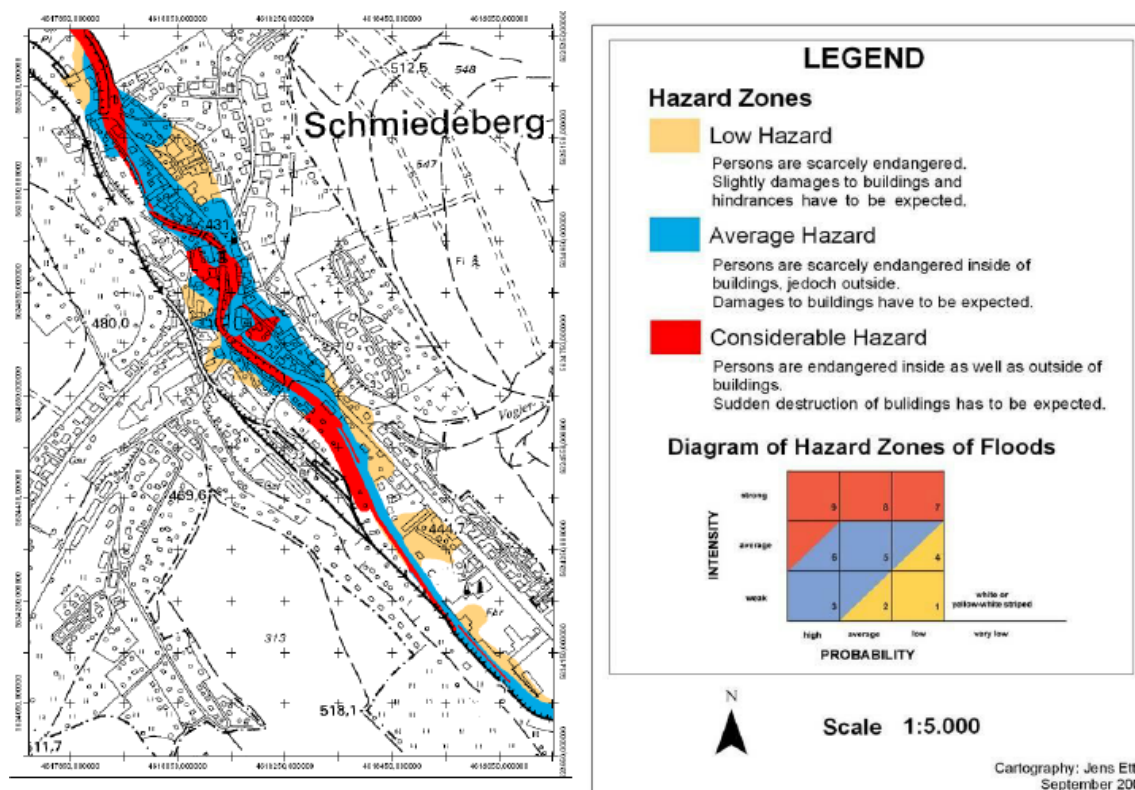
Glacier related hazards



Using maps in the spatial planning process

The role of hazard mapping in spatial planning:

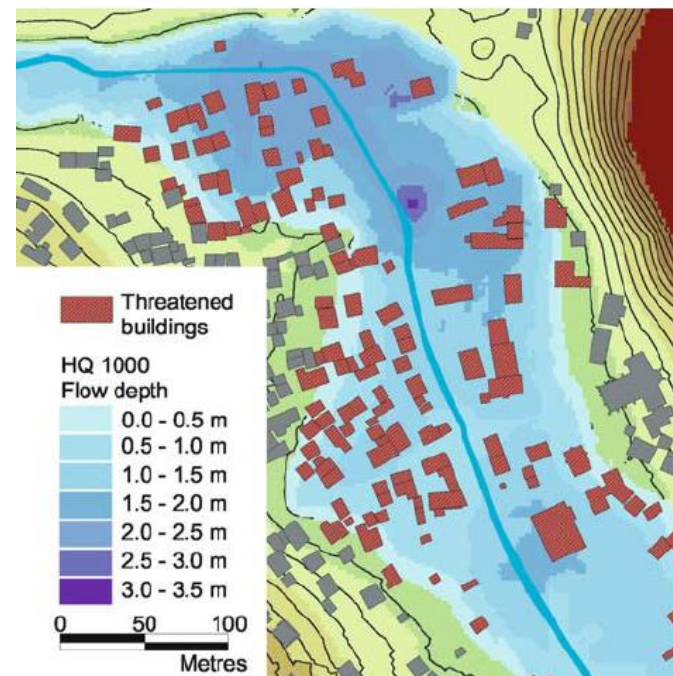
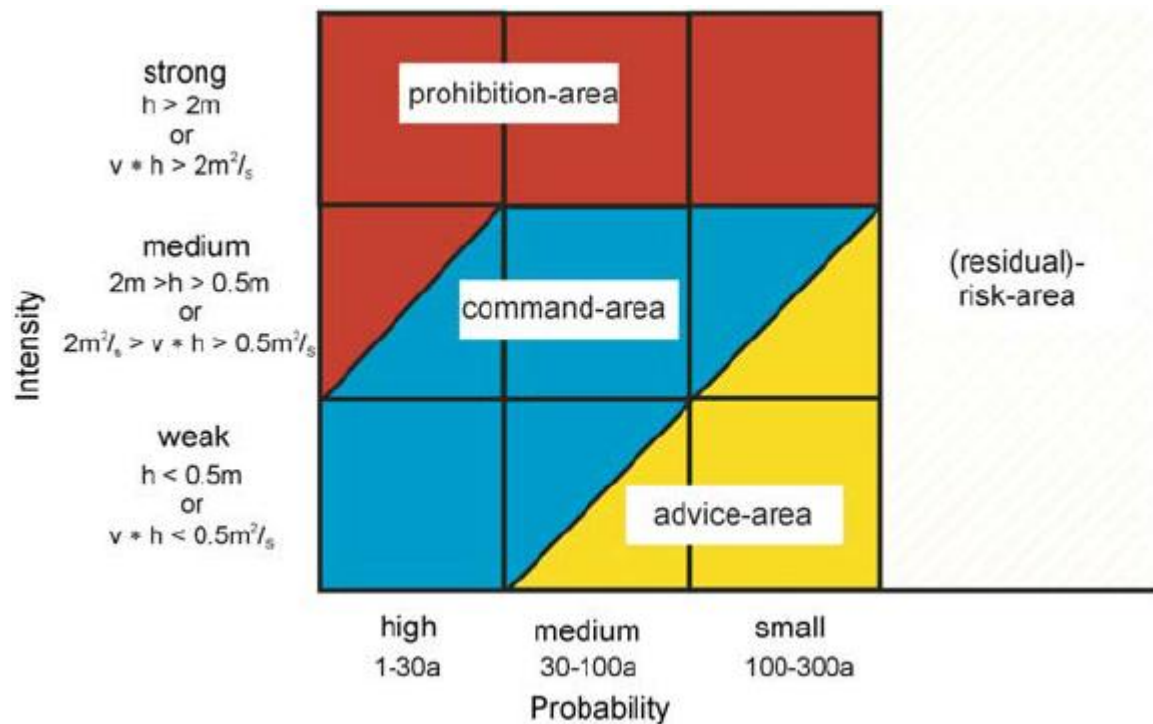
- Identifying high-risk areas for relevant zoning and land-use regulations
- Integrating risk into infrastructure planning and design
- Integrating mitigation measures into urban and regional development plans



Using maps in the land use permit process

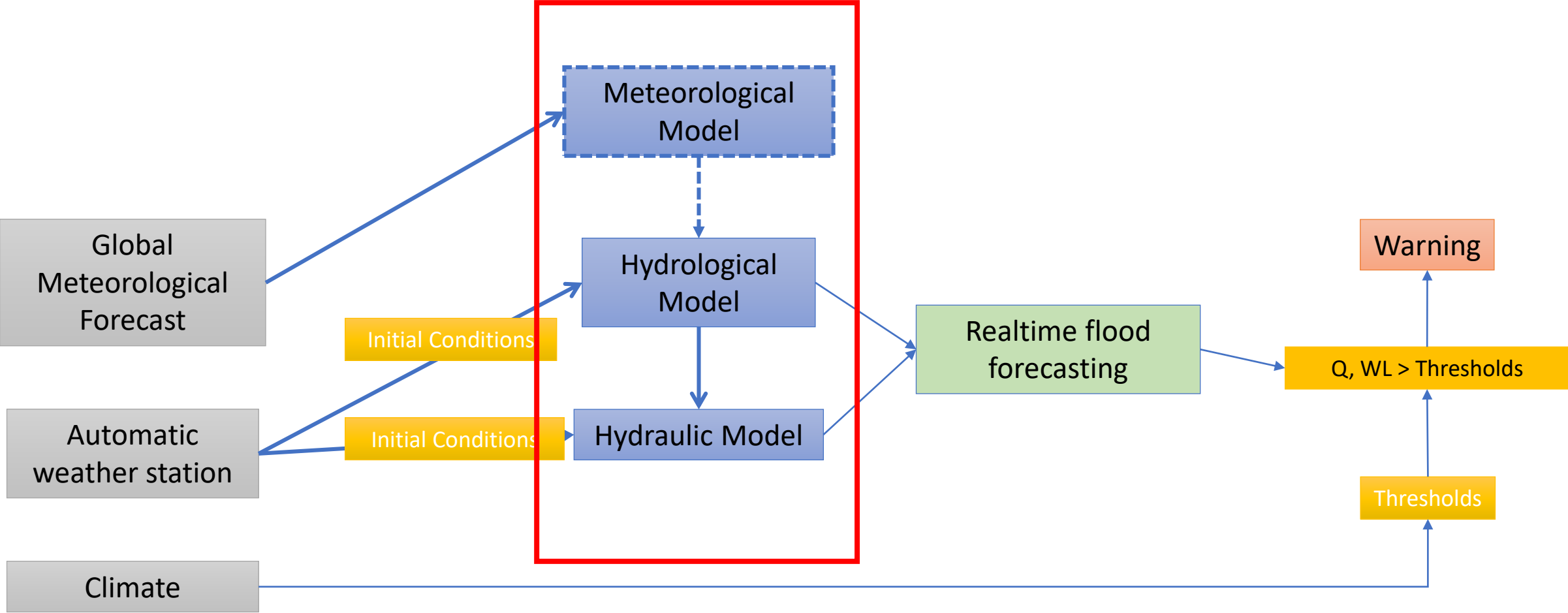
Land development permit:

- Risk assessment to determine if additional measures are needed for construction
- Implementation of building codes and standards to increase resilience to hazards
- Flood evacuation routes and emergency response plans





Flood Forecasting

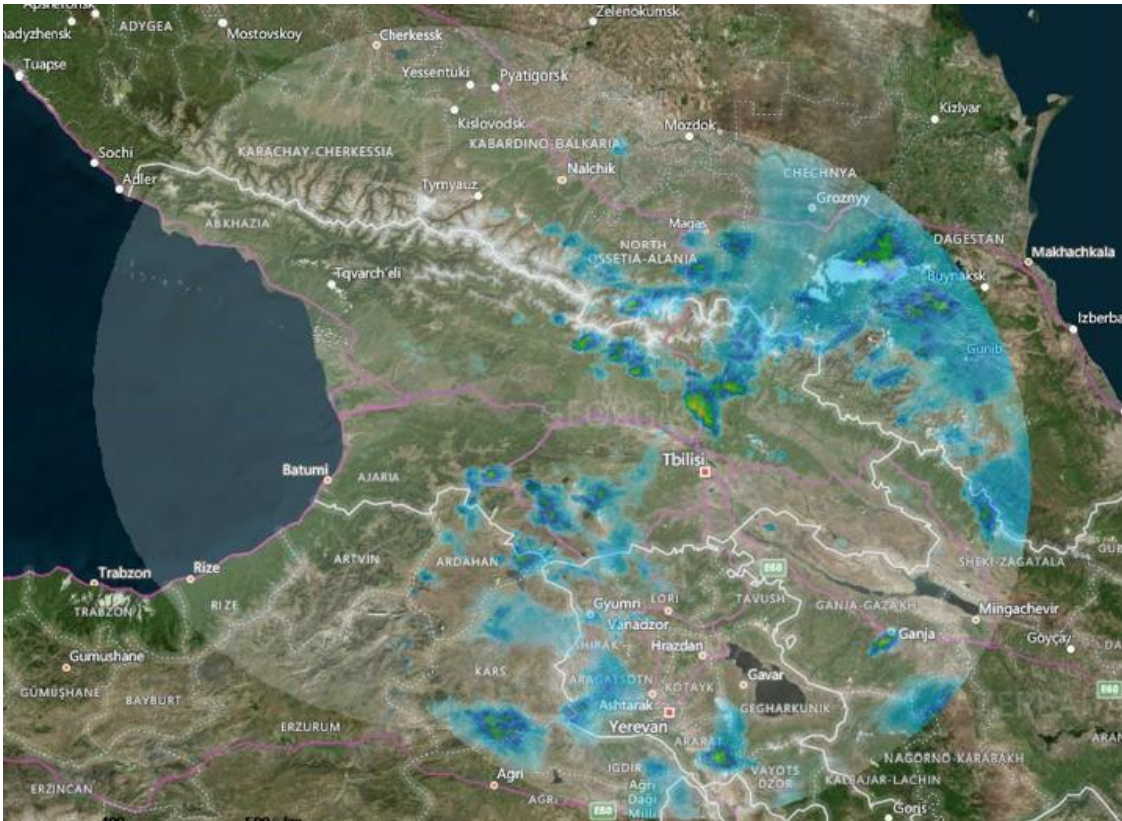




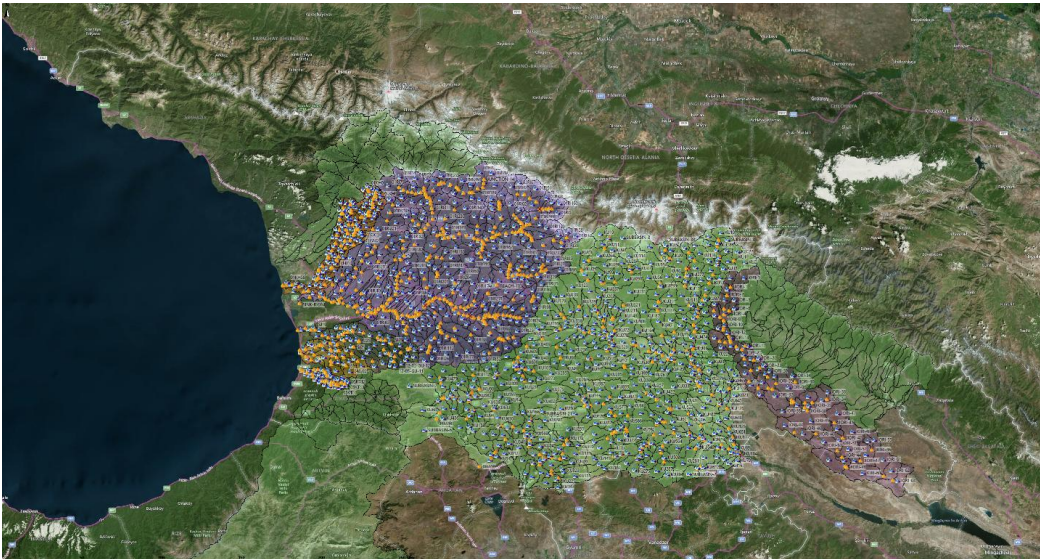
National Environmental
Agency

Flood Forecasting System - DELFT-FEWS

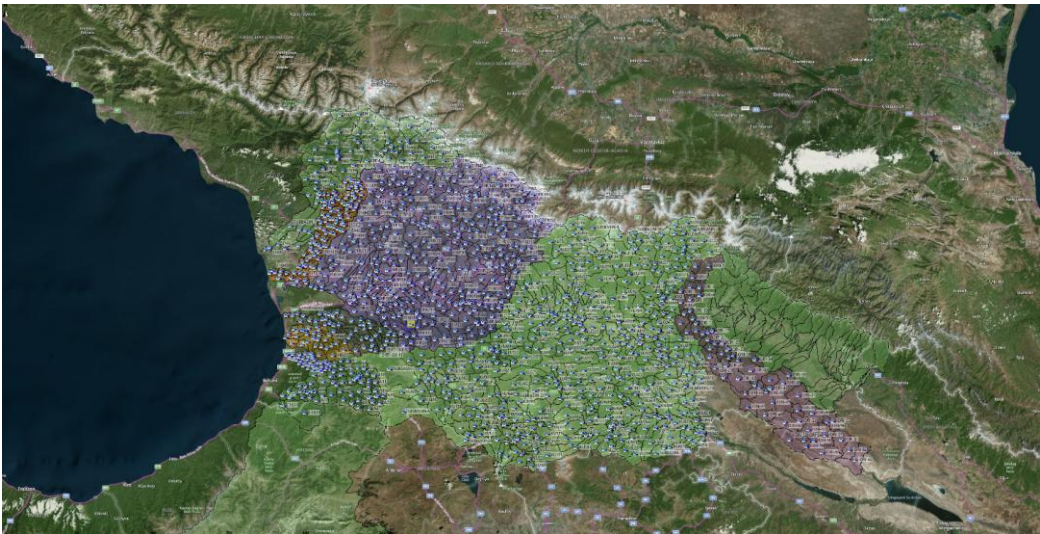
Radar Data



Discharge

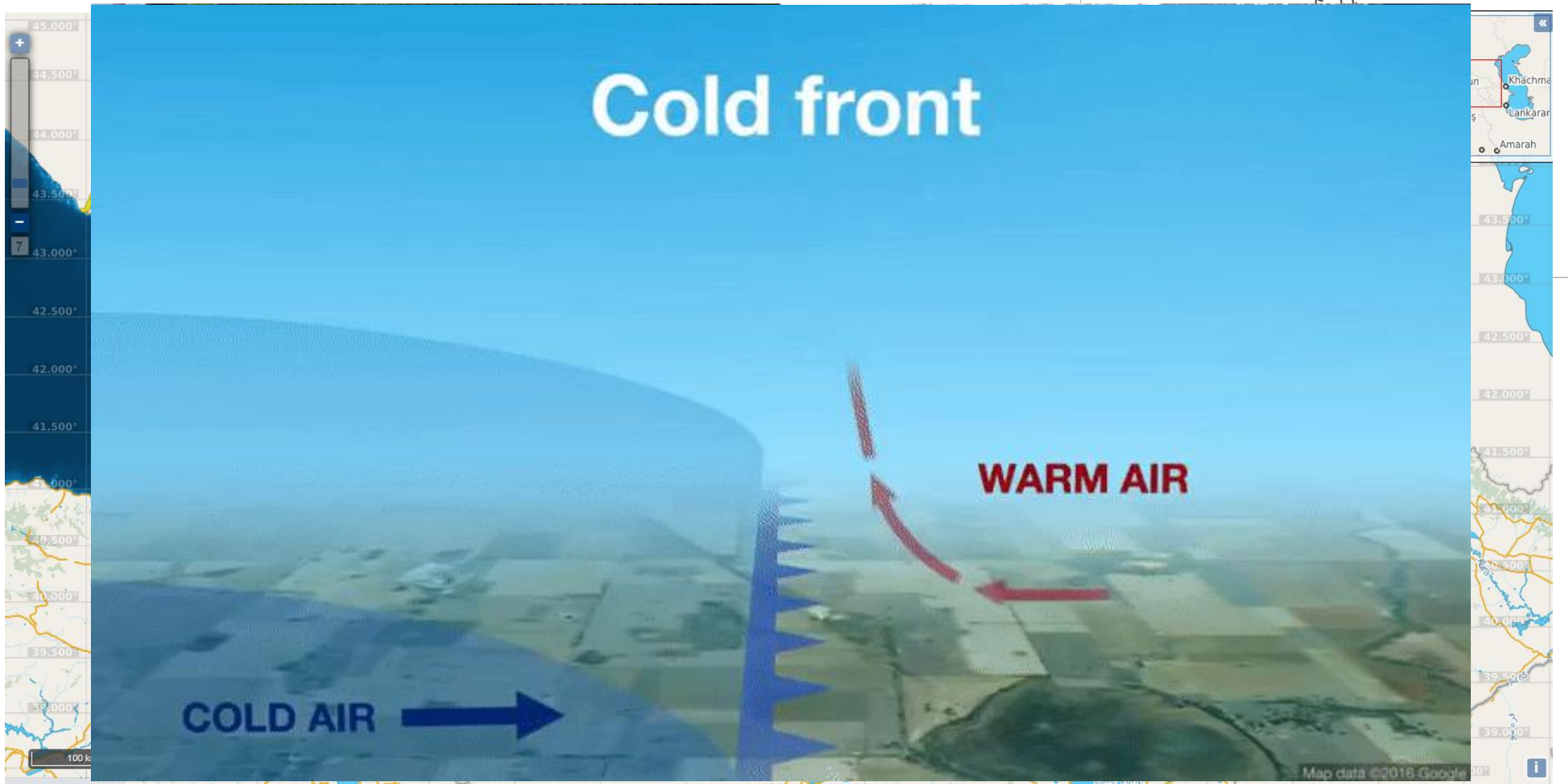


Water Level



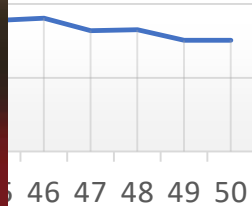
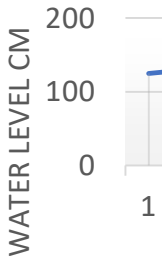


Nowcasting and issued warning,
Saguramo 2020





Forecasted Flash flood, River Stori



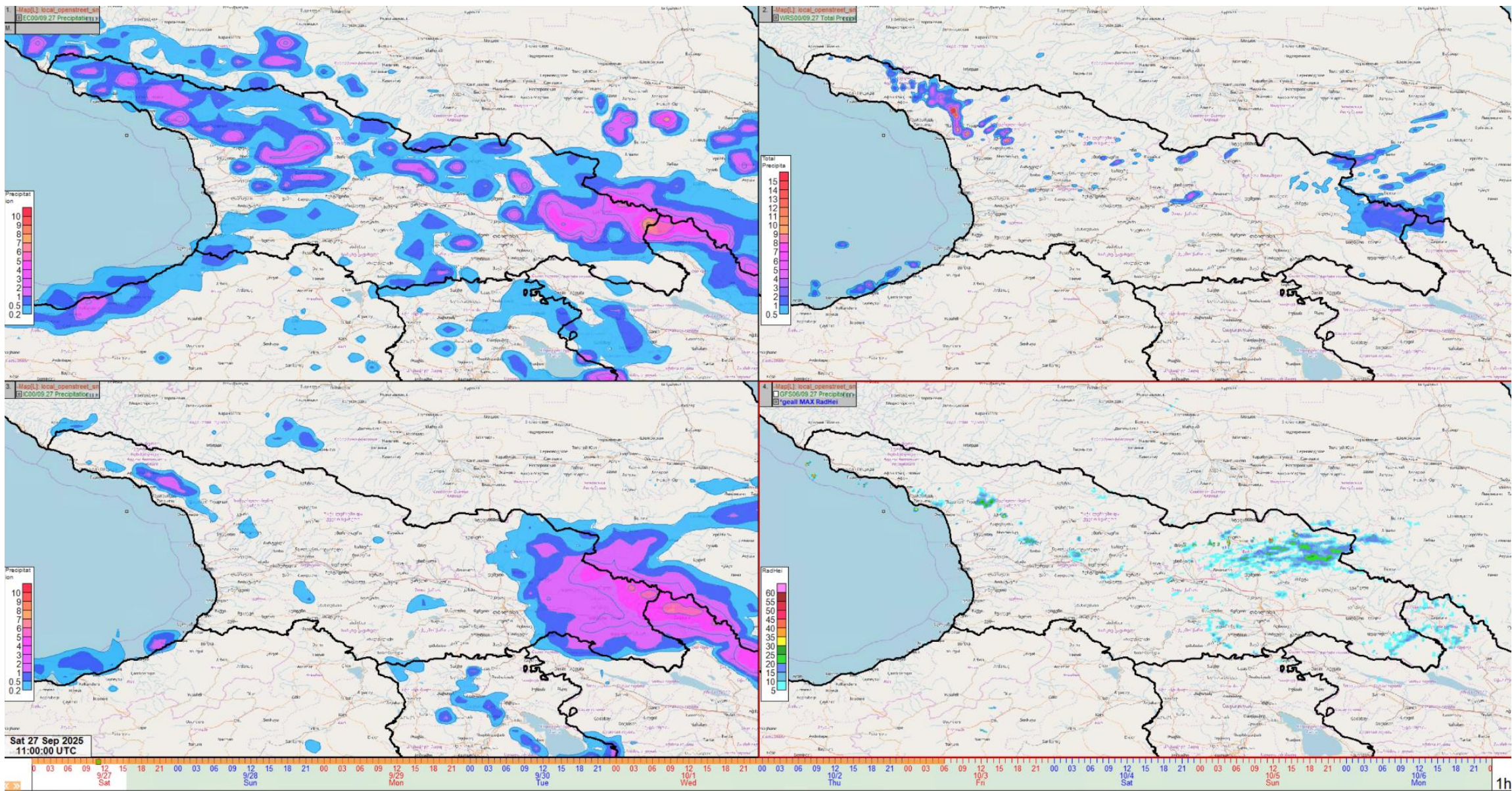


Information and Communication Technology (ICT)



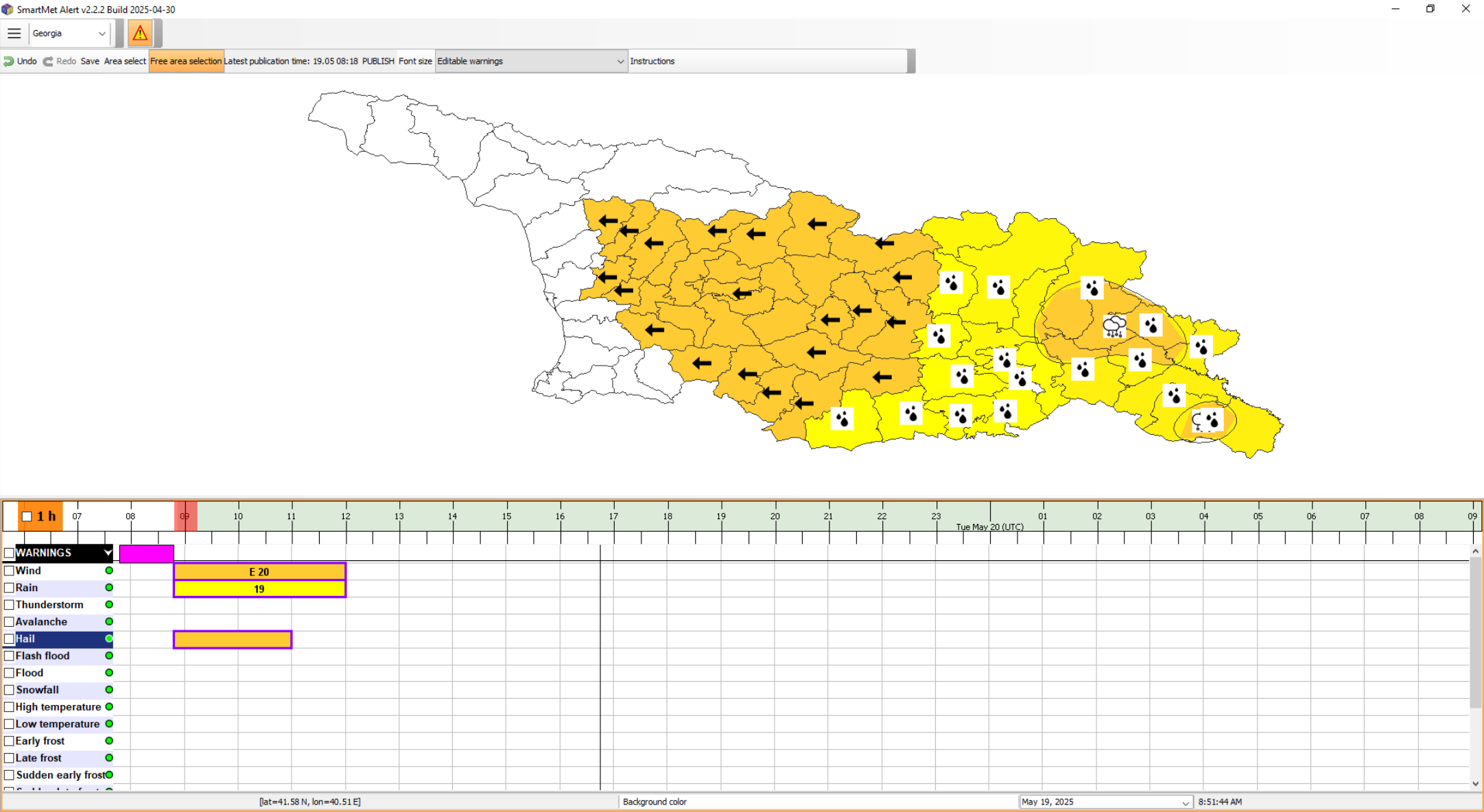


Smartmet – Forecasting platform



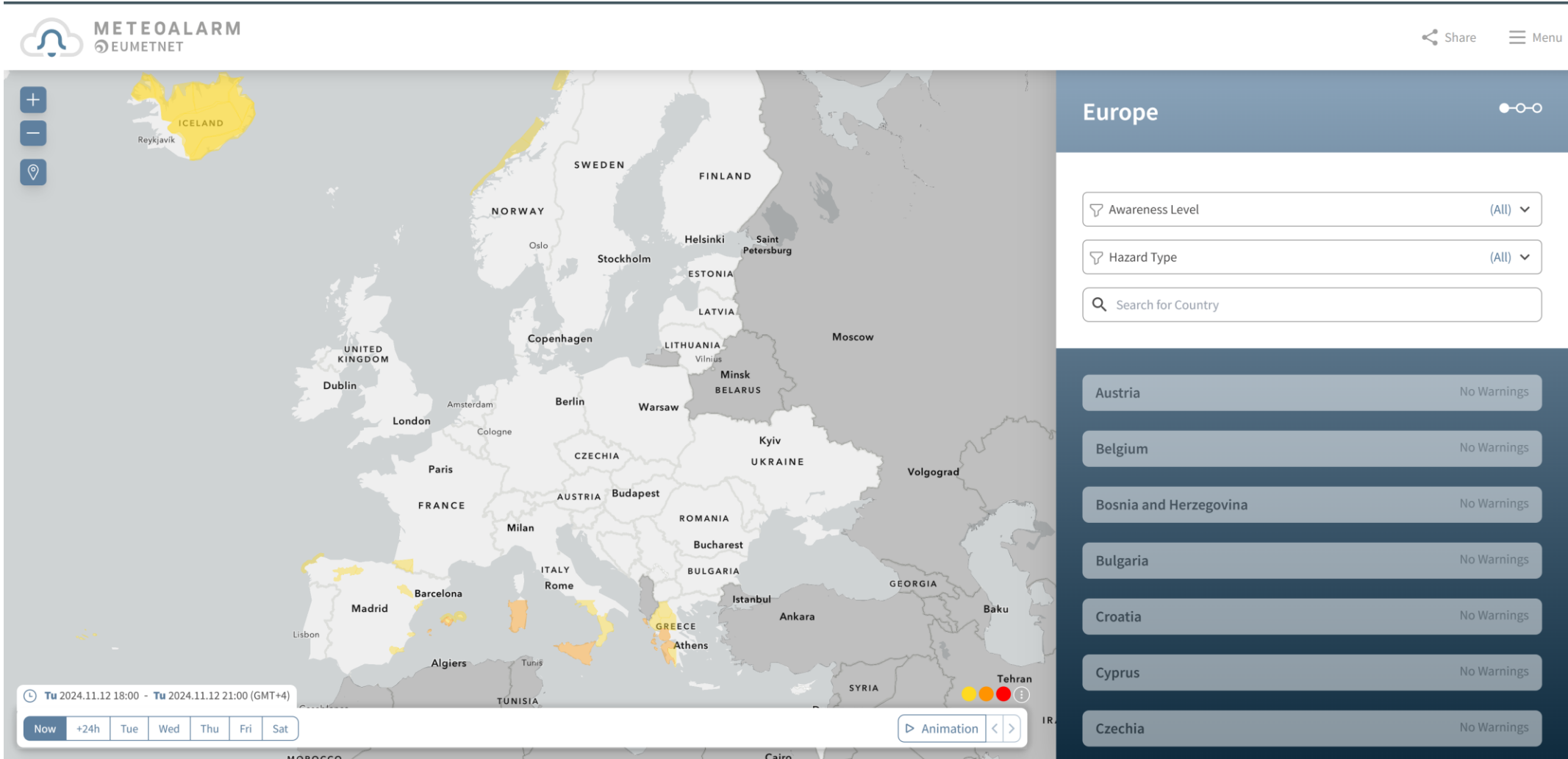


Warning System - Smartalert



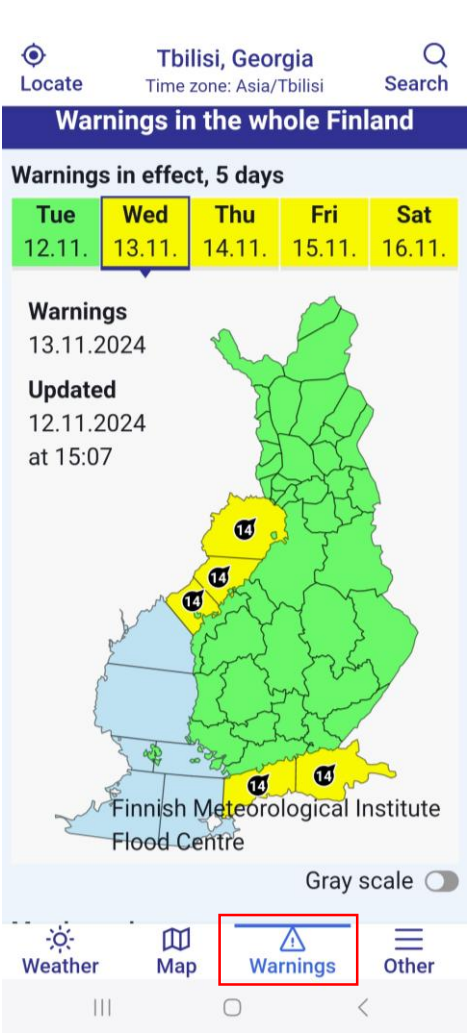
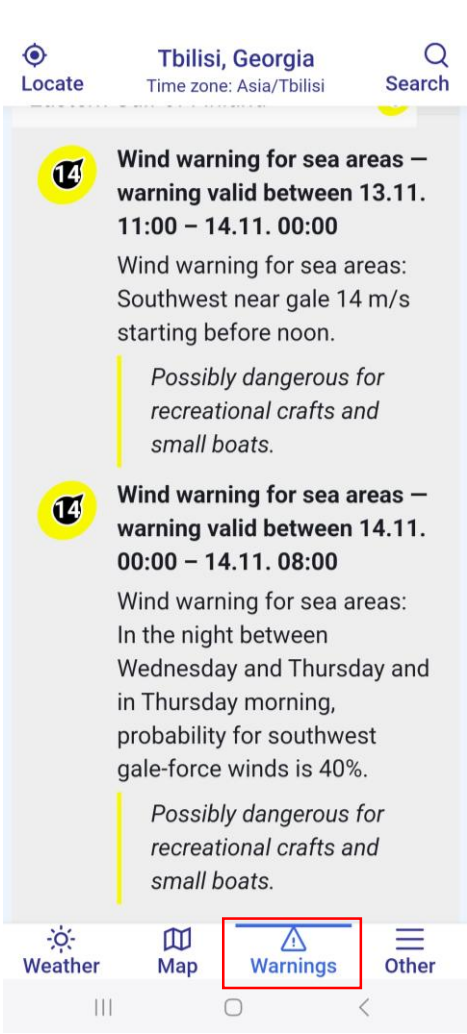
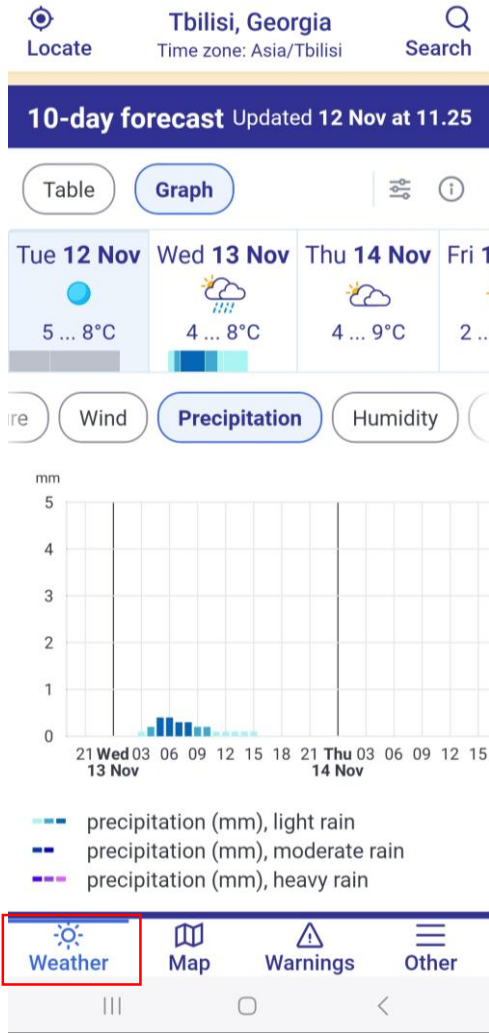
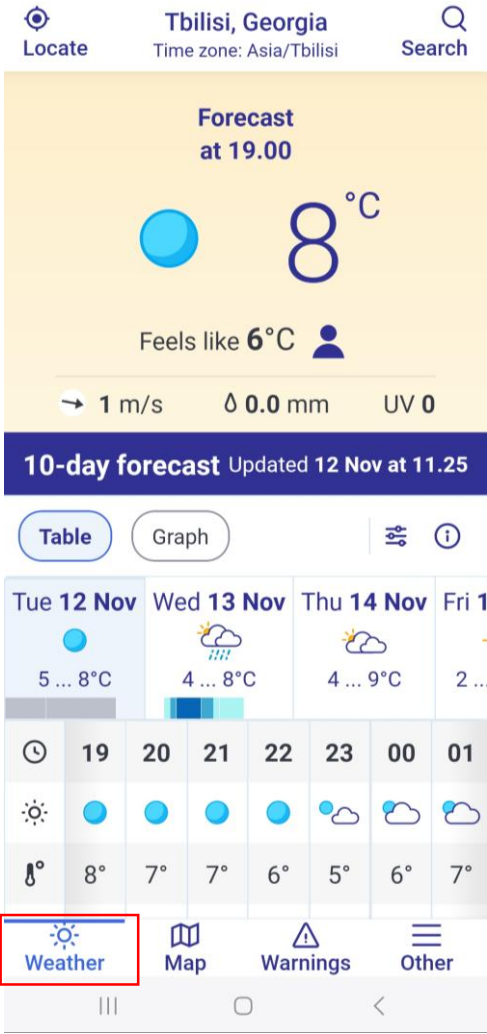


Data exchange through MeteoAlarm (Eumetnet)





Mobile APP





Upcoming activities



- Installation of 50 additional automatic weather stations
- Establishment of an aerological station in the eastern part of the country
- Installation of a lightning detection system
- Membership in EUMETNET
- Implementation of a unified data management and integration platform, including paid services such as data acquisition and digitization
- Updating **meteo.gov.ge** upon completion of ICT systems



National Environmental
Agency

THANK YOU FOR
YOUR ATTENTION!

Davit.loladze@nea.gov.ge