

Methods for landslide risk monitoring

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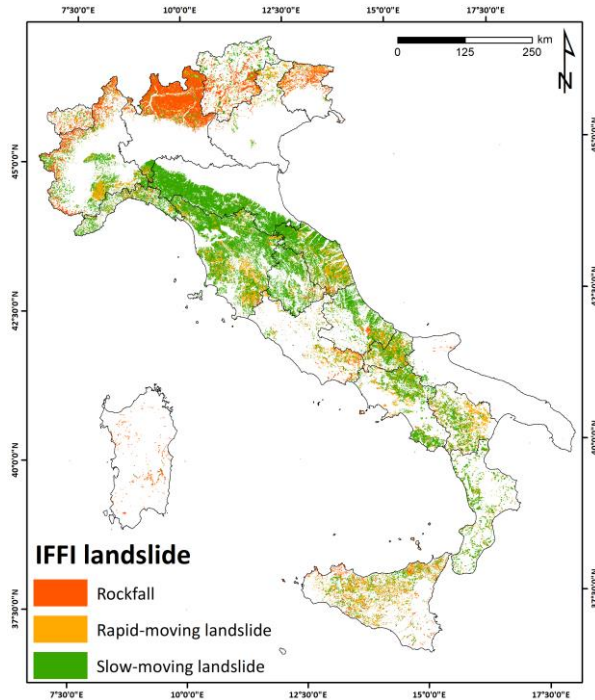
University of Firenze, Department of Earth Sciences

Friday, November 17th 14.30 - 16.00
PALAFFARI Basement HALL -1, Piazza Adua 1 Florence

Purpose of the activities

Develop methodology to support prevention and management of geohazards

Landslide risk assessment

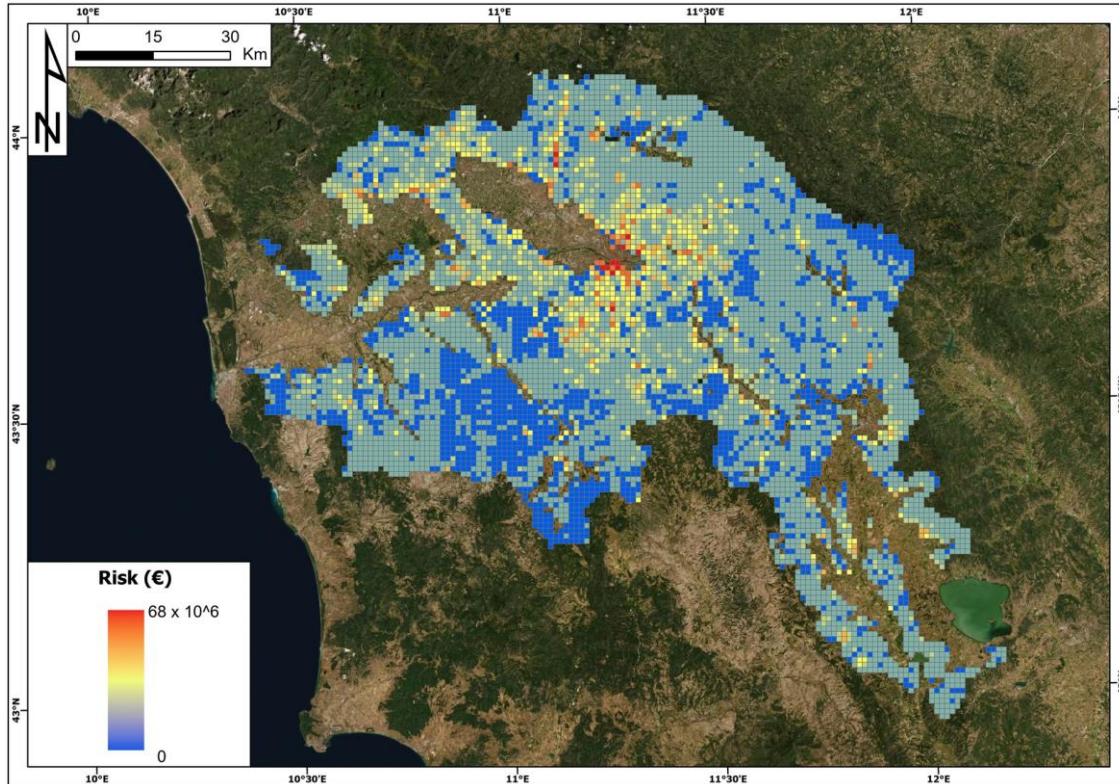


Doppler radar monitoring



Landslide risk assessment

Production of a quantitative landslide risk map at national scale



Methodological approach applied for the Arno River Basin (9100 km², Central Italy), aiming at national replicability.

Grid with a 1 km² cell size. For each cell the parameters necessary for the risk assessment were calculated.

Landslide risk assessment

Input data for the production of a quantitative landslide risk map at national scale

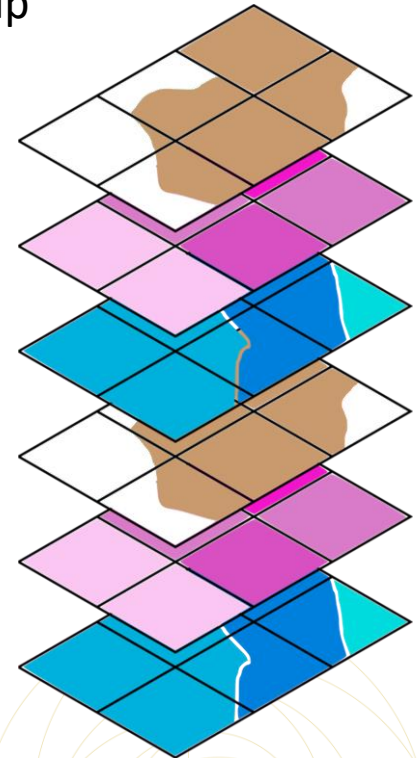
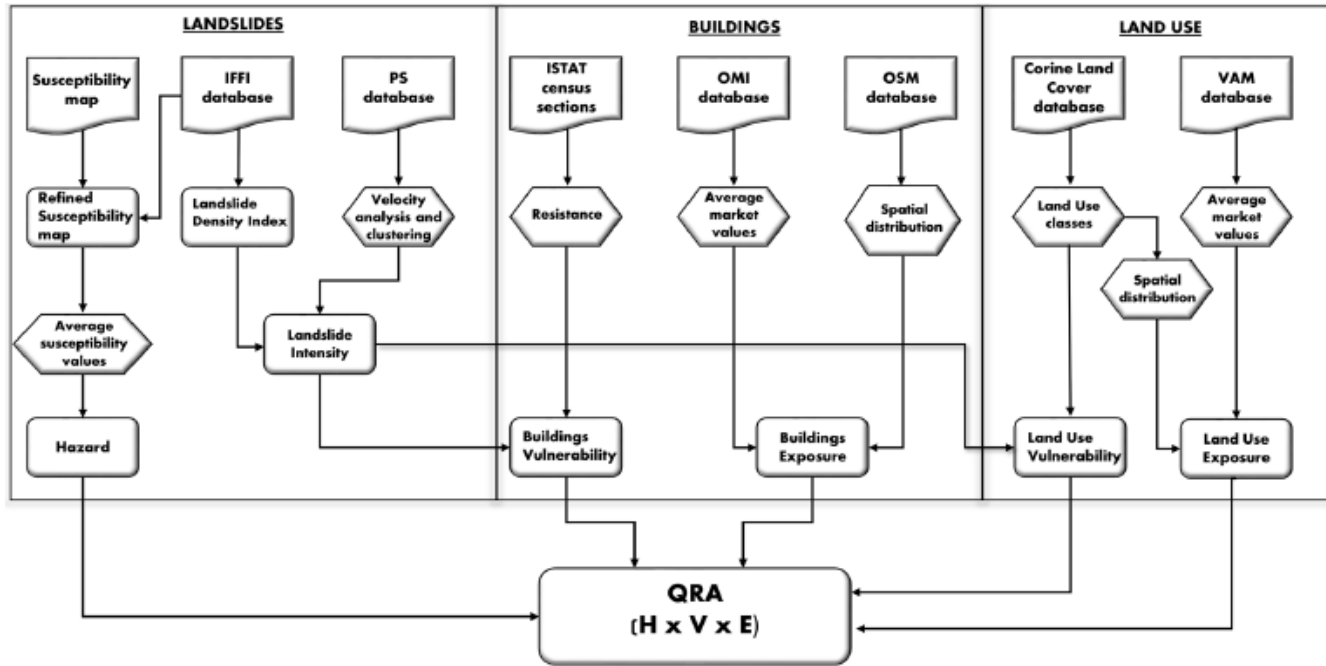
Input data	Description	Risk parameter	Scale/resolution	Website/reference
DTM	Digital Terrain Model	Risk analysis mask	10 m	http://tinality.pi.ingv.it/
IFFI database	Database of Italian landslides	Hazard — intensity	1:10.000/1: 25.000	https://www.isprambiente.gov.it/it
Susceptibility map	Spatial probability of landslides occurrence	Hazard	50 m	Trigila et al. (2013)
PS database	Distribution of ground deformation and movement rate	Intensity	National	Raspini et al. (2018)
ISTAT census sections	Spatial distribution of buildings characteristics	Vulnerability	From 1:5.000 to 1:25.000	https://www.istat.it/
OMI database	Market value of buildings	Exposure	Sub-municipal scale	https://www.agenziaentrate.gov.it/
Open Street Map (OSM) database	Spatial distribution of buildings	Exposure	1:5.000	https://www.openstreetmap.org/
Corine Land Cover (CLC) database	Spatial distribution of land use	Vulnerability — exposure	European scale — minimum mapping unit (MMU) of 25 ha	https://www.isprambiente.gov.it/it
VAM database	Market value of land use	Exposure	Municipal scale	https://www.agenziaentrate.gov.it

Objective: creation of a procedure to be applied at the national scale.

All of the input data will be open, homogeneous and free, with uniform characteristics at the national scale.

Landslide risk assessment

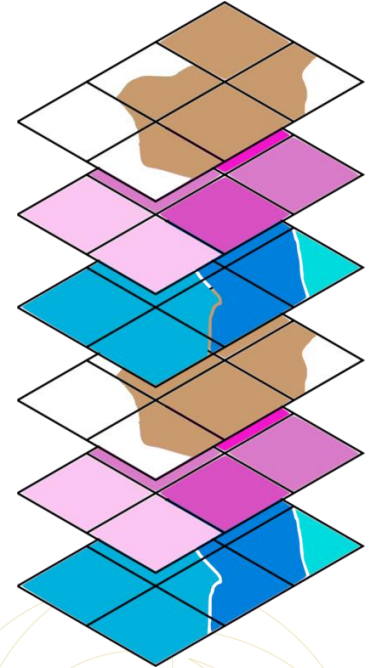
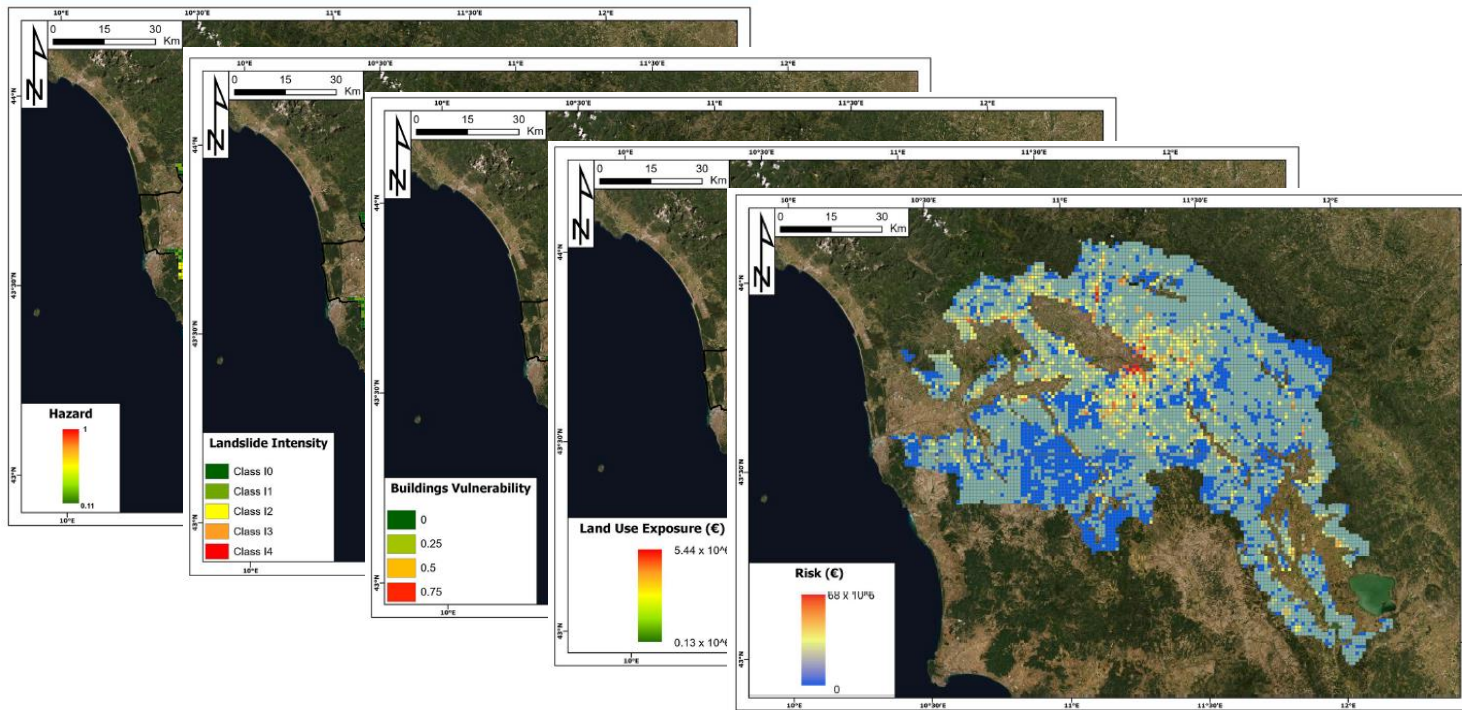
Approach: GIS analysis and matrix-based relationship



The resolution of the QRA map will be 1 km². Floodplains will be excluded from the analysis to simplify the calculation

Landslide risk assessment

Results for the Arno River Basin



The obtained results show that the total risk of the study area amounts to approximately 7 billion €

Doppler radar monitoring

Operative implementation of a monitoring system service for site of regional interest

During

Detect track and alarm

Before

Early warning



GB-SAR provides information before the collapse event



Gap in technology



After

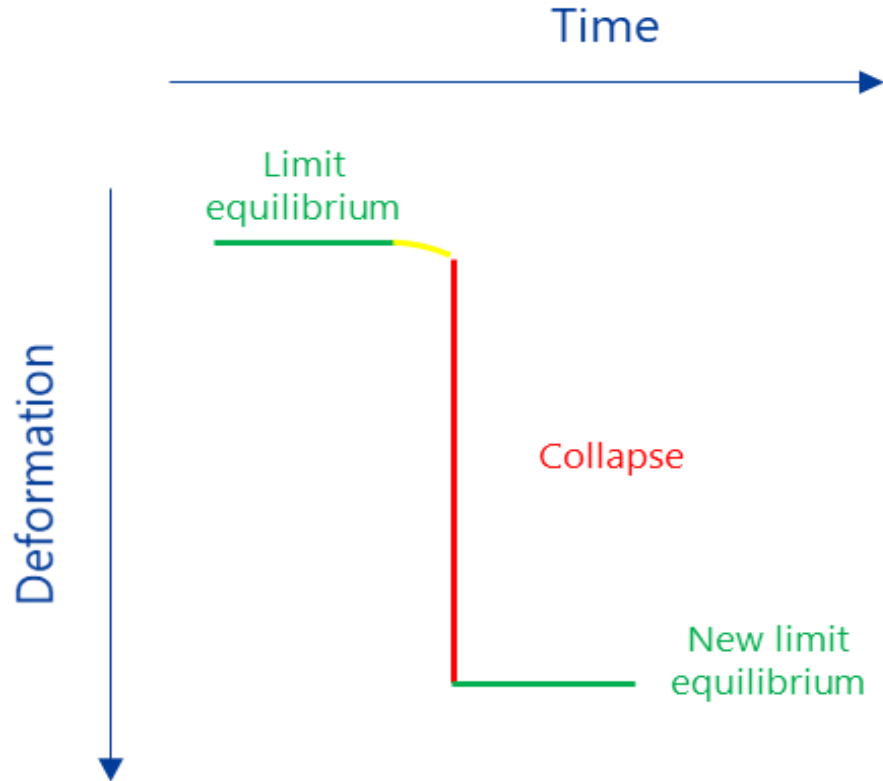
Post-analysis activities



Laser scanner provides information on event volume

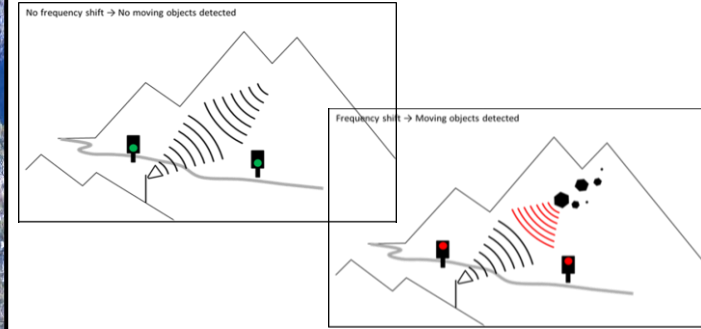
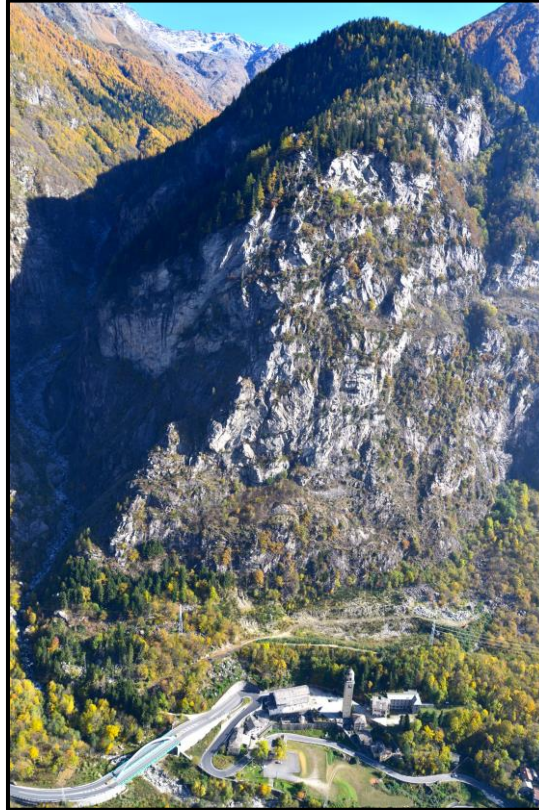
Doppler radar monitoring

Operative implementation of a monitoring system service for site of regional interest



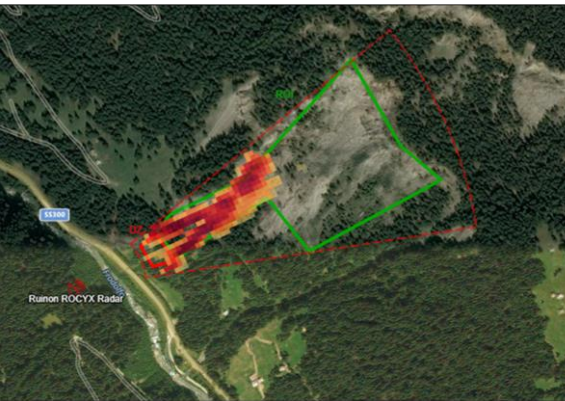
Doppler radar monitoring

Operative implementation of a monitoring system service for site of regional interest



Doppler radar monitoring

Operative implementation of a monitoring system service for site of regional interest



Evento rilevato alle ore: [01.10.2020 18:18:49](#); distanza tra radar e punto di innesco: [487.16 m](#); distanza di propagazione: [374.74 m](#); classe di dimensione: [3.78](#); velocità media: [48.64 km/h](#).

Thanks for the attention

<https://geosciences-ir.it>

