AIGeo – GdL 'Morfodinamica costiera'

Roma, 27 May 2019

Research on coastal geomorphology and morphodynamics in Malta: UNIMORE Team

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MAIN RESEARCH TOPICS

- ✓ *Terrrestrial investigations on coastal landslides in Malta and Gozo*
- ✓ *Submarine investigations on the 'hidden' landslides of the NW coast of Malta*
- ✓ *Coupling and analysis of terrestrial and marine datasets*
- ✓ *Landslide cosmogenic exposure dating*
- ✓ *Coastal risk issues in Malta*
  - erosion vs landsliding
  - role of sea level rise

Azure Window, Gozo

The disappearance of an icon of the Maltese landscape

Azure Window before (a) and after (b) the collapse of 2012

Source: Coratza et al. 2016, Geoheritage 8(1)

Azure Window before and after the collapse of 8 March 2017

EUR-OPA Major Hazards Agreement
COUNCIL of EUROPE

European Centre for
Geomorphological Hazards

Euro-Mediterranean Centre on
Insular Coastal Dynamics

PROJECT: Coastline at Risk: Methods for multihazard assesssment (2009-11)

PROJECT: Coupling terrestrial and marine datasets for coastal hazard assessment and risk reduction in changing environments (2012-15)

PROJECT: Developing geomorphological mapping skills and datasets in anticipation of subsequent susceptibility, vulnerability, hazard and risk mapping (2016-17)

PROJECT: Hazard and vulnerability assessment – the path to identifying risk (2018-19)

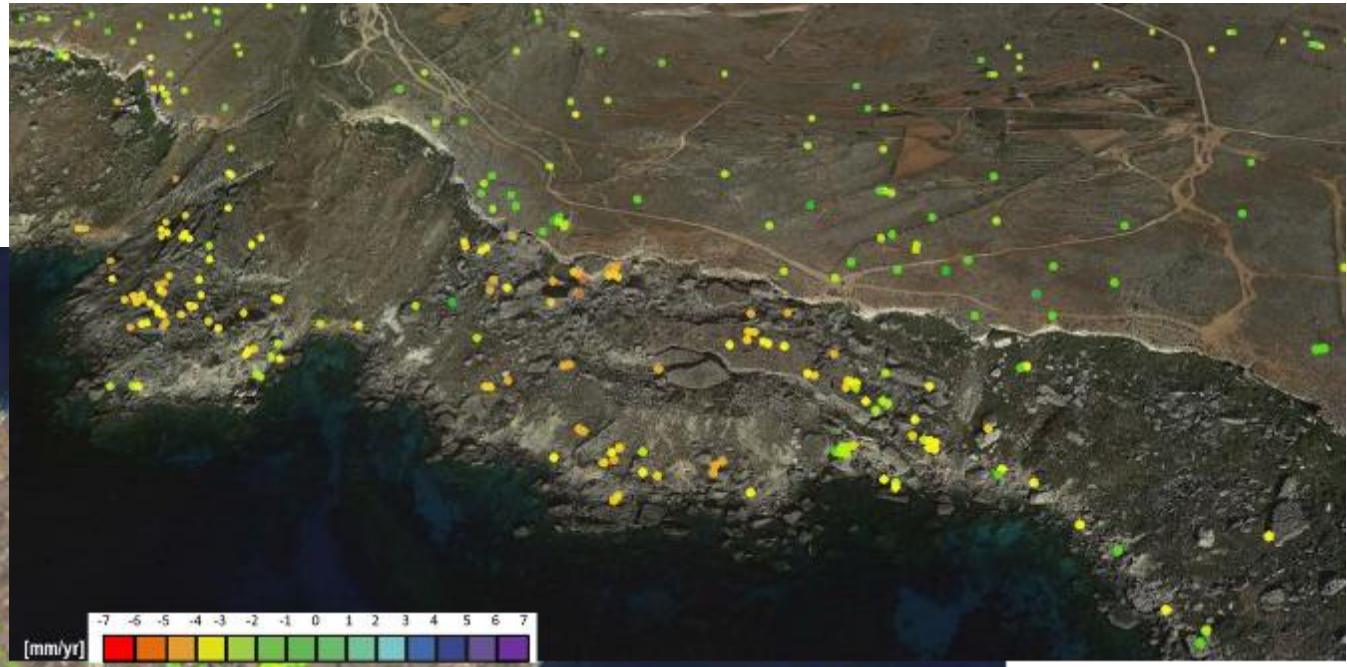
Onshore research aimed at:

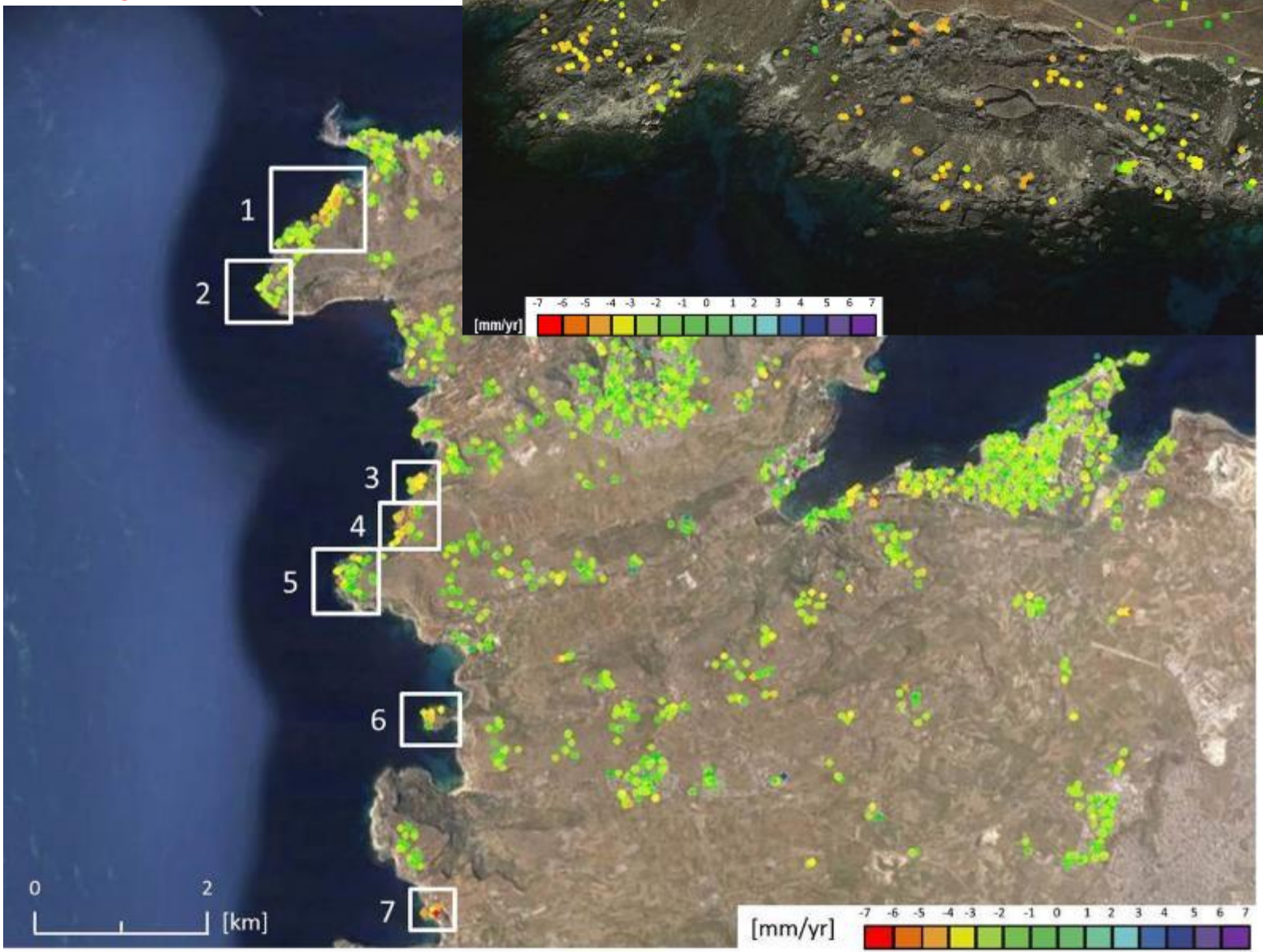
- Recognising different types of landslides and defining their state of activity
- Identifying the role of rock spreading and block sliding in the geomorphological evolution of the NW coast of Malta
- Testing the reliability and effectiveness of different techniques applied to extremely slow mass movements

Geomorphological features

The NW coast of Malta is affected by spectacular examples of active rock spreads and block slides

State of activity: Interferometric analysis

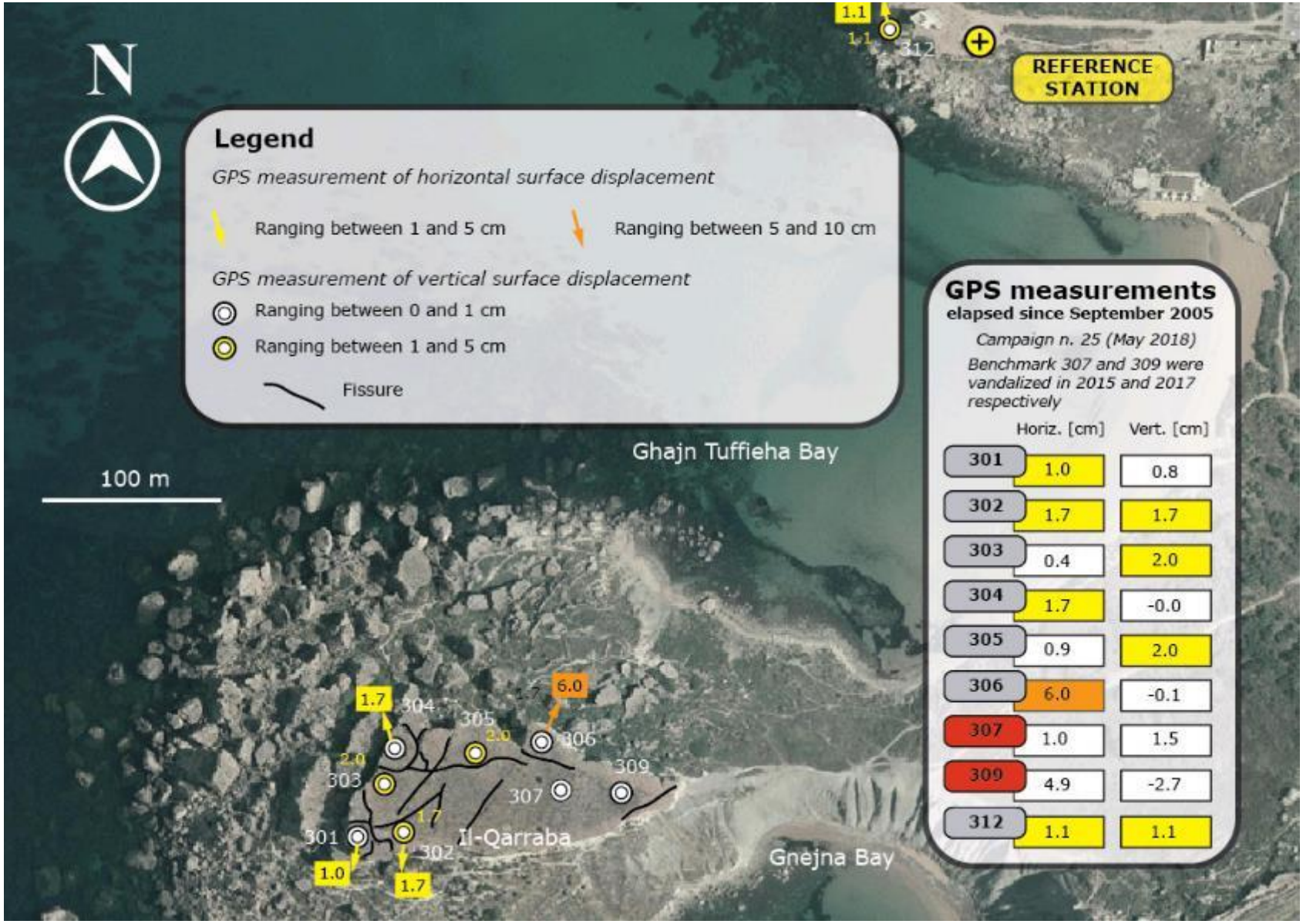


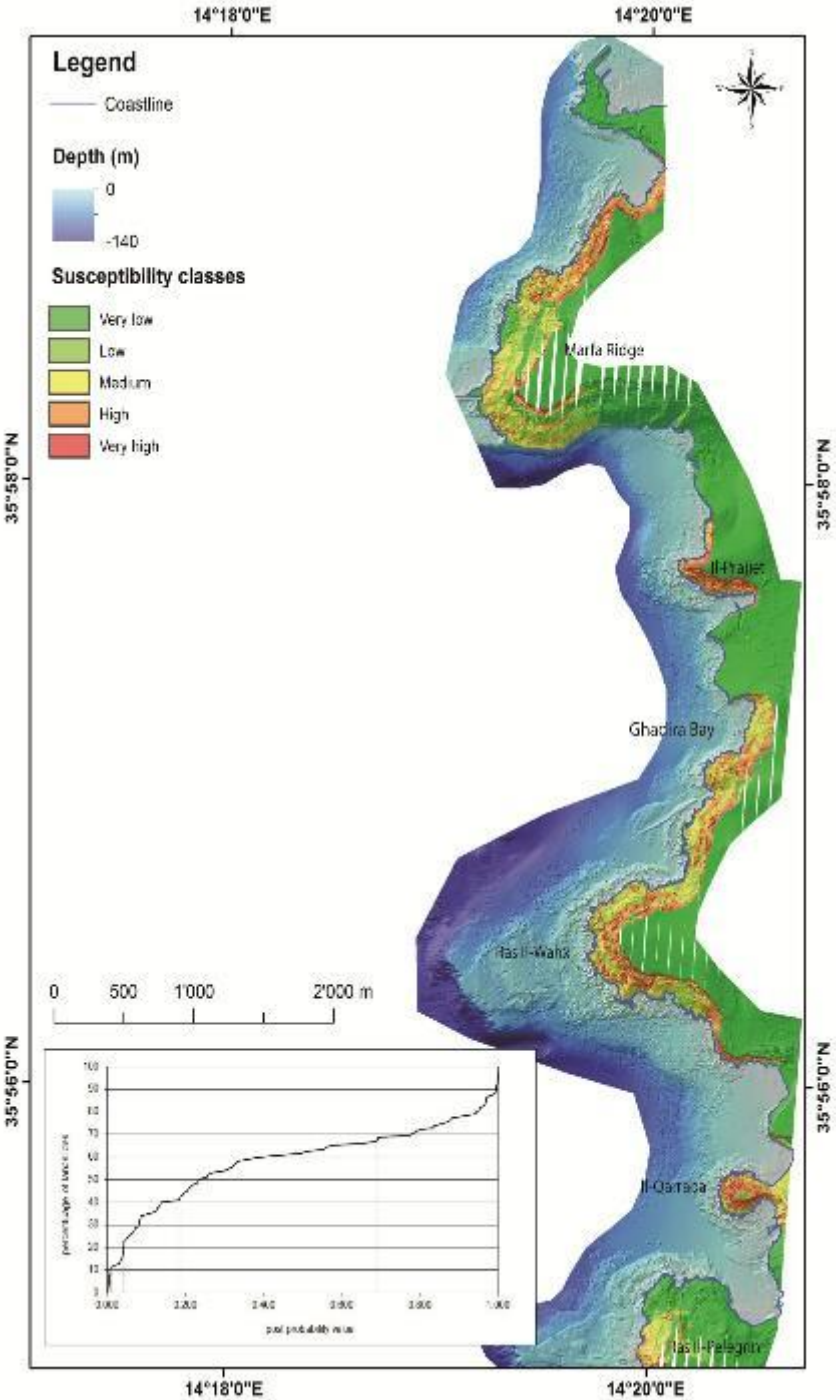


First evidence of **active** deformation

Monitoring results – Il-Qarraba

Benchmarks	9
Reading 0	September 2005
Reading 25	May 2018





Landslide susceptibility map of NW coast of Malta

New approach that combines the WofE method and PSI analysis

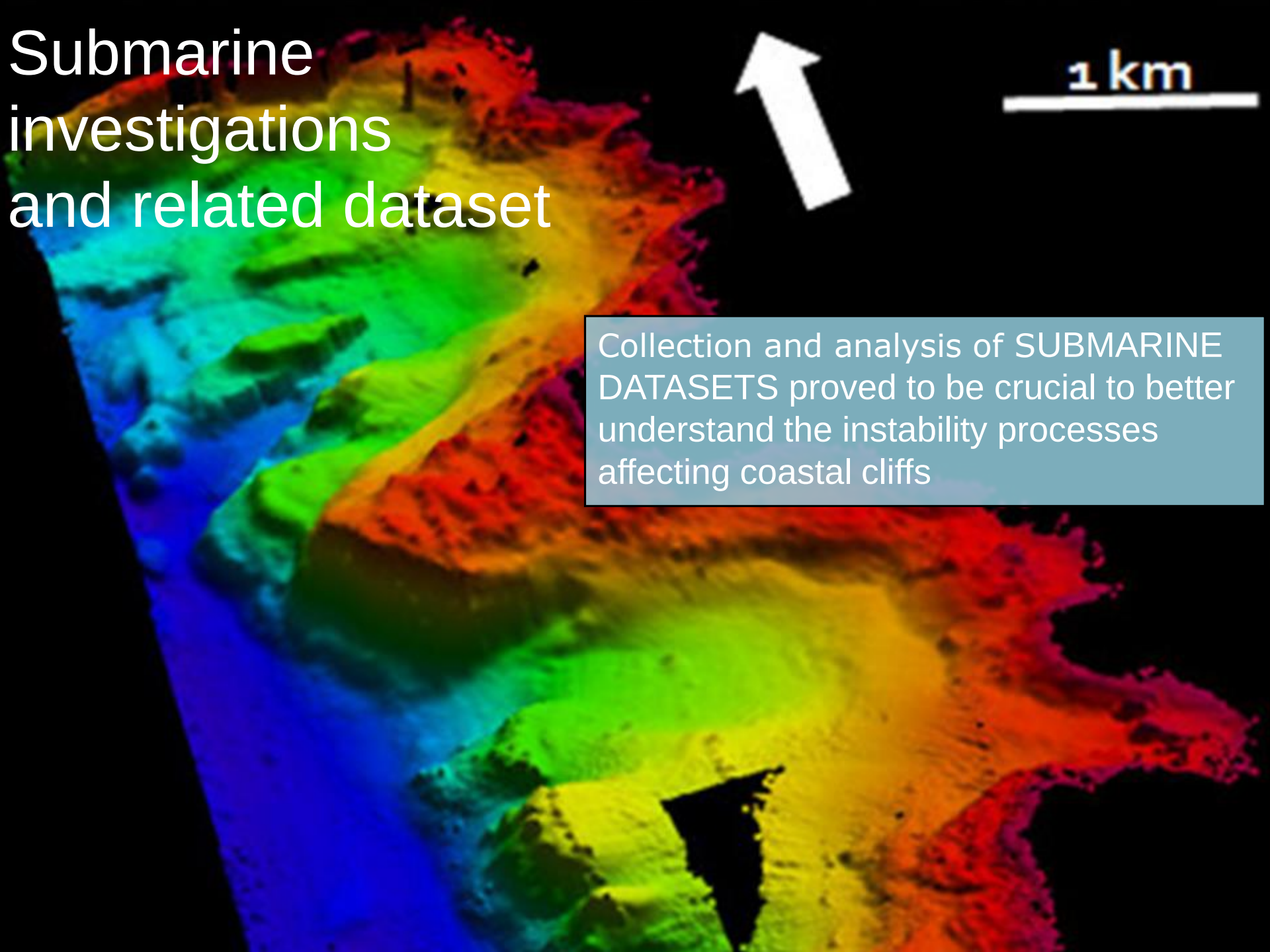
Parameters considered:

- slope angle
- curvature
- distance from coastline
- distance from scarp
- distance from faults
- distance from joints
- Topographic Position Index

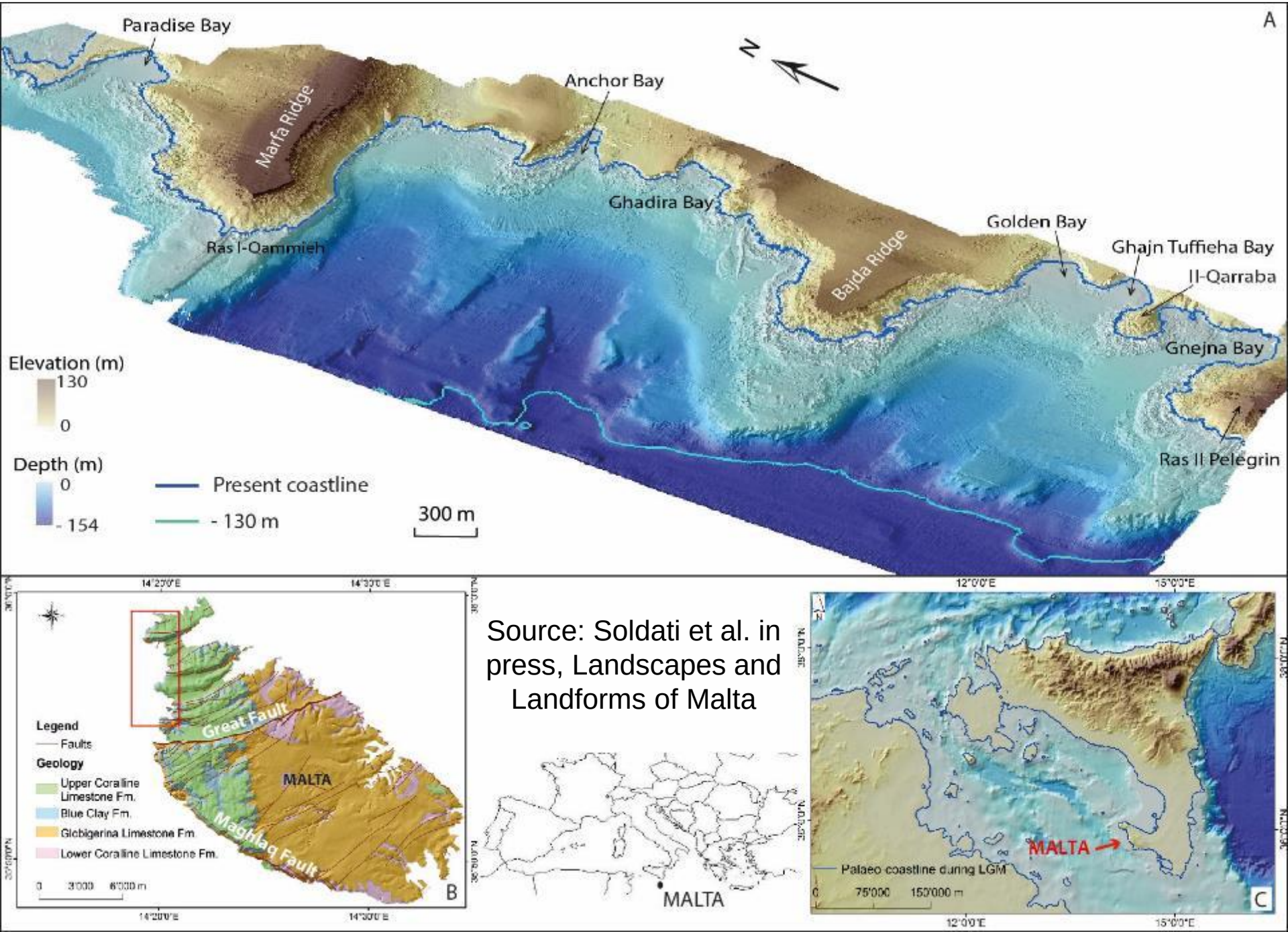
The results were verified by a cross-validation, field surveys and on-site GPS measurements

Source: Piacentini et al. 2015, Natural Hazards, 78

Submarine investigations and related dataset



Collection and analysis of SUBMARINE DATASETS proved to be crucial to better understand the instability processes affecting coastal cliffs



Source: Soldati et al. in press, Landscapes and Landforms of Malta