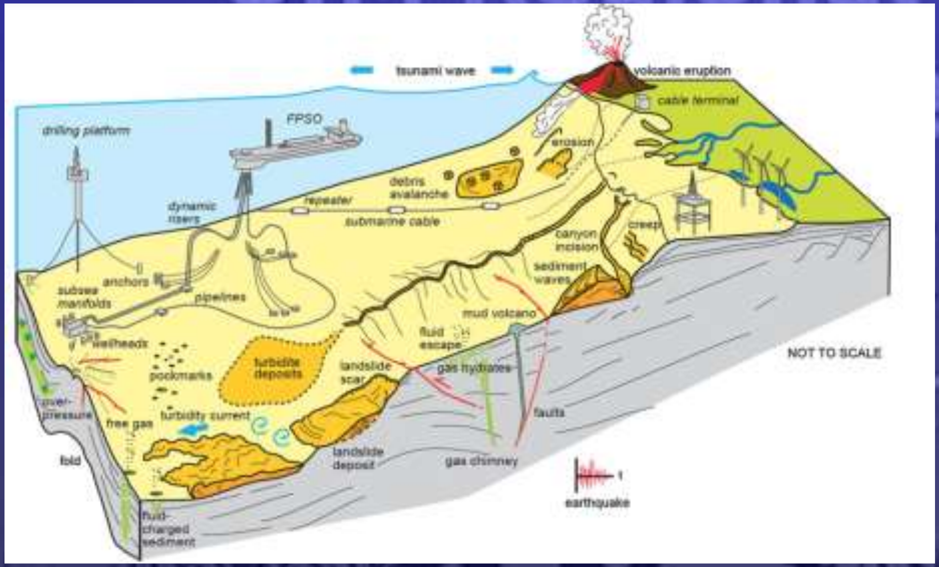
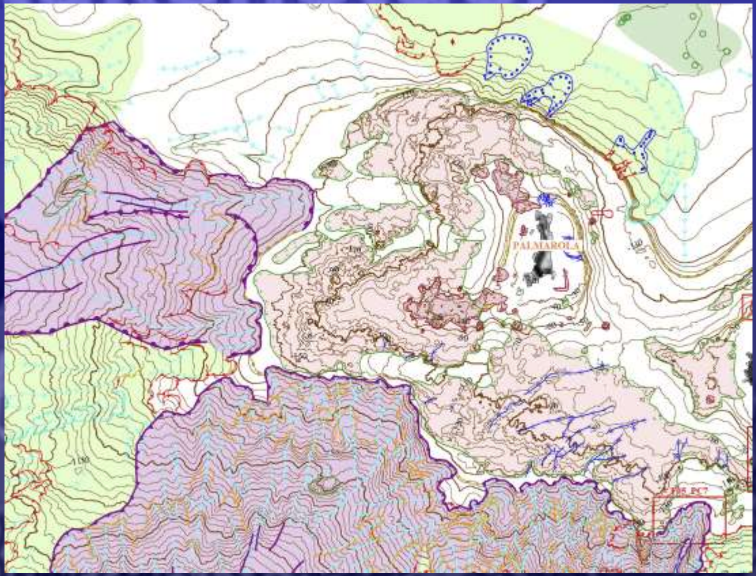


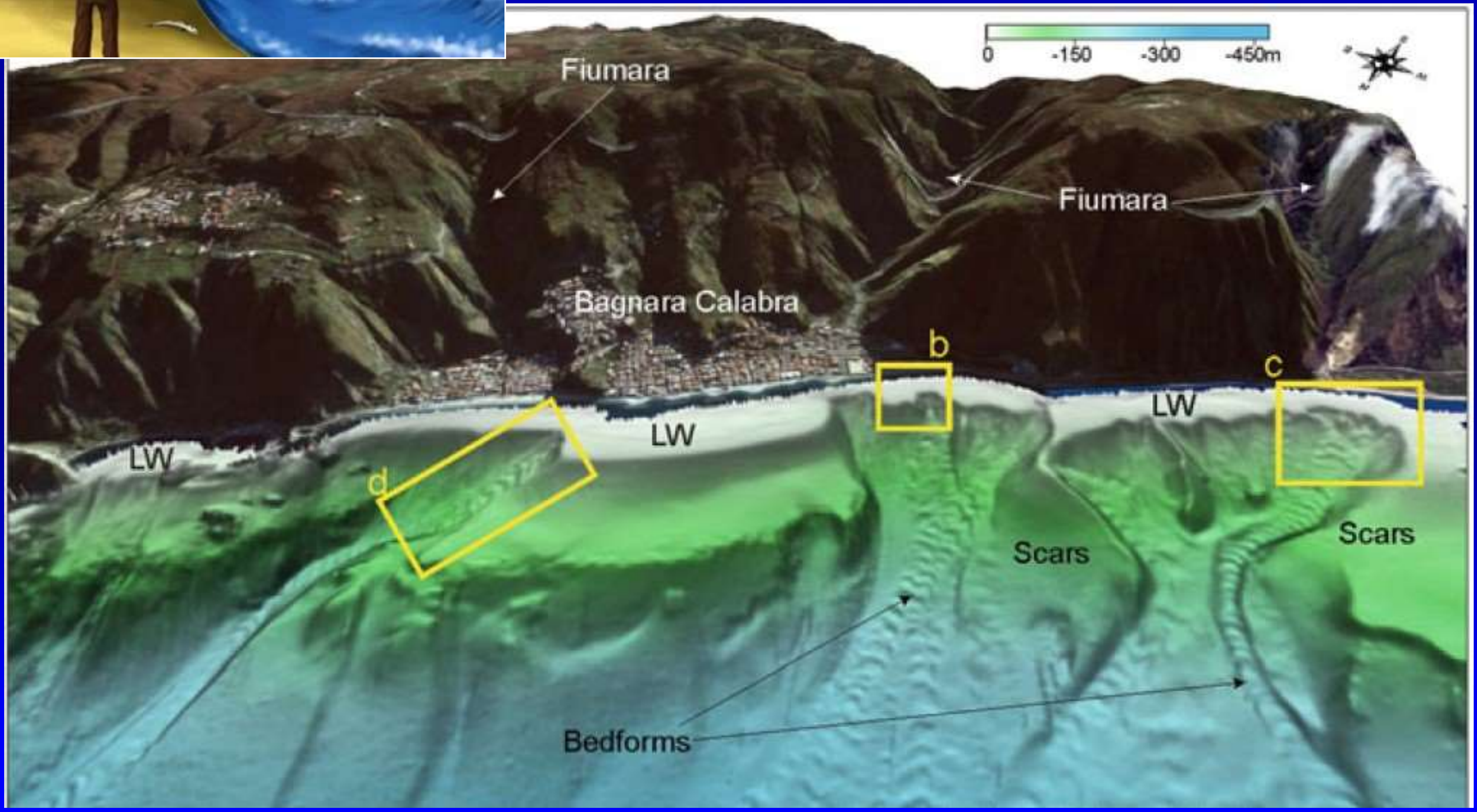




# Seafloor Mapping for Geohazard Assessment: the need of a joint effort for knowledge transfer from science to society

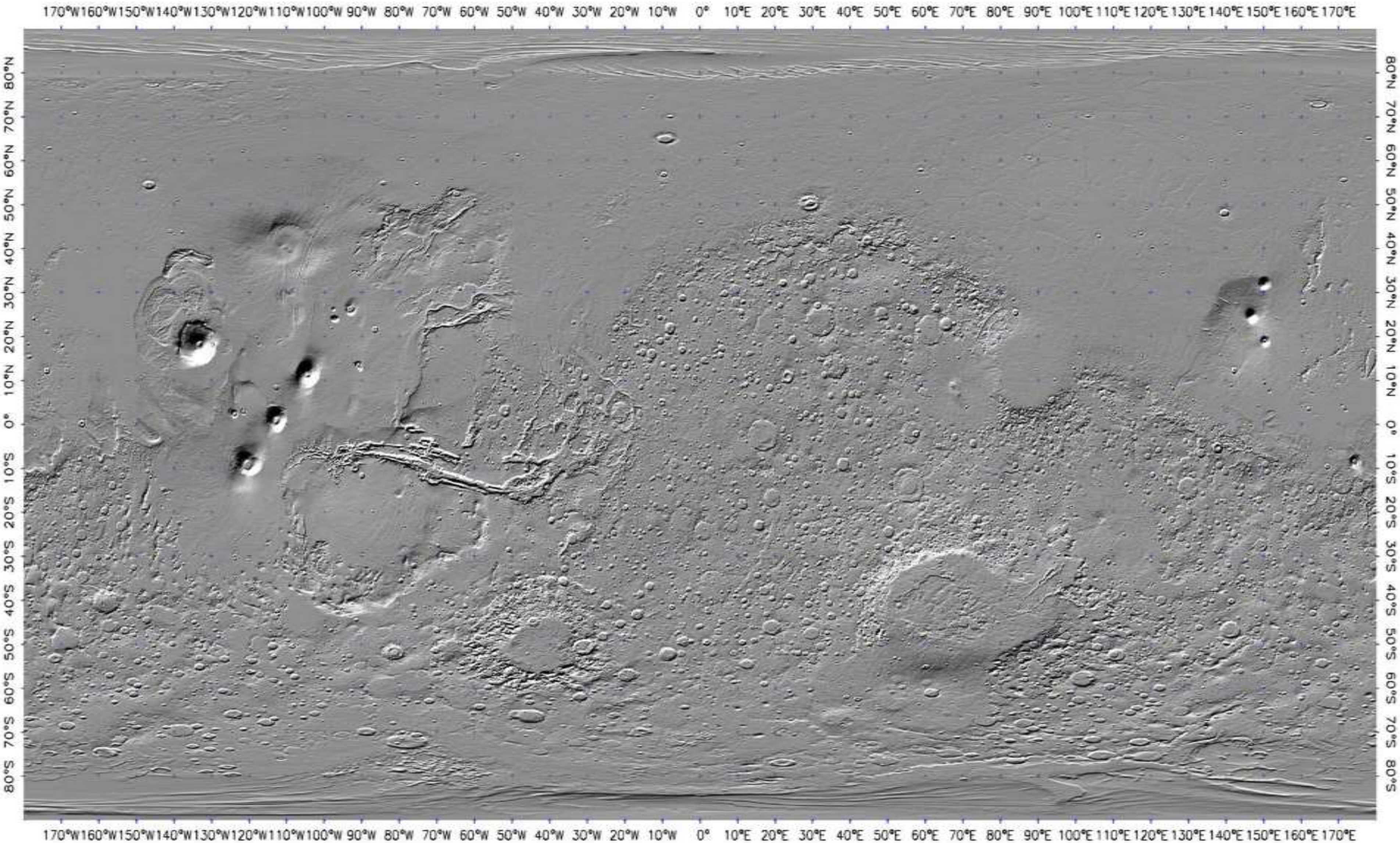
Francesco L. Chiocci (University of Rome)

In the last decades technological advances (multibeam *in primis*) greatly improved our capability to image the seafloor with very high detail.

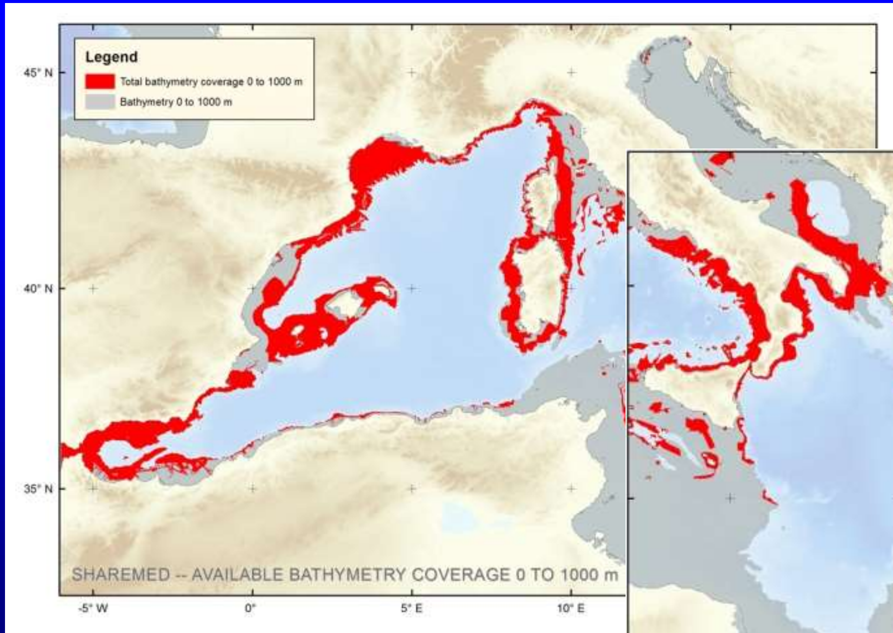
A new, totally unknown world emerged in front of our eyes, with its beauty and its hazard

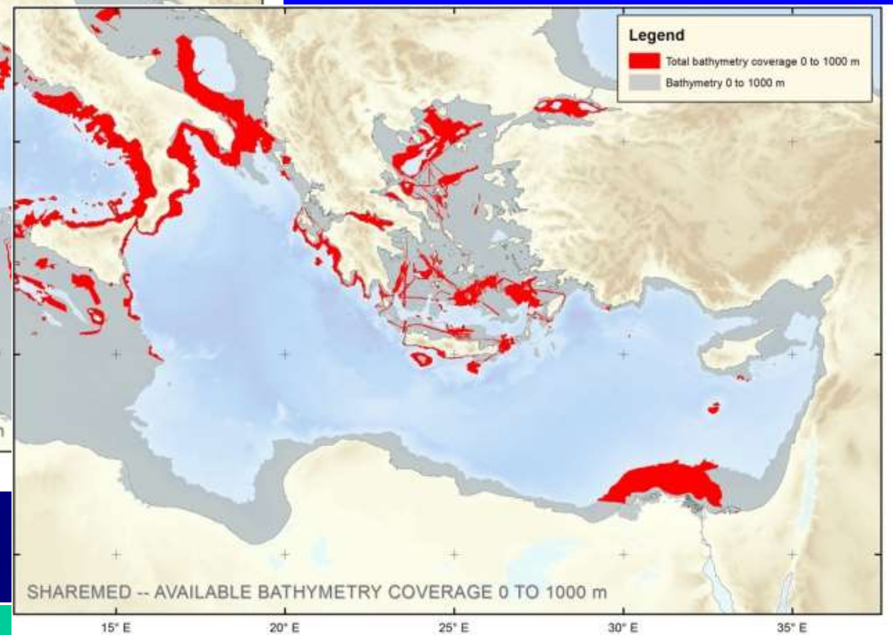


# Shaded relief map of Mars




*(Derived from NASA / MOLA DEM data. Image processing by E. Pilger and H. Garbeil, Hawai'i Institute of Geophysics and Planetology at the University of Hawai'i.)*

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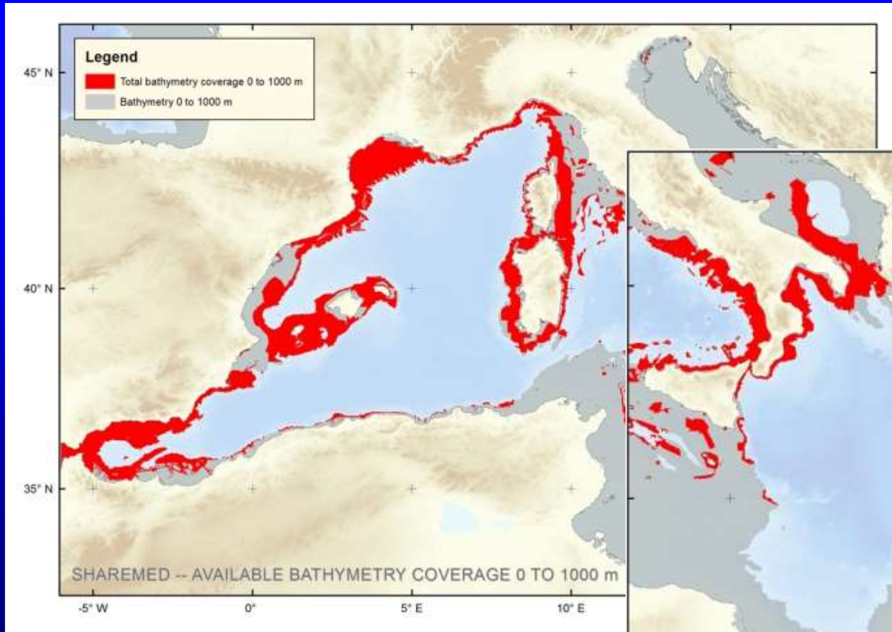
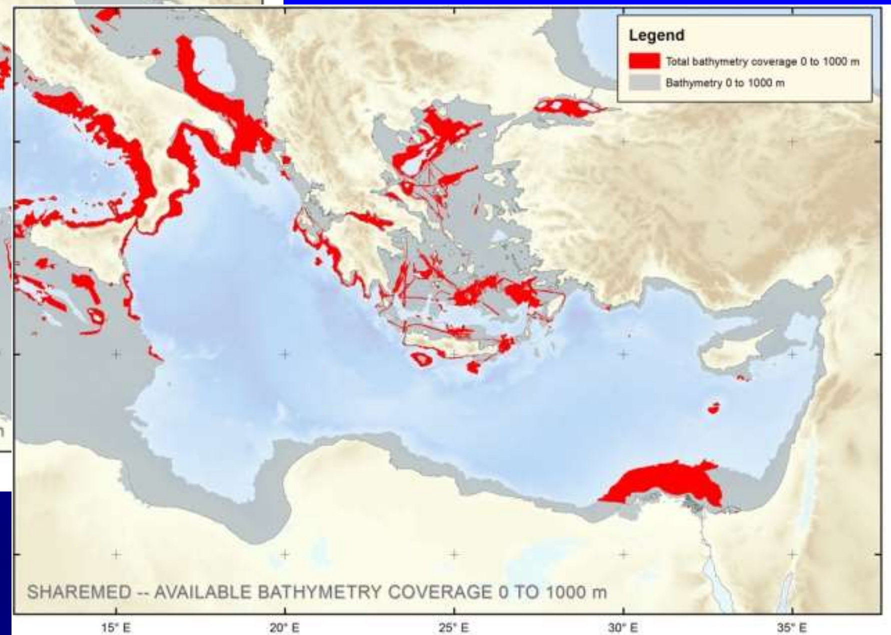
|---|---|---|---|
| Université Pierre et Marie Curie – Paris 6 | UPMC | FR | |
| Universita Degli Studi di Roma La Sapienza | UniRoma | IT | |
| Agencia Estatal Consejo Superior de Investigaciones Cientificas | CSIC | ES | |
| Hellenic Centre for Marine Research | HCMR | GR | |
| Panepistimio Patron | UPAT | GR | |
| Universita Ta Malta | UOM | MT | |
| Universitat De Barcelona | UB | ES | |
| Instituto Geológico y Minero de España | IGME | ES | |
| Instituto Español de Oceanografía | IEO | ES | |
| Consorzio Nazionale Interuniversitario per le Scienze del Mare | CONISMA | IT | |
| Istituto Nazionale di Oceanografia e di Geofisica Sperimentale | OGS | IT | |
| Consiglio Nazionale delle Ricerche | CNR | IT | |
| Institut Français de Recherche pour l'Exploitation de la Mer | IFREMER | FR | |

Data available for geohazard assessment in scientific institutes



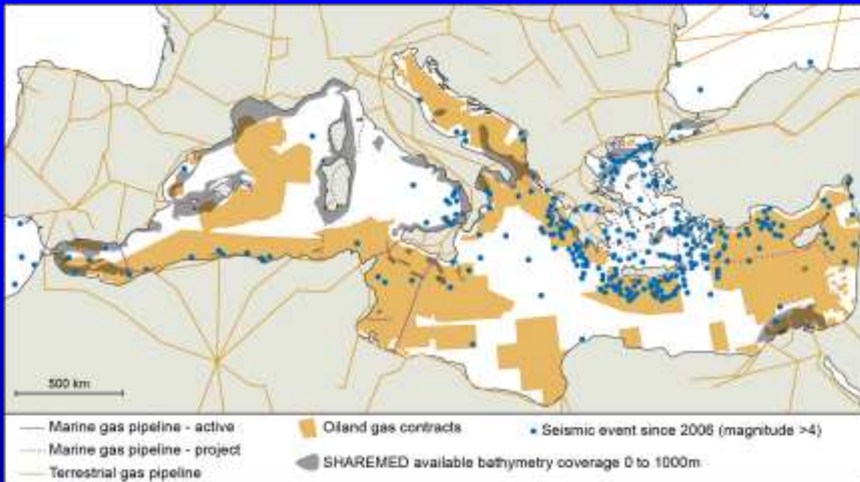

# END USERS

OIL AND GAS
CABLE AND WIND FARM
COASTAL MANAGERS
CIVIL PROTECTION AGENCIES
MARINE GEOCONSULTANT
INSURANCE COMPANIES

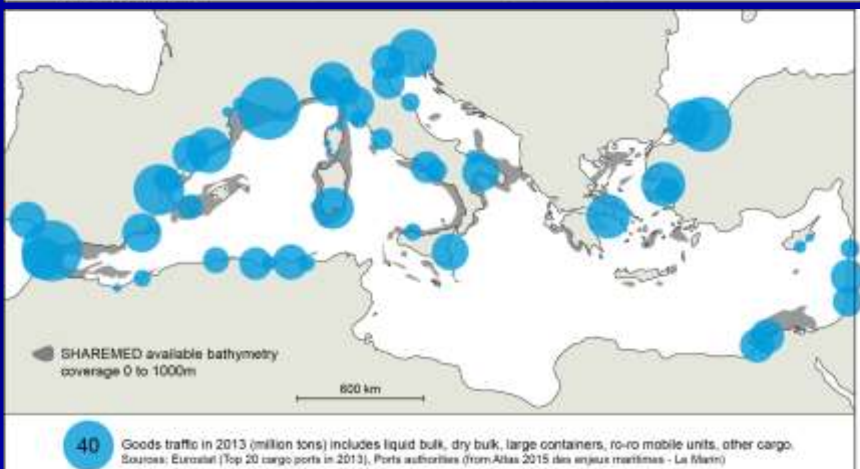
**The Mediterranean has its own specificities**

Active geology (volcanism and seismicity)
Orography and climate (coastal range and flash floods)
High tourist exploitation of scenic coasts
Specific characters of southern European research institutes
Dense infrastructures and settlements on the coast

# INFRASTRUCTURES

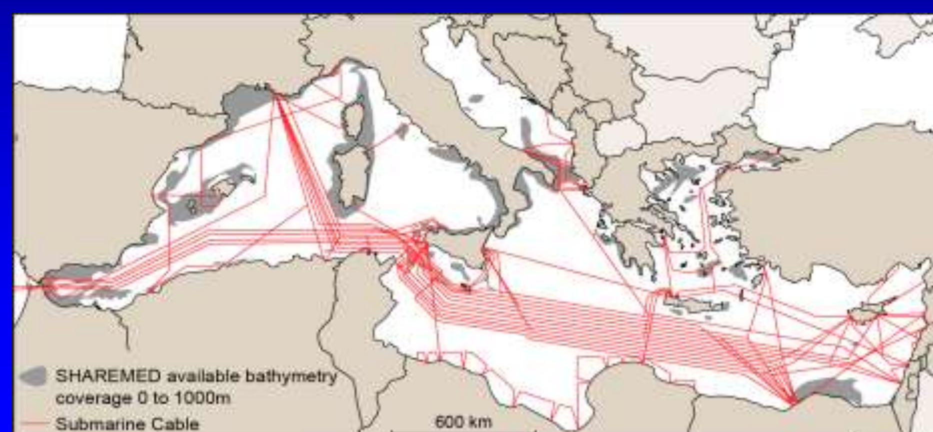



*Map of the Mediterranean Sea showing seismic events of magnitude >4 (blue dots) superimposed on areas contracted for oil and gas activities (orange areas).*




*Main Mediterranean harbours with goods traffic in 2013 (from Eurostat website)..*


*Distribution of main transport infrastructures within 1 km from the coastline*




*Map of submarine cable network in the Mediterranean Sea.*

# The need of a joint effort for knowledge transfer from science to society

**H.R. geomorphological mapping for marine geohazard;** identification and classification of geohazard feature, based on ORIGINAL interpretation of ALL the multibeam raw data existing in the Med, according to an harmonised procedure of mapping and representation, commonly defined with end-user, aimed at becoming a standard for European regions.

**Now.**

In this historical moment the geoscience has the possibility to produce base maps for all communities that will use the information. Not enough HR geohazard maps have been produced so far so t is still possible to define a standard for future interpretation

**Transferring the knowledge** from marine geoscientist working in the field to end-users (industry, civil protection, coastal authorities, SMEs)


**All the research groups and agencies** that own multibeam data and the capability for their advanced geomorphological interpretation.

**In the Mediterranean**

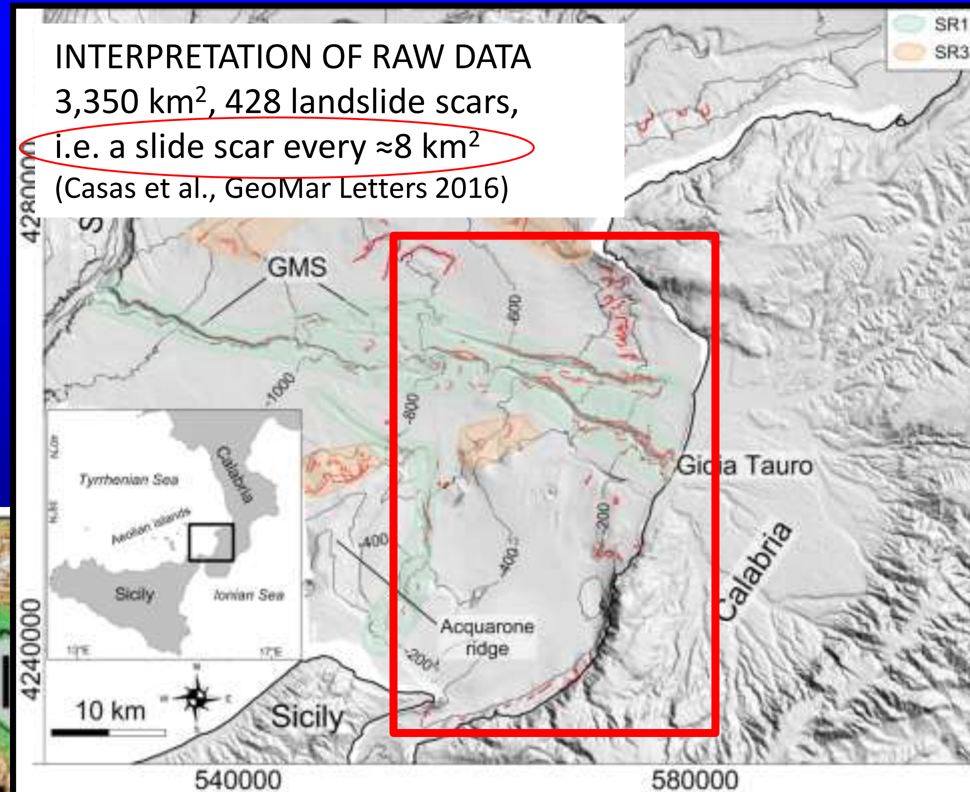
Because of its specificity either for active geology (seismicity, volcanism, canyons, ….) and for the strong exploitation of the coast and seafloor, i.e. exposure to geohazard

Help a **safe and responsible development** of economic activities at sea and on the coast (MMSP, ICZ MSFD, Blue Growth).

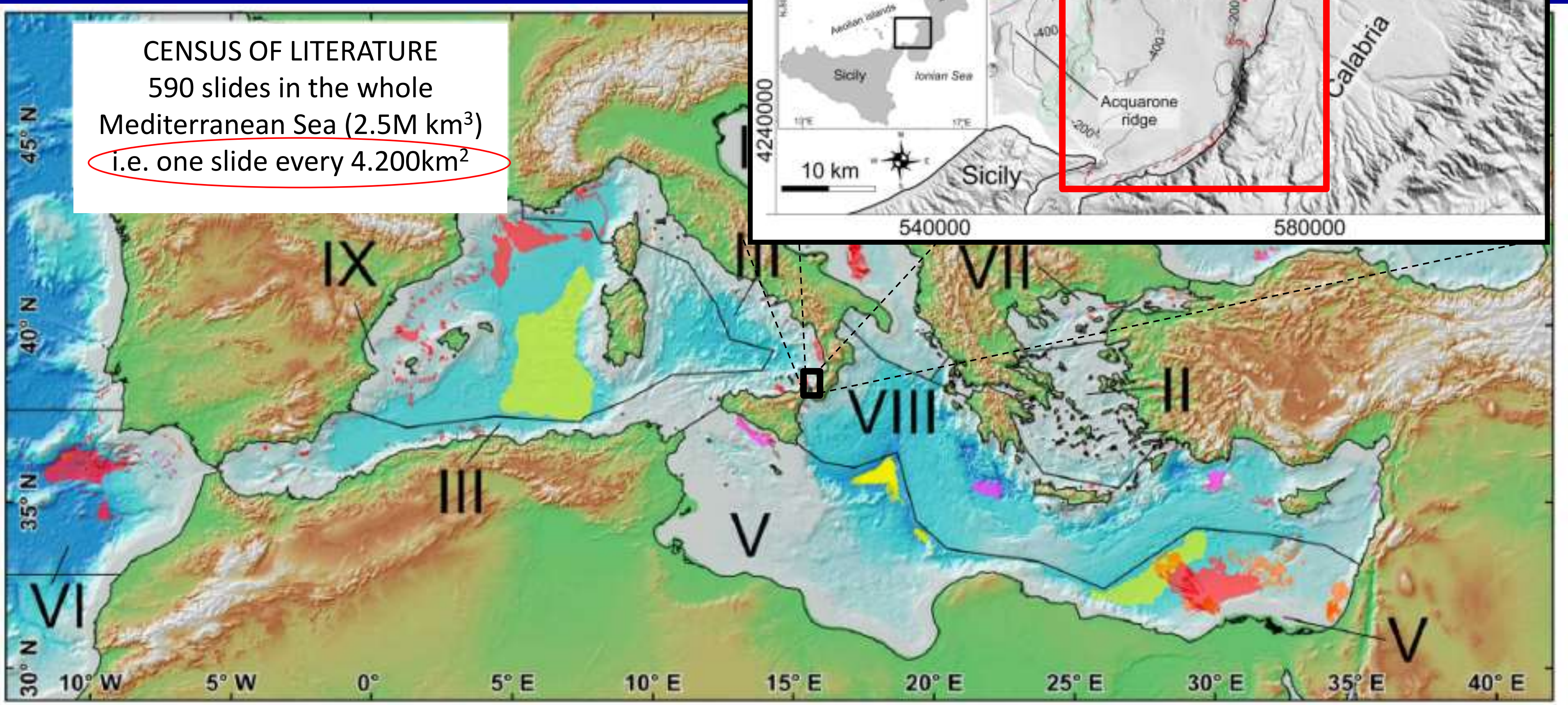
**Exploit under (or un-)utilized data** resting on research institutes

**Gain an European leadershi**p in the field

# Difference between landslide data available in literature or published maps versus high-resolution mapping based on raw data interpretation




INTERPRETATION OF RAW DATA
3,350 km$^2$, 428 landslide scars,
i.e. a slide scar every ≈8 km$^2$
(Casas et al., GeoMar Letters 2016)



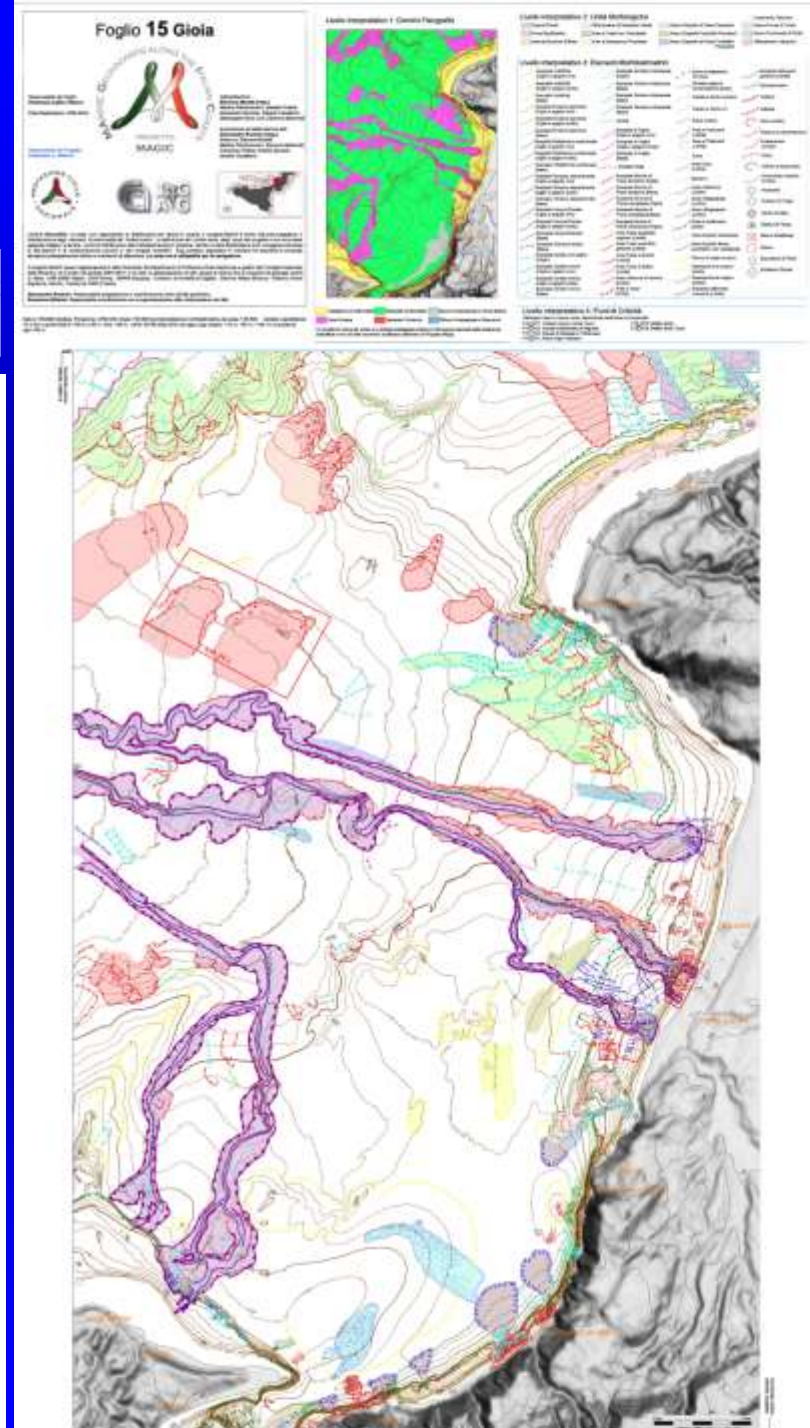

CENSUS OF LITERATURE
590 slides in the whole Mediterranean Sea (2.5M km$^3$)
i.e. one slide every 4.200km$^2$

(Urgeles and Camerlenghi, JGR 2013)

Example of one of the 72 high-resolution map of geohazard features, produced by the Italian project "MaGIC", that demonstrated the feasibility and potentiality of the initiative

OGS

CoNISMa
Consorzio Nazionale Interuniversitario per le Scienze del Mare


<u>KEY MESSAGE:</u> Because of its active geology, geohazards in the Mediterranean Sea represent a very specific and real threat to infrastructures and densely populated coastal settlements.

Due to new technological advances (multibeam swath bathymetry) a huge amount of data and knowledge for geohazard assessment exist in research institutes and universities. Such knowledge should be transferred to society to boost blue economy and insure a sustainable and safe development of human activities in the marine environment.