

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

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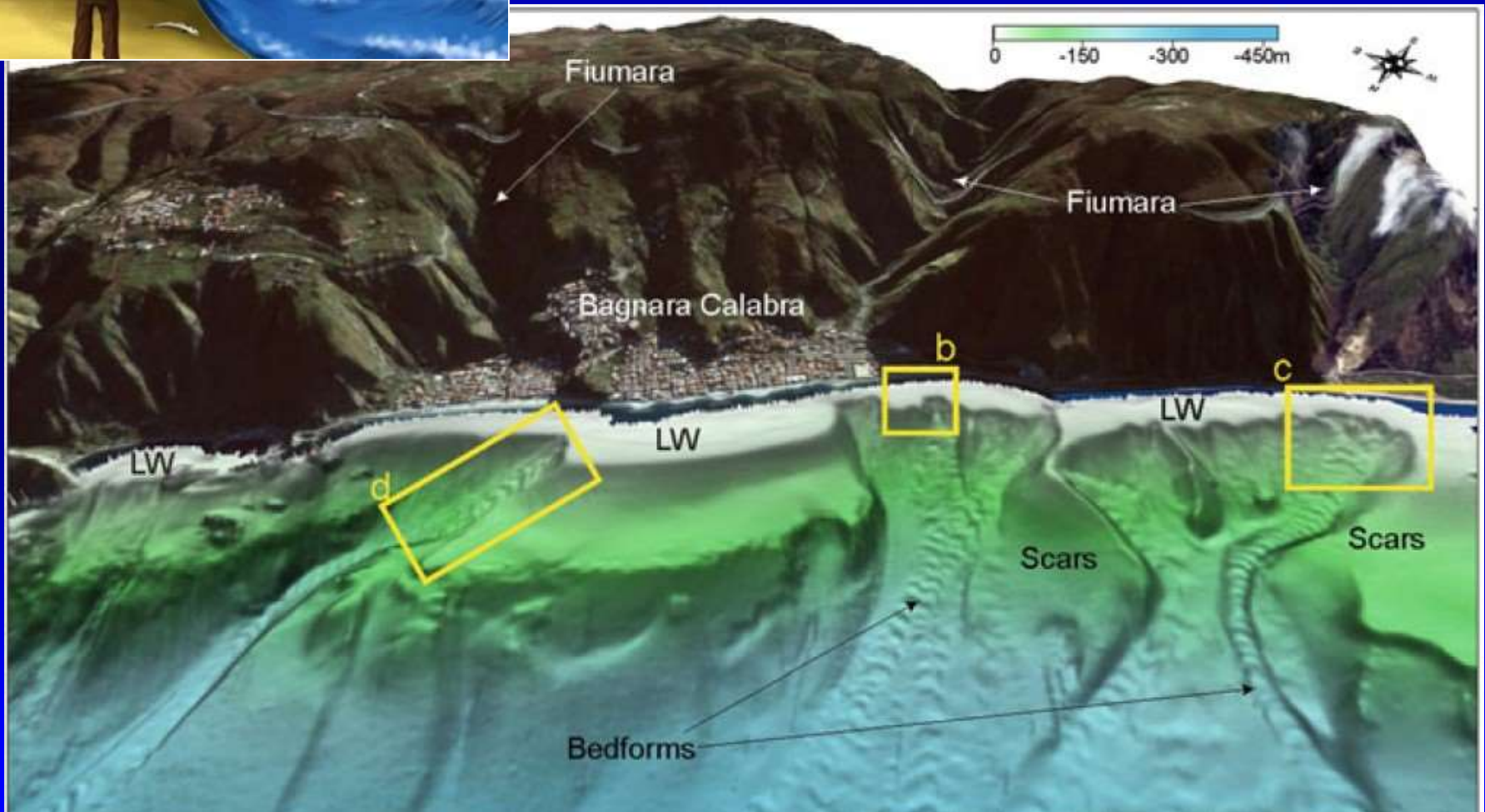


Union for the Mediterranean
Union pour la Méditerranée
الاتحاد من أجل المتوسط

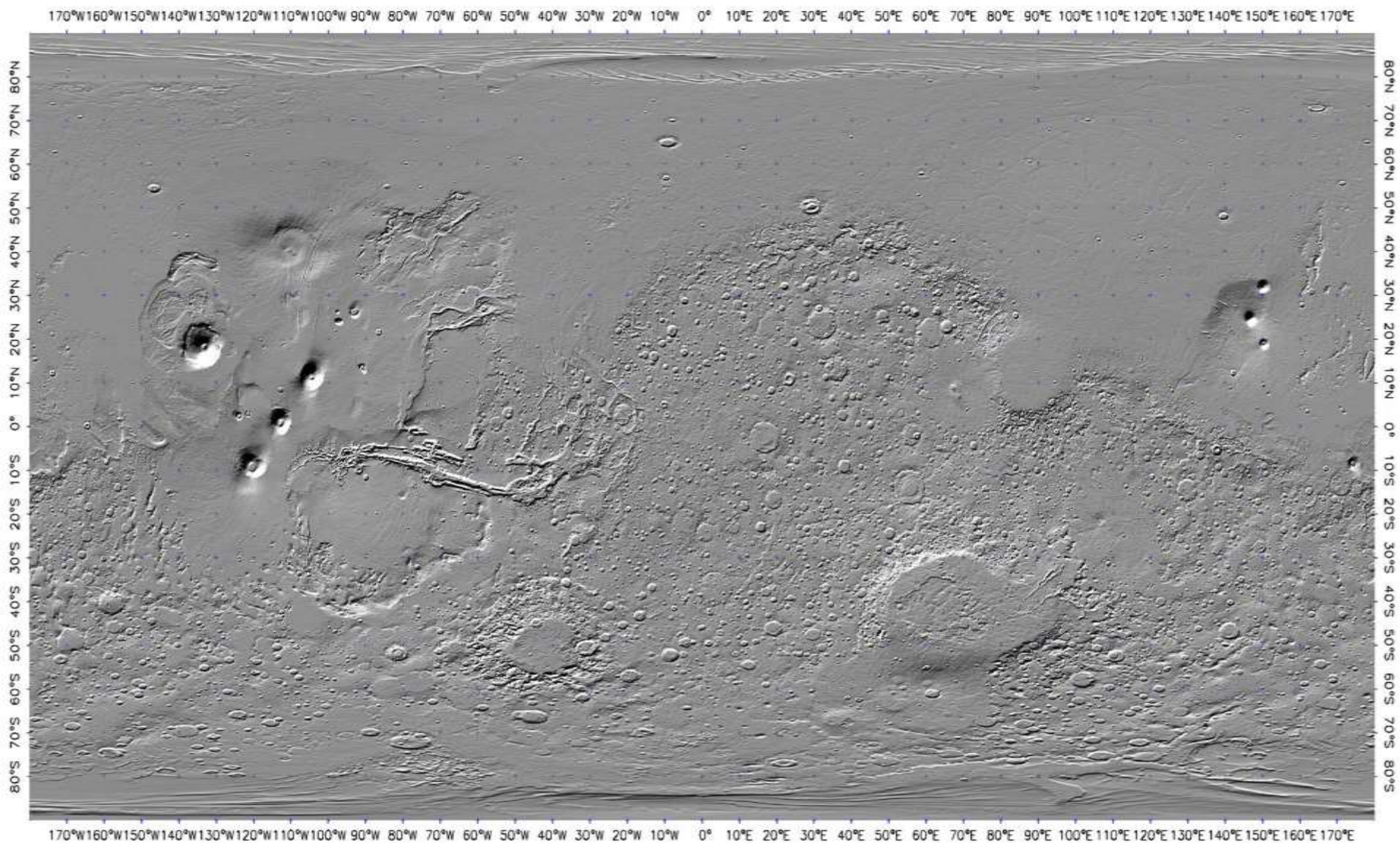


In the last decades technological advances (multibeam *in primis*) greatly improved our capability to image the seafloor with very high detail.

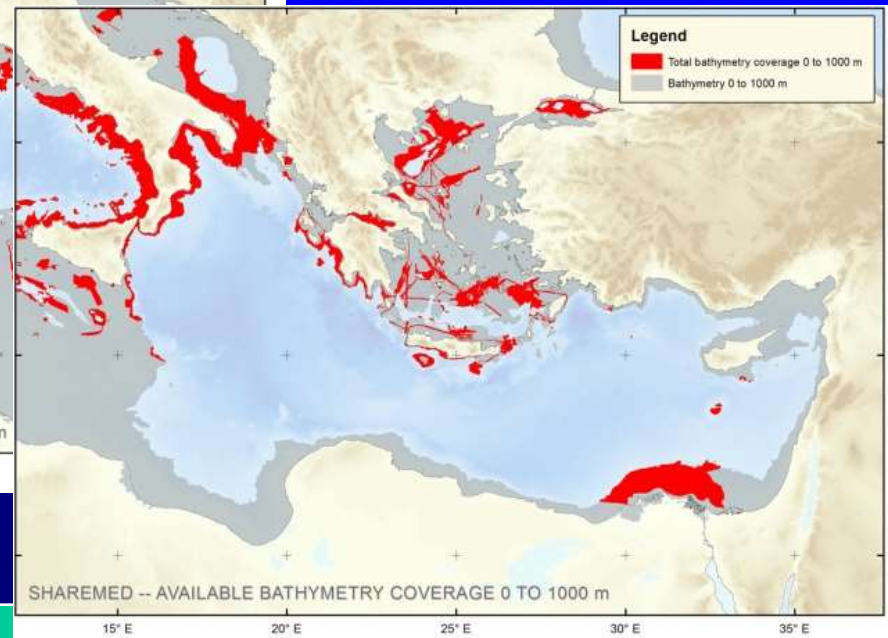
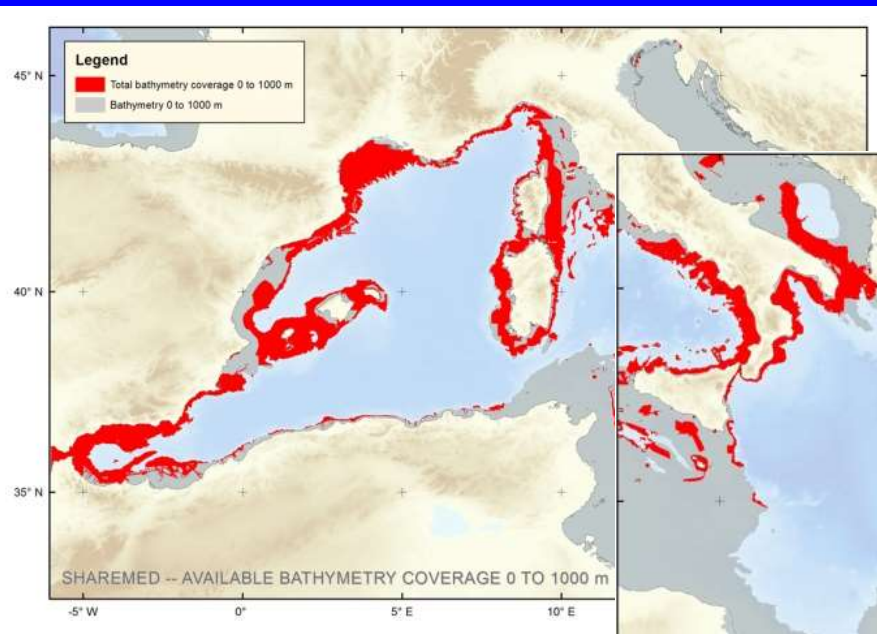
A new, totally unknown world emerged in front of our eyes, with its beauty and its hazard
















Shaded relief map of Mars

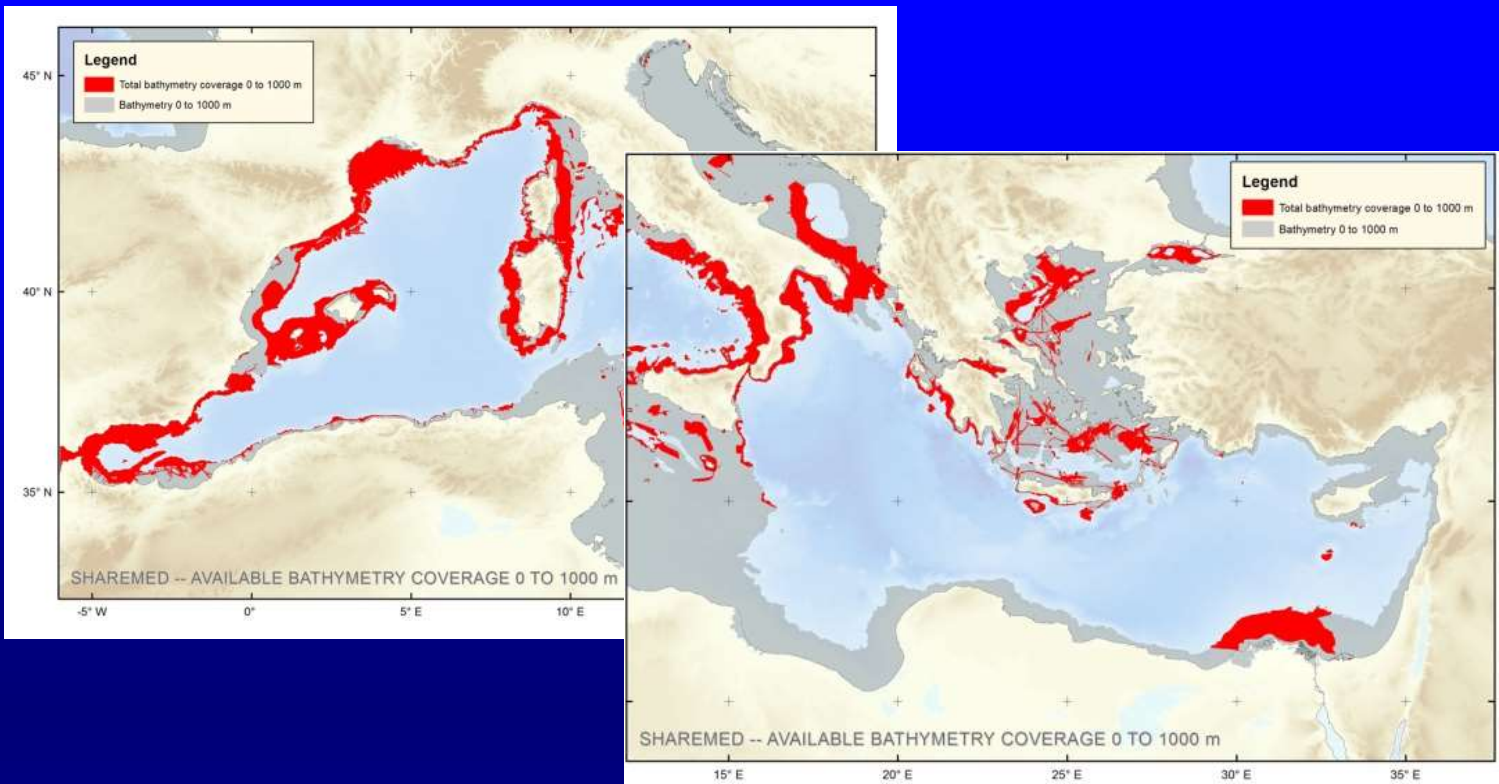


(Derived from NASA / MOLA DEM data. Image processing by E. Pilger and H. Garbeil, Hawai'i Institute of Geophysics and Planetology at the University of Hawai'i.)



Université Pierre et Marie Curie – Paris 6	UPMC	FR	
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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

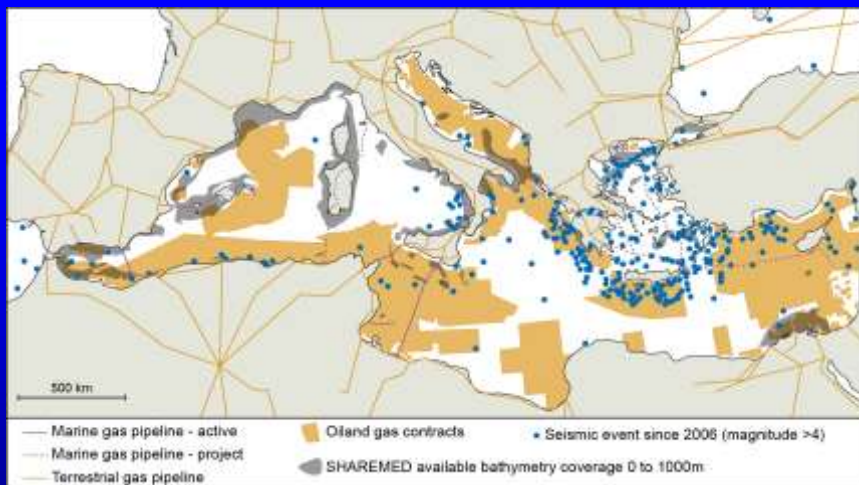
The Mediterranean has its own specificities

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

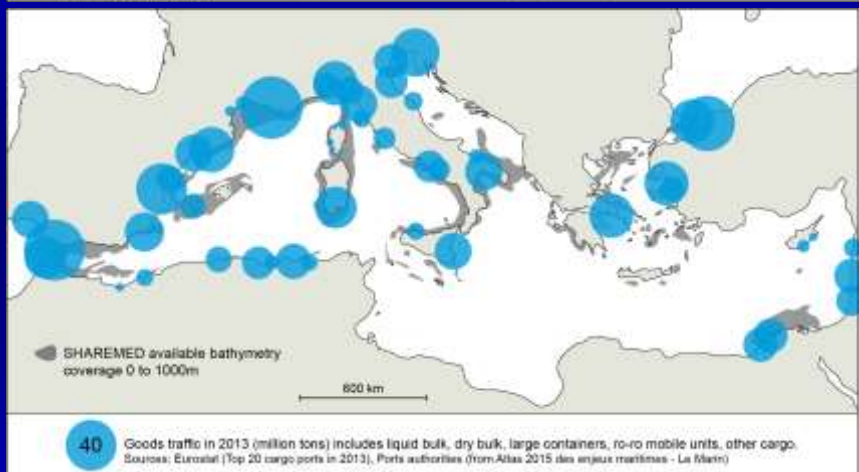
Active geology (volcanism and seismicity)
Orography and climate (coastal range and flash floods)
High tourist exploitation of scenic coasts
Specific characters of southern European research institutes
Dense infrastructures and settlements on the coast

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).



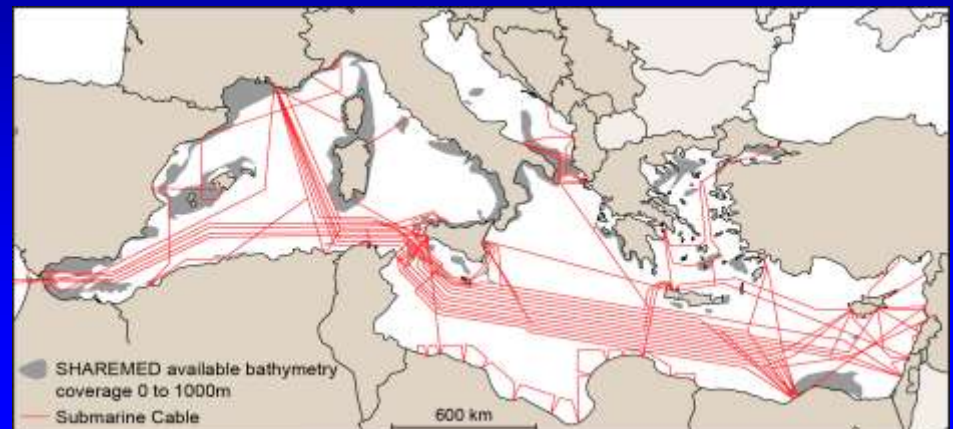
Main Mediterranean harbours with goods traffic in 2013 (from Eurostat website)..



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 it 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.

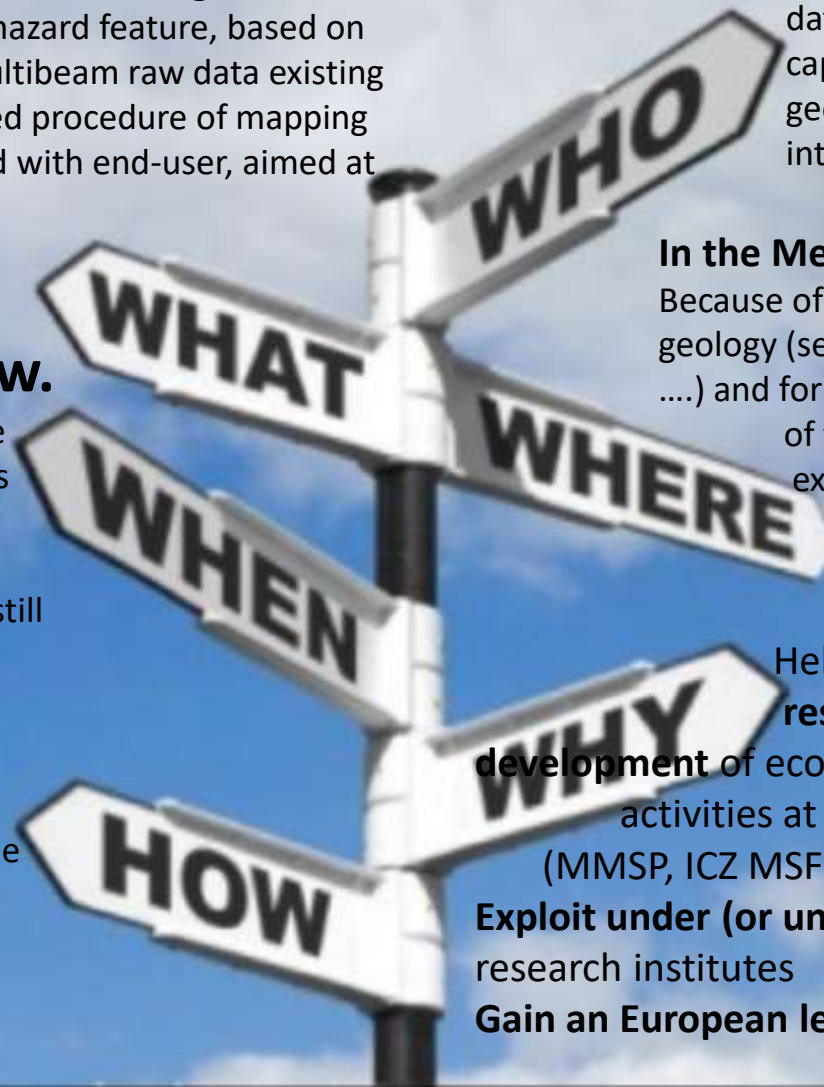
In the Mediterranean

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

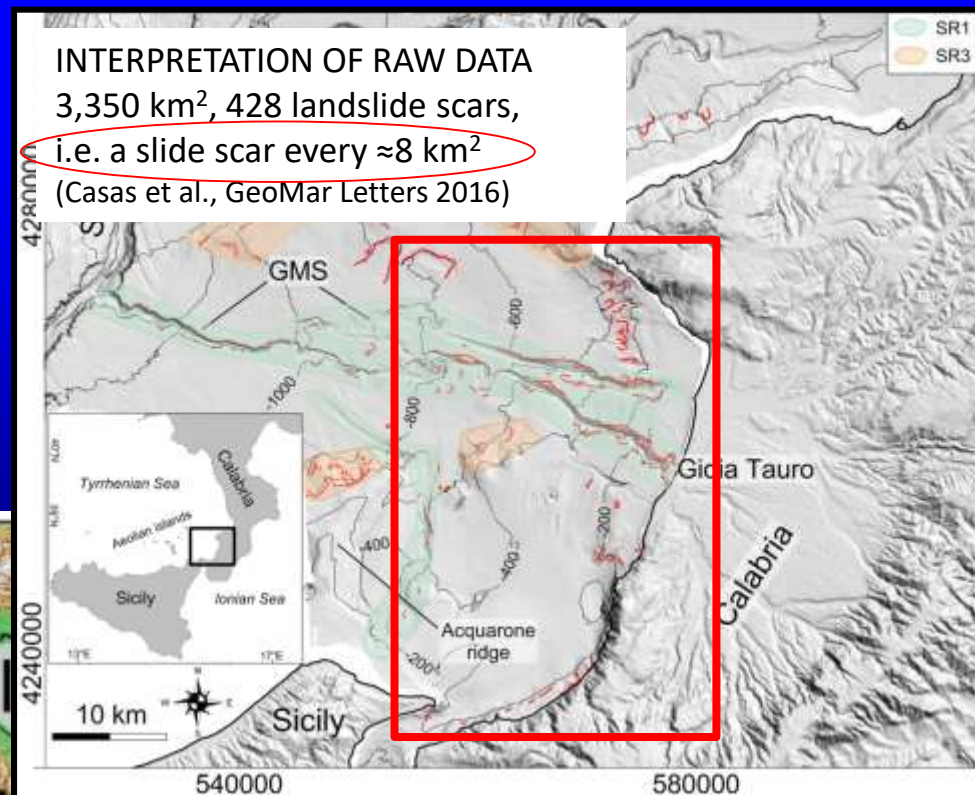
Help a **safe and responsible** development of economic activities at sea and on the coast (MMSP, ICZ MSFD, Blue Growth).

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

Gain an European leadership in the field

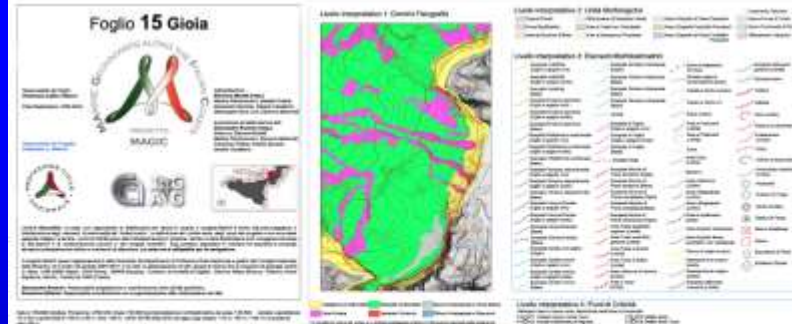


Difference between landslide data available in literature or published maps versus high-resolution mapping based on raw data interpretation



CENSUS OF LITERATURE
590 slides in the whole
Mediterranean Sea (2.5M km³)
i.e. one slide every 4.200km²

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



Livello interpretativo 2: Unità Morfologiche

Conconi/Canali	Affioramento di Substrato Unico	Area a Depositi di Frana Prevalenti	Lineamento Tettonico
Frane Significative	Area a Flussi non Canalizzati	Area a Depositi Contorfoli Prevalenti	Area a Forme di Fondo
Area ad Erosione Diffusa	Area a Depressioni Prevalenti	Area a Depositi da Flussi Torbidosi Prevalenti	Area a Fuoriotite di Flussi
			Affioramento Vulcanico

Livello interpretativo 3: Elementi Morfobatimetrici

Scarpata Indefinita (Ciglio a spigolo vivo)	Scarpata Terrazzo intracanalare (Ciglio)	Zona di instabilità di Frana	Substrato affiorante generico (Limite)
Scarpata Indefinita (Ciglio a spigolo tondo)	Scarpata Terrazzo intracanalare (Base)	Dorsale piegata di compressione (Asse)	Siccatizzazione
Scarpata Indefinita (Base)	Scarpata Terrazzo intracanalare (Base)	Canale a fondo concavo	Cratere
Scarpata Erosione generica (Ciglio a spigolo vivo)	Scarpata Terrazzo intracanalare (Base)	Canale a fondo a V	Caldera
Scarpata Erosione generica (Ciglio a spigolo tondo)	Cresta	Salco erosivo	Cone eruttivo
Scarpata Erosione generica (Base)	Scarpata di Faglia (Ciglio a spigolo vivo)	Area a Pockmark (Limite)	Fessura di alimentazione
Scarpata Piattoforma continentale (Ciglio a spigolo vivo)	Scarpata di Faglia (Ciglio a spigolo tondo)	Area a Pockmark (Limite)	Cratere lavica (Limite)
Scarpata Piattoforma continentale (Ciglio a spigolo tondo)	Scarpata di Faglia (Base)	Dorsale	Dorso
Scarpata Piattoforma continentale (Base)	Dorsale Piegata	Area Duna (Limite)	Estrofo a lava plate
Scarpata Terrazzo deposizionale (Ciglio a spigolo vivo)	Scarpata Nicchia di Frana semplice (Ciglio)	Barriera	Hummocky volcano (Limite)
Scarpata Terrazzo deposizionale (Ciglio a spigolo tondo)	Scarpata Nicchia di Frana semplice (Base)	Area a Rannare (Limite)	Pockmark
Scarpata Terrazzo deposizionale (Base)	Scarpata Nicchia di Frana complessa (Ciglio)	Area a Mergolipie (Limite)	Volcano di Fango
Scarpata Canyon/Canale (Ciglio a spigolo vivo)	Scarpata Nicchia di Frana complessa (Base)	Area a Mergolipie (Limite)	Centro Eruttivo
Scarpata Canyon/Canale (Ciglio a spigolo tondo)	Scarpata Nicchia di Frana intracanalare (Ciglio)	Onda di sedimenti (Base)	Diapiro di Fango
Scarpata Canyon/Canale (Base)	Area Frana superficiale regolare (Limite)	Area deposito intracanalare	Bocca Stratificata
Scarpata Canyon/Canale (Base)	Area Frana superficiale globosa (Limite)	Area deposito fuso gravitativo non canalizzata	Dorso
Scarpata Canale con argine (Ciglio)	Area Frana a blocchi (Limite)	Rilievo di origine incerta	Esposizione di Flussi
Scarpata Canale minore (Ciglio a spigolo vivo)	Area Frana di flusso (Limite)	Depressione di origine incerta	Emissioni Termali
Scarpata Canale minore (Ciglio a spigolo tondo)	Area a fessure di frattura (Limite)	Depressione di origine erosiva	
Scarpata Canale minore (Base)	Area a cresta (Limite)	Substrato affiorante vulcanico (Limite)	

UfM Regional Stakeholder Conference on **Blue Economy** *29-30 November 2017*



KEY MESSAGE: 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.