EMODnet
European Marine Observation and Data Network

Info-Day

EMODnet - GEOLOGY 2

Work Package 6: "Geological events and probabilities"

Eventi geologici: tettonica, vulcani, frane

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ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

WP6 Eventi geologici

Il *Workpackage 6 "Geological events and probabilities"* include una serie di fenomenologie presenti nei mari europei, identificate e mappate nell'ambito di vari progetti nazionali e regionali, disponibili in letteratura. Gli eventi considerati sono:

- frane sottomarine
- terremoti
- strutture vulcaniche
- tettonica
- tsunami
- emissioni fluide di origine non vulcanica

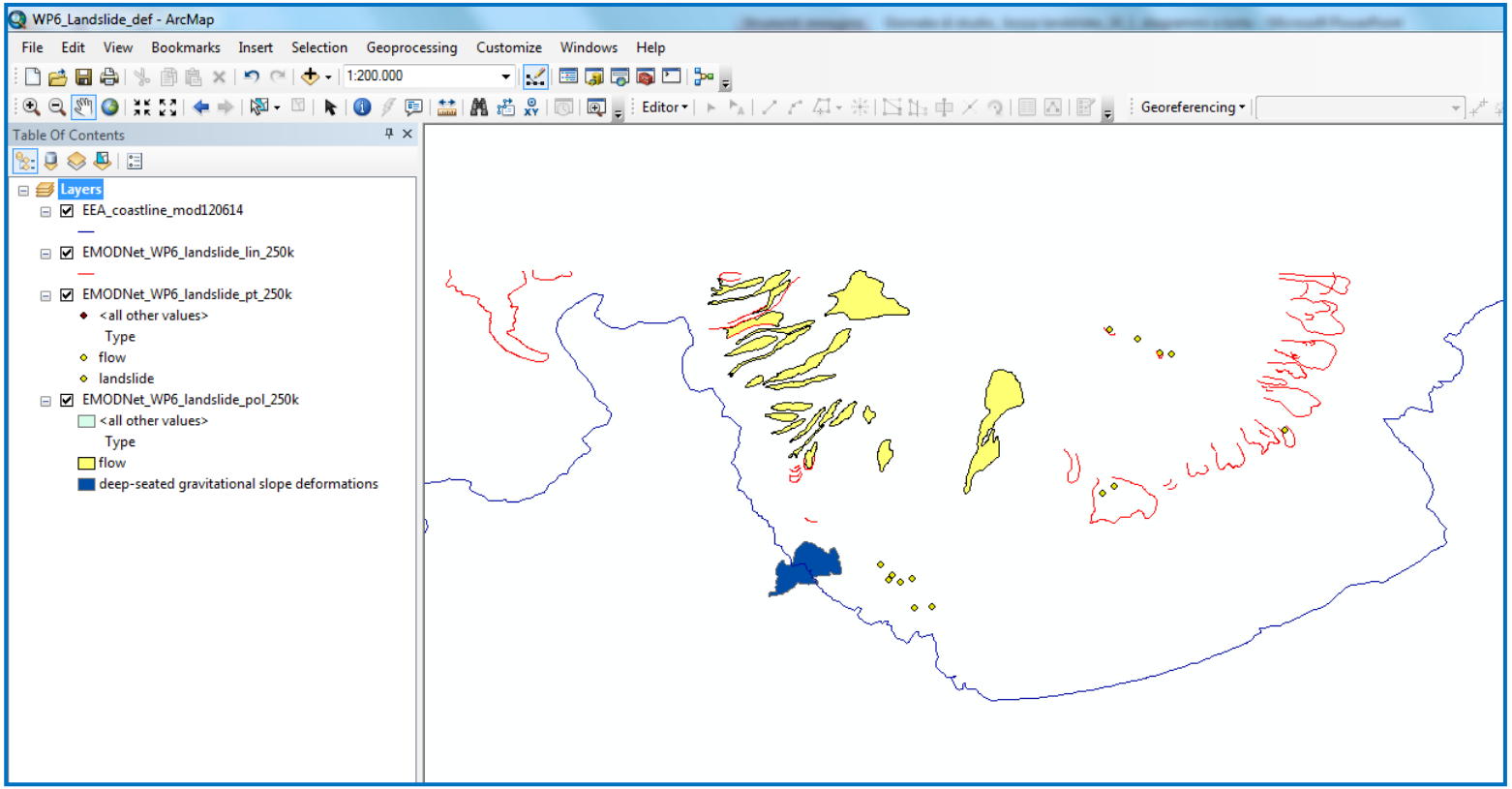
Obiettivo: l'identificazione e la rappresentazione cartografica degli eventi geologici significativi, anche al fine di fornire informazioni utili per future valutazioni sulla probabilità di occorrenza degli eventi.

Il Servizio Geologico d'Italia è il WP6 Leader.

WP6 Eventi geologici - rappresentazione

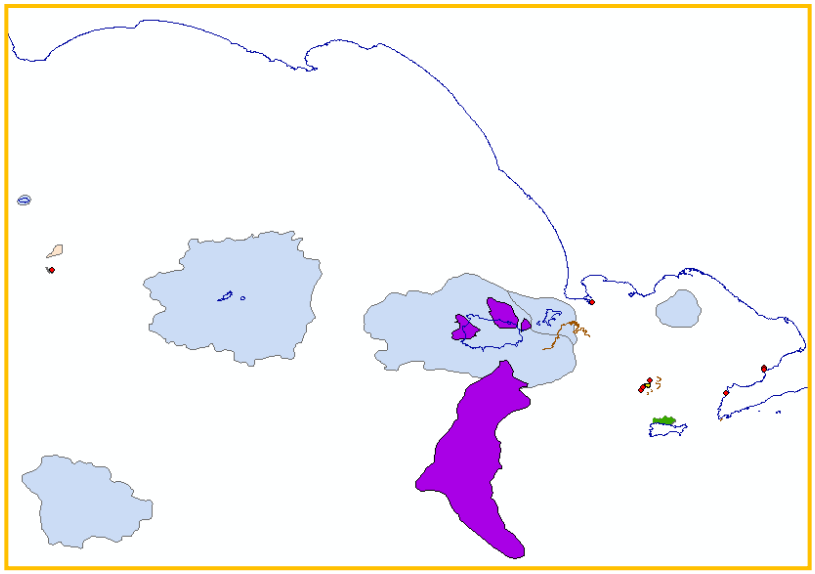
Il WP6 *dataset* è costituito da differenti *shapefile* per ogni evento; la scala di riferimento è 1:250,000.

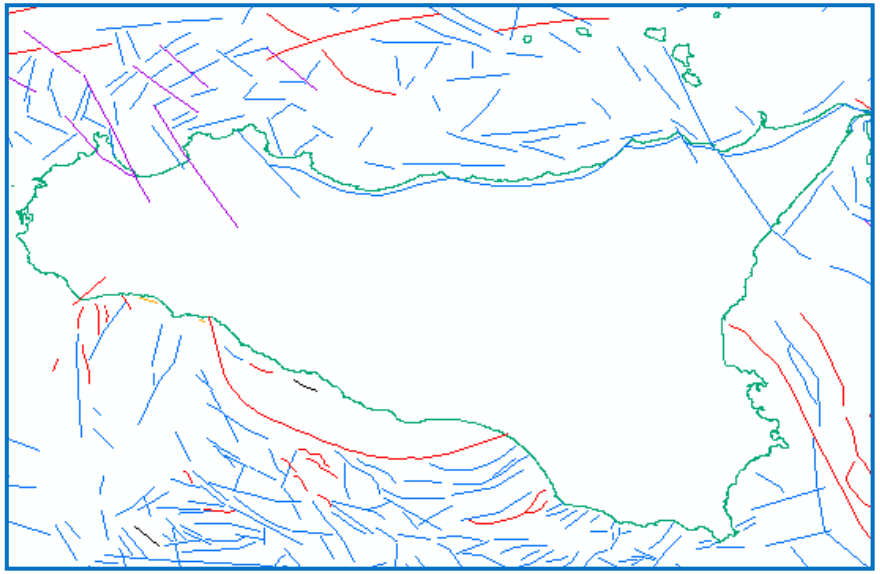
Per la rappresentazione di tutte le possibili occorrenze è stata prevista la realizzazione di *shapefile* diversi per ciascuna caratteristica geometrica (punti, linee e poligoni).



WP6 Eventi geologici - rappresentazione

Per gli elementi che sono in parte emersi, è stato concordato di estendere la rappresentazione anche alla parte emersa, laddove possibile.





WP6 Eventi geologici – tabella degli attributi

Per ciascuna tipologia di evento è stata elaborata, con il contributo di tutti i partner europei, una tabella degli attributi, necessaria per indicarne le diverse caratteristiche.

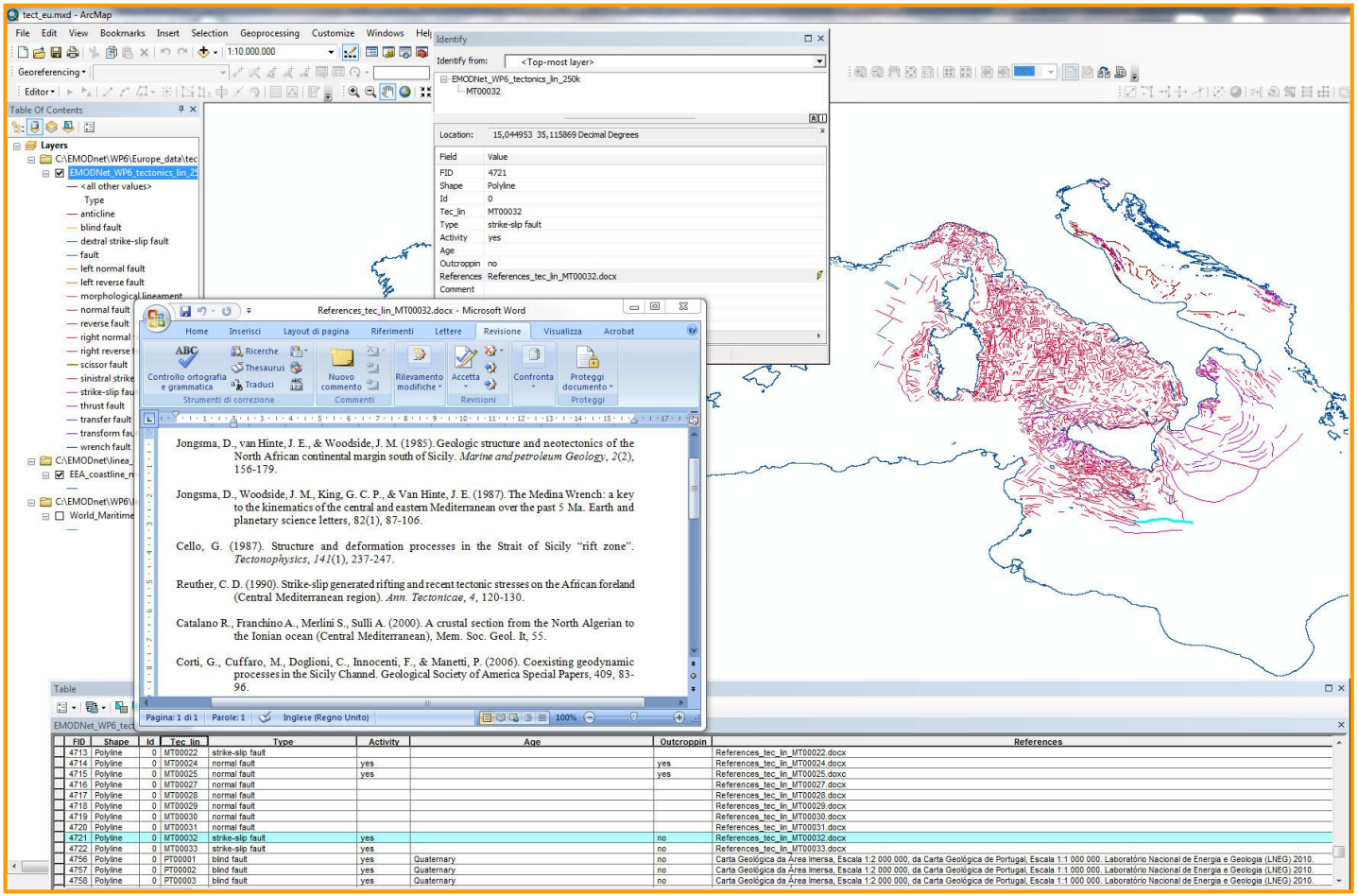
Eventuali informazioni rilevanti che non rientrano negli attributi della tabella possono essere inserite nel campo dei commenti.

	A	B	C	D	E	F	G
1	Feature	Status	Format	Definition	Description	Reference	Remarks
2	**Tec_lin**	mandatory	Text (8)	polylines	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		
3	**Type**		Text (50)	fault, normal fault, reverse fault, strike-slip fault, thrust fault, polygonal fault, anticline, syncline, morphological lineament, volcanic lineament, blind fault, sinistral strike-slip fault, dextral strike-slip fault, left normal fault, left reverse fault, right normal fault, right reverse fault, wrench fault, scissor fault (Inspire), transfer fault (Dictionary of Earth Science, Gennary 1999), transform fault		The genesis of polygonal fault systems: a review. Joe Cartwright, David James and Al Bolton. Geological Society, London, Special Publications 2003, v.216; p223-243	anticline, syncline (Inspire compliant)
4	**Activity**		Text (3)	yes - no - nd			**Active fault:** a fault having documented activity during the last 2.58 Ma (Quaternary)
5	**Age**		Text (50)	geochronology			
6	**Outcropping**		Text (3)	yes - no - nd			
7	**References**	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_tec_lin_IT00001.doc			
8	**Comment**		Text (200)	free comments			Specify seismogenic activity of faults in case information is available

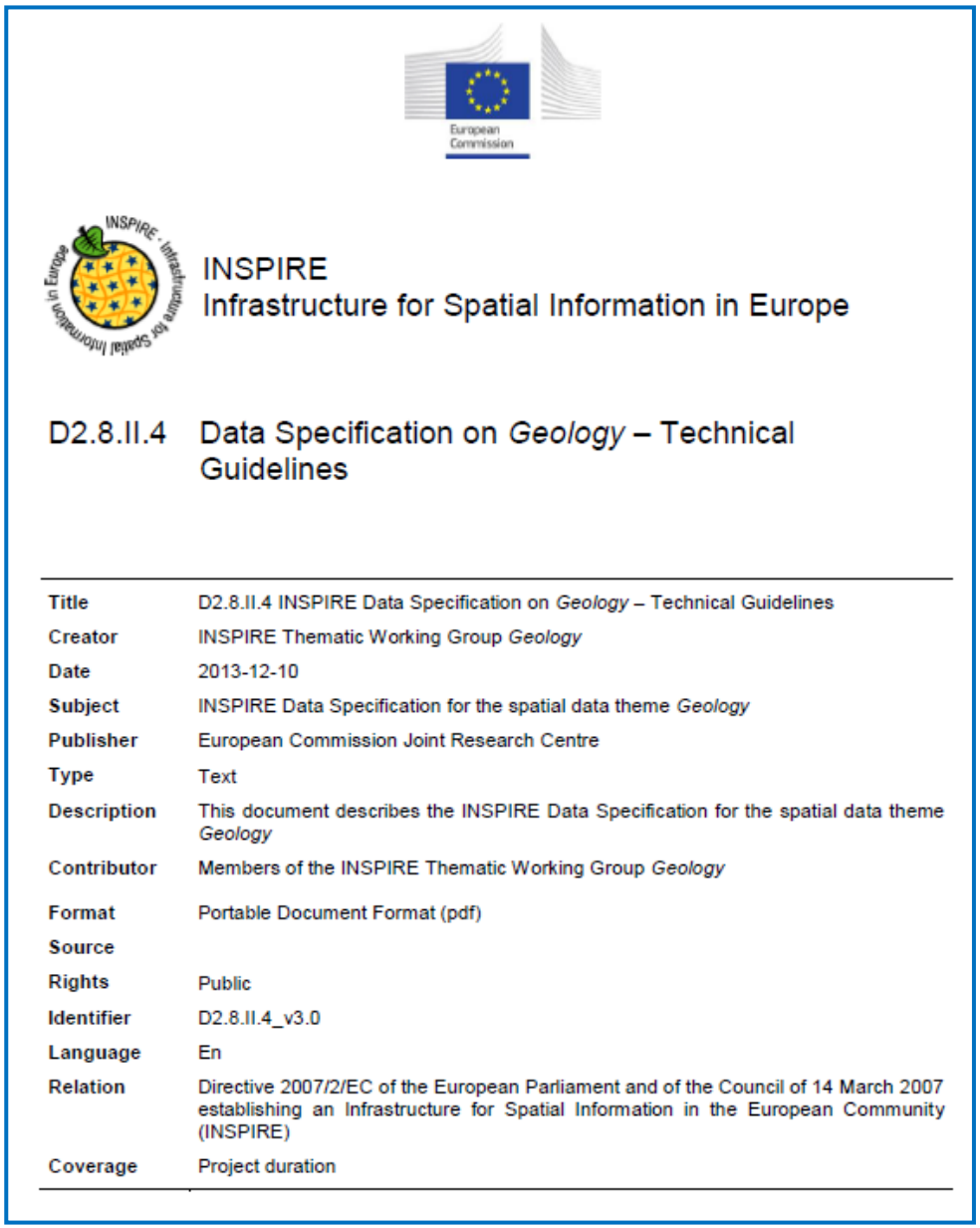
submarine landslides | earthquakes | volcanic centers | **tectonics** | tsunamis | non volcanic emissions

WP6 Eventi geologici – tabella attributi - references

Una bibliografia completa è riportata per identificare facilmente la fonte dei dati raccolti.



WP6 Eventi geologici – conformità con INSPIRE



European Commission

INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.II.4 Data Specification on *Geology* – Technical Guidelines

Title	D2.8.II.4 INSPIRE Data Specification on *Geology* – Technical Guidelines
Creator	INSPIRE Thematic Working Group *Geology*
Date	2013-12-10
Subject	INSPIRE Data Specification for the spatial data theme *Geology*
Publisher	European Commission Joint Research Centre
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Geology*
Contributor	Members of the INSPIRE Thematic Working Group *Geology*
Format	Portable Document Format (pdf)
Source	
Rights	Public
Identifier	D2.8.II.4_v3.0
Language	En
Relation	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
Coverage	Project duration

WP6 Eventi geologici – conformità con INSPIRE

Tettonica

INSPIRE

Data Specification on Geology – Technical guidelines. D2.8.II.4_v3.0

mancanza di alcuni termini

(ad es. faglia trasforme, anche se tra i processi tettonici c'è il "*trasformfaulting*")

FaultTypeValue

Definition: Terms describing the type of shear displacement structure.

Description: EXAMPLE: thrust fault, normal fault, wrench fault.

fault	
Name:	fault
Definition:	A discrete surface, or zone of discrete surfaces, with some thickness, separating two rock masses across which one mass has slid past the other.
extractionFault	
Name:	extraction fault
Definition:	A fault whose two sides have approached each other substantially in the direction perpendicular to the fault.
Parent:	fault
highAngleFault	
Name:	high angle fault
Definition:	Fault that dips at least 45 degrees over more than half of its recognized extent, for which slip or separation is not explicitly specified.
Parent:	fault
lowAngleFault	
Name:	low angle fault
Definition:	Fault that dips less than 45 degrees over more than half of the recognized extent of the fault.
Parent:	fault
obliqueSlipFault	
Name:	oblique slip fault
Definition:	Fault with slip vector that has ratio of strike-parallel to dip-parallel displacement between 10 to 1 and 1 to 10 at at least one location along the mapped trace of the fault.
Parent:	fault
reverseFault	
Name:	reverse fault
Definition:	Fault with dip-parallel displacement component of slip vector more than 10 times the strike-parallel component of the slip vector at at least one location along the mapped trace of the fault, and the fault dips consistently in the same direction with the hanging wall displaced up relative to the footwall over at least half the mapped trace of the fault.
Parent:	fault
scissorFault	
Name:	scissor fault
Definition:	A fault on which there is increasing offset or separation along the strike from an initial point of no offset, with the opposite sense of offset in the opposite direction.
Parent:	fault
strikeSlipFault	
Name:	strike slip fault
Definition:	Fault with strike-parallel displacement component of slip vector more than 10 times the dip-parallel component of the slip vector at at least one location along the mapped trace of the fault.
Parent:	fault

WP6 Eventi geologici – conformità con INSPIRE

Vulcani

INSPIRE
Data Specification on Geology – Technical guidelines. D2.8.II.4_v3.0

- disomogeneità di gerarchizzazione (ad esempio per i diversi tipi di eruzione)

EventProcessValue

Definition:	Terms specifying the process or processes that occurred during an event.
Description:	EXAMPLE: deposition, extrusion, intrusion, cooling.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/EventProcessValue
Values:	The allowed values for this code list comprise the values specified in the table below and additional values at any level defined by data providers.

strombolianEruption

Name:	strombolian eruption
Definition:	Eruption characterized by jetting of clots or fountains of fluid, basaltic lava from a central crater
Parent:	eruption

- mancanza di alcuni termini (ad esempio relativi ai processi idrotermali)

NaturalGeomorphologicFeatureTypeValue

Definition:	Terms describing the type of natural geomorphologic feature.
Extensibility:	open
Identifier:	
Values:	The allowed values for this code list comprise the values specified in the table below and additional values at any level defined by data providers.

volcanic

Name:	volcanic features
Definition:	Geomorphologic landscapes and landforms related to the deep seated (igneous) processes by which magma and associated gases rise through the crust and are extruded onto the earth's surface and into the atmosphere.
Description:	"Landscape-scale volcanic geomorphologic features include volcanic and lava fields, lava plateaux or lava fields. Landform-scale, volcanic geomorphologic features include lava flows and related features (diverse types of scarps, levees, and lava flow surface features); lahars, calderas, the diverse types of cones and related rims, necks, domes, tubes, trenches, fissures and scarps. Volcanic geomorphologic features include also microfeatures as pressure ridges, tumuli, spatter cones or spiracles."

- necessità di dettagliare le diverse *volcanic geomorphological features*

WP6 Eventi geologici – conformità con INSPIRE

Frane

INSPIRE

Data Specification on Geology – Technical guidelines D2.8.II.4_v3.0

NaturalGeomorphologicFeatureTypeValue

Definition:	Terms describing the type of natural geomorphologic feature.
Extensibility:	open
Identifier:	
Values:	The allowed values for this code list comprise the values specified in the table below and additional values at any level defined by data providers.

slopeGravitational

Name:	slope and gravitational features
Definition:	Geomorphologic landscapes and landforms related to slope environments; geomorphologic landscapes and landforms developed under the action of the gravitational force.
Description:	"Examples of slope and gravitational features include landforms as colluvial aprons, scree slopes, talus cones, talus slopes, landslides, as falls (rockfall, debris fall or soil fall), topples (rock topple, debris topple, earth topple) and their related features (main and minor scarps, sag, toe), slides (rotational slide, rotational debris slide, rotational earth slide, rotational rock slide, toreva block, translational slide, translational debris slide, translational earth slide, translational rock slide, block glide), flows (debris flow, debris avalanche, earth flow, rockfall avalanche, mudflow, sand flow, block stream), the diverse types of creep, spreads (lateral spread, debris spread, earth spread, rock spread) and complex landslides. Include natural subsidence areas."

WP6 Eventi geologici – conformità con INSPIRE

INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.III.12 Data Specification on *Natural Risk Zones* – Technical Guidelines

Title	D2.8.III.12 INSPIRE Data Specification on *Natural Risk Zones* – Technical Guidelines
Creator	INSPIRE Thematic Working Group *Natural Risk Zones*
Date	2013-12-10
Subject	INSPIRE Data Specification for the spatial data theme *Natural* Risk Zones
Publisher	European Commission Joint Research Centre
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Natural Risk Zones*
Contributor	Members of the INSPIRE Thematic Working Group *Natural Risk Zones*
Format	Portable Document Format (pdf)
Source	
Rights	Public
Identifier	D2.8.III.12_v3.0
Language	En
Relation	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
Coverage	Project duration

WP6 Tabella degli attributi – conformità con INSPIRE

Frane

Data Specification on *Natural Risk Zones – Technical Guidelines* D2.8.III.12

B.5 Landslides

Currently a number of different landslide inventories exist in various databases and each uniquely addresses a specific purpose (for example we refer here to CSIRO https://www.seegrid.csiro.au/twiki/bin/view/Geohazards/LandSlides, or http://www.landslides.usgs.gov among others). These databases range in scale and detail, and although some similarities and a number of common themes are apparent between databases, the method in which information is organised and described varies considerably. This means information cannot readily be compared or aggregated with other sources. Furthermore, these inventories are generally only accessible to a small number of individuals and subsequently, it is possible there is significant duplication of effort among landslide researchers independently attempting to fill information gaps. Landslide inventories are fundamental for developing rigorous hazard and risk assessments.

This is only an example of use case description, to show what it is, the link with examples of use, and what the impact is on the data model

B.5.1 Landslide hazard mapping

The hazard is often defined as the probability of occurrence of a potentially damaging phenomenon of a given intensity within a given area and a given period of time. To define this probability the geologist or engineer has to access datasets of observed past events, climate, lithology, earthquake activity, and topography, physical, chemical, mechanical properties of rocks or soils, hydrological, hydrogeological data etc.

Among various landslide types (i.e. slides, rockfalls, rock flows, debris flows, earth flows, etc), the rapid, and long run-out landslides, especially those that occur in urbanizing areas often cause catastrophic damage to the community.

The goal of this use case is to deliver historical and possible future occurrence of a landslide in a given area for the creation of appropriate landslide risk preparedness plans. Interoperability will enable landslide information to be accessed in real time by all levels of government, geotechnical professionals, emergency managers, land use planners, academics and the general public regardless of where it is hosted. It provides direct access to spatial-enabled data and allows users to simultaneously search and query the most up-to-date information available in geographically distributed databases through a single website. The search results can be displayed as reports, graphs, maps, statistics or tables, and data can be queried against background datasets, such as topography, geology and geomorphology.

Actors:

- Geological surveys to provide geological information (Geological Surveys represent the Member States)
- Engineers responsible for establishing hazard and risk area maps using the geological information in combination with other data.
- Authorities for managing appropriate landslide risk preparedness plans.
- geotechnical professionals,
- emergency managers,
- land use planners,
- academics, and
- the general public.

Narrative description

Landslides are various types of gravitational mass movements of the Earth's surface that pose the Earth-system at risk. A classification of landslides according to material type (i.e. rock, soil, debris) and type of movement (i.e. rock falls, topples, slides, spreads, rock flows, debris flows, earth flows and combinatorial or complex slides) is schematically shown in Fig. 4.

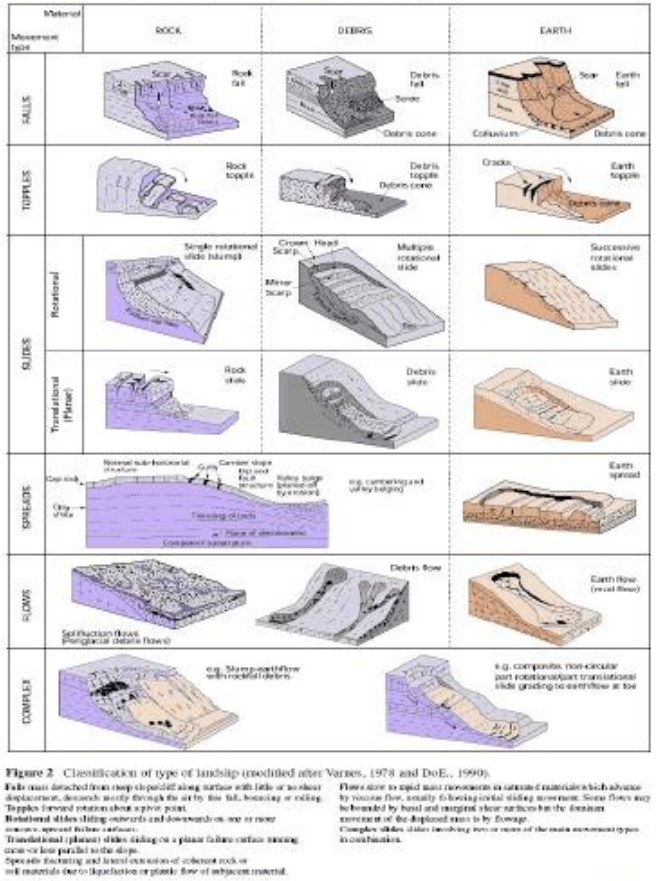
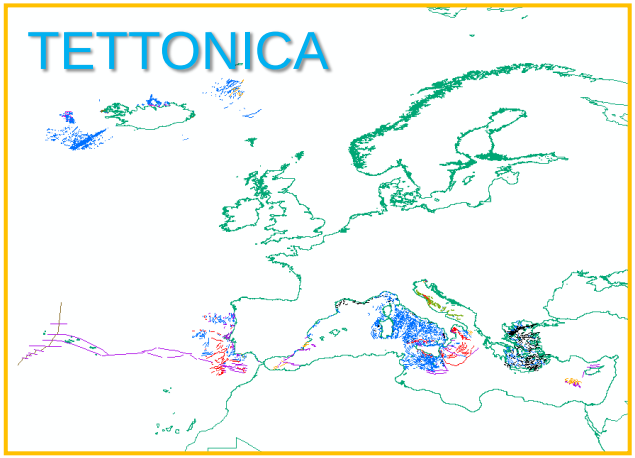
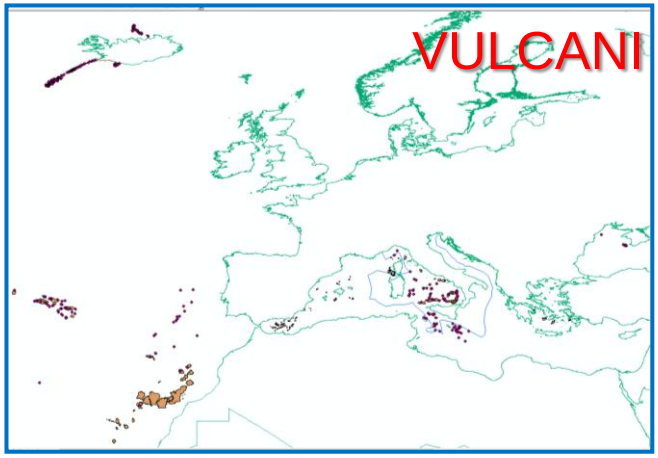
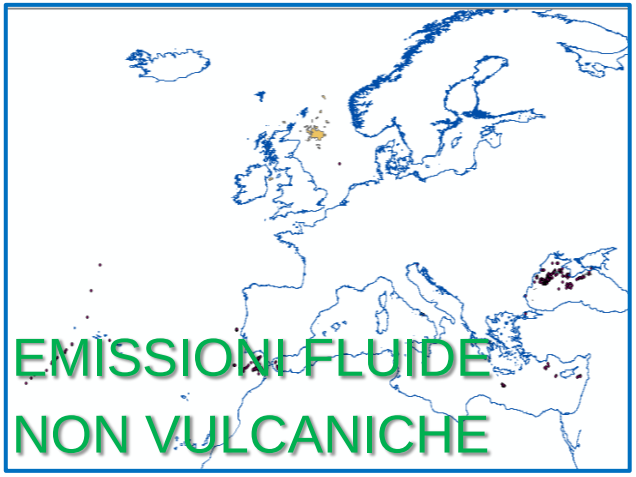


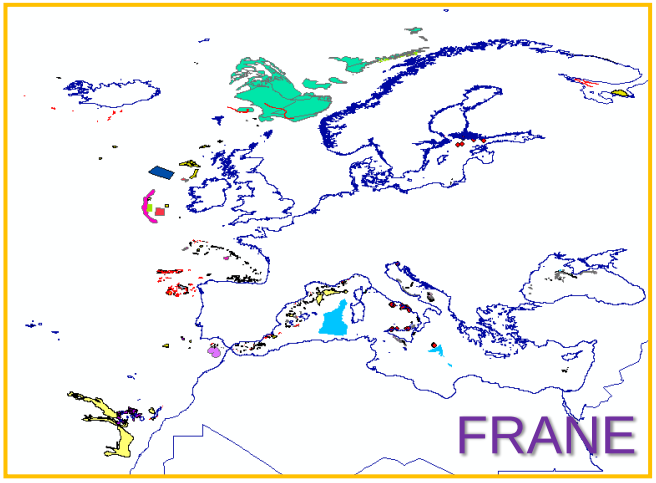
Figure 4: Classification of type of landslides occurring in rocks, debris or soil masses (*http://www.geonet.org.nz/landslide/glossary.html*).

WP6 Eventi geologici





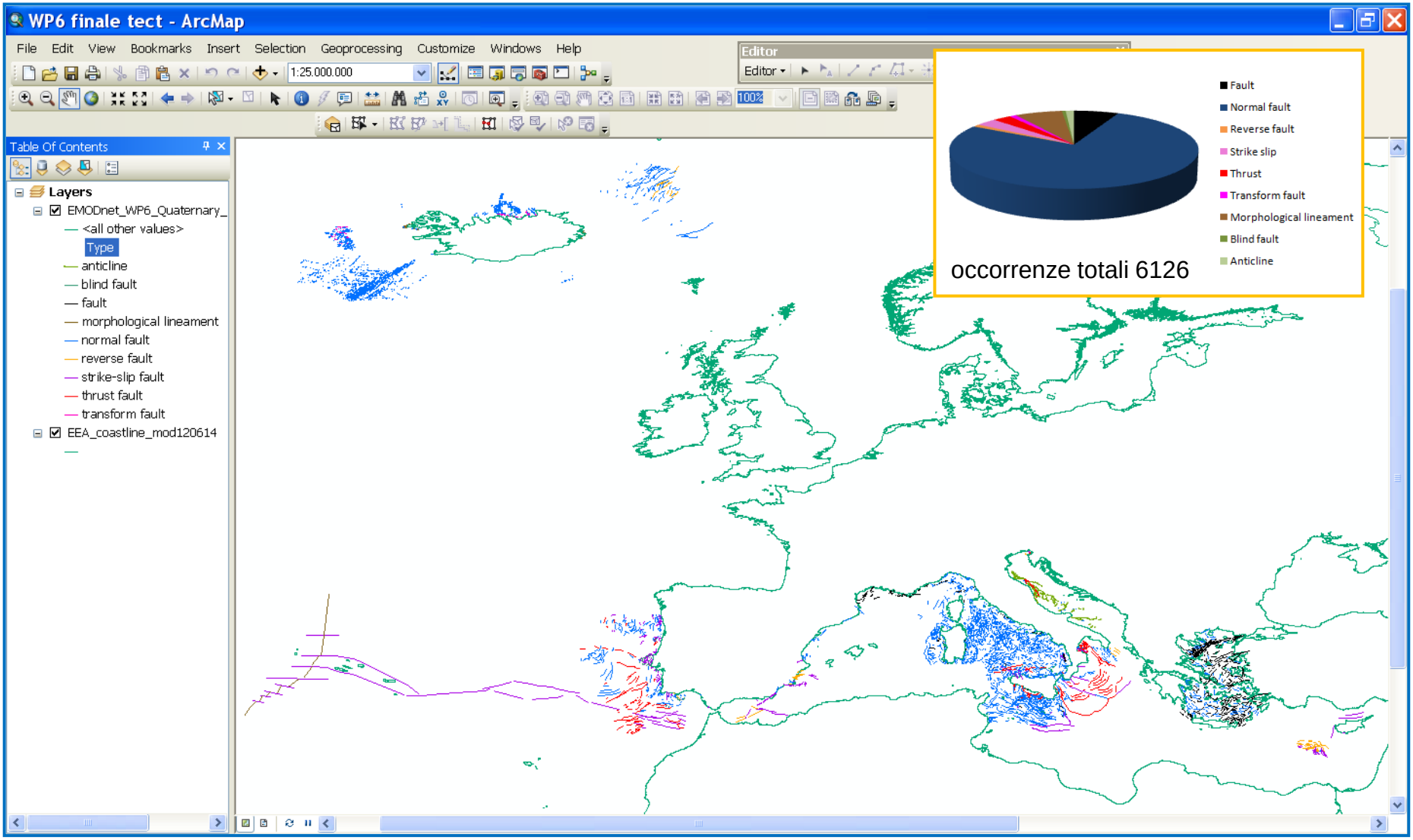




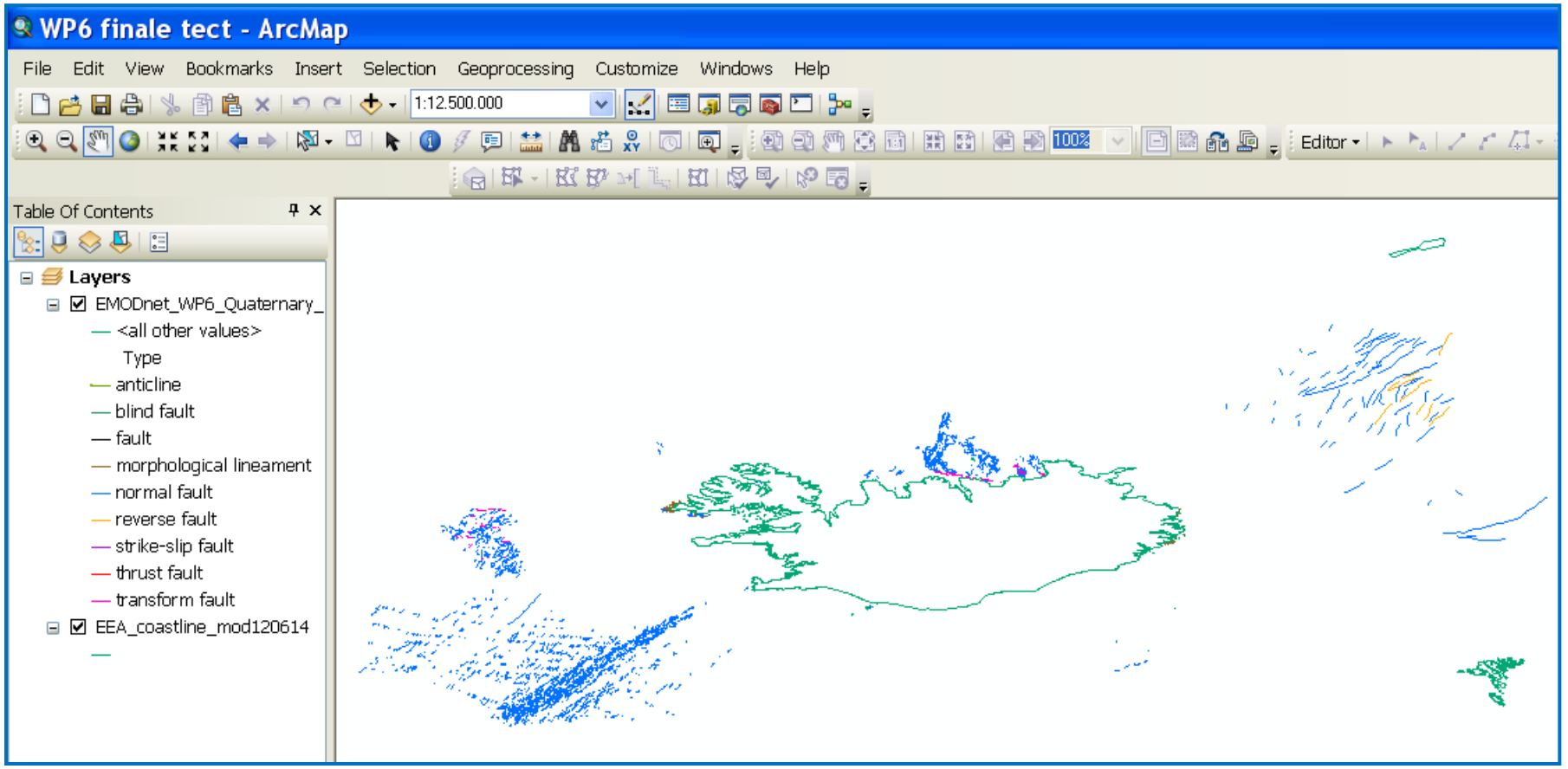
WP6 Tettonica – tabella degli attributi

Feature	Status	Format	Definition	Description	References	Remarks
Tec_lin	mandatory	Text (8)	polylines	unique identifier code (two letters country code, which corresponds to ISO3166-code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		
Type		Text (50)	fault, normal fault, reverse fault, strike-slip fault, thrust fault, polygonal fault, anticline, syncline, morphological lineament, volcanic lineament, blind fault, sinistral strike-slip fault, dextral strike-slip fault, left normal fault, left reverse fault, right normal fault, right reverse fault, wrench fault, scissor fault (Inspire), transer fault (Dictionary of Earth Science, Gennary 1999), transform fault		The genesis of polygonal fault systems: a review. Joe Cartwright, David James and Al Bolton. Geological Society, London, Special Publications 2003, v.216; p223-243	anticline, syncline (Inspire compliant)
Activity		Text (3)	yes - no - nd			**Active fault**: a fault having documented activity during the last 2.58 Ma (Quaternary)
Age		Text (50)	geochronology			
Outcropping		Text (3)	yes - no - nd			
References	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_tec_lin_IT00001.doc			
Comment		Text (200)	free comments			Specify seismogenic activity of faults in case information is available

WP6 Tettonica – distribuzione



WP6 Tettonica – esempi



WP6 Tettonica – contributi italiani

Per i mari italiani i dati sono stati raccolti ed elaborati da quattro istituti di ricerca e università, in collaborazione con ISPRA, attraverso la stipula di apposite convenzioni nell'ambito di un Protocollo d'intesa.

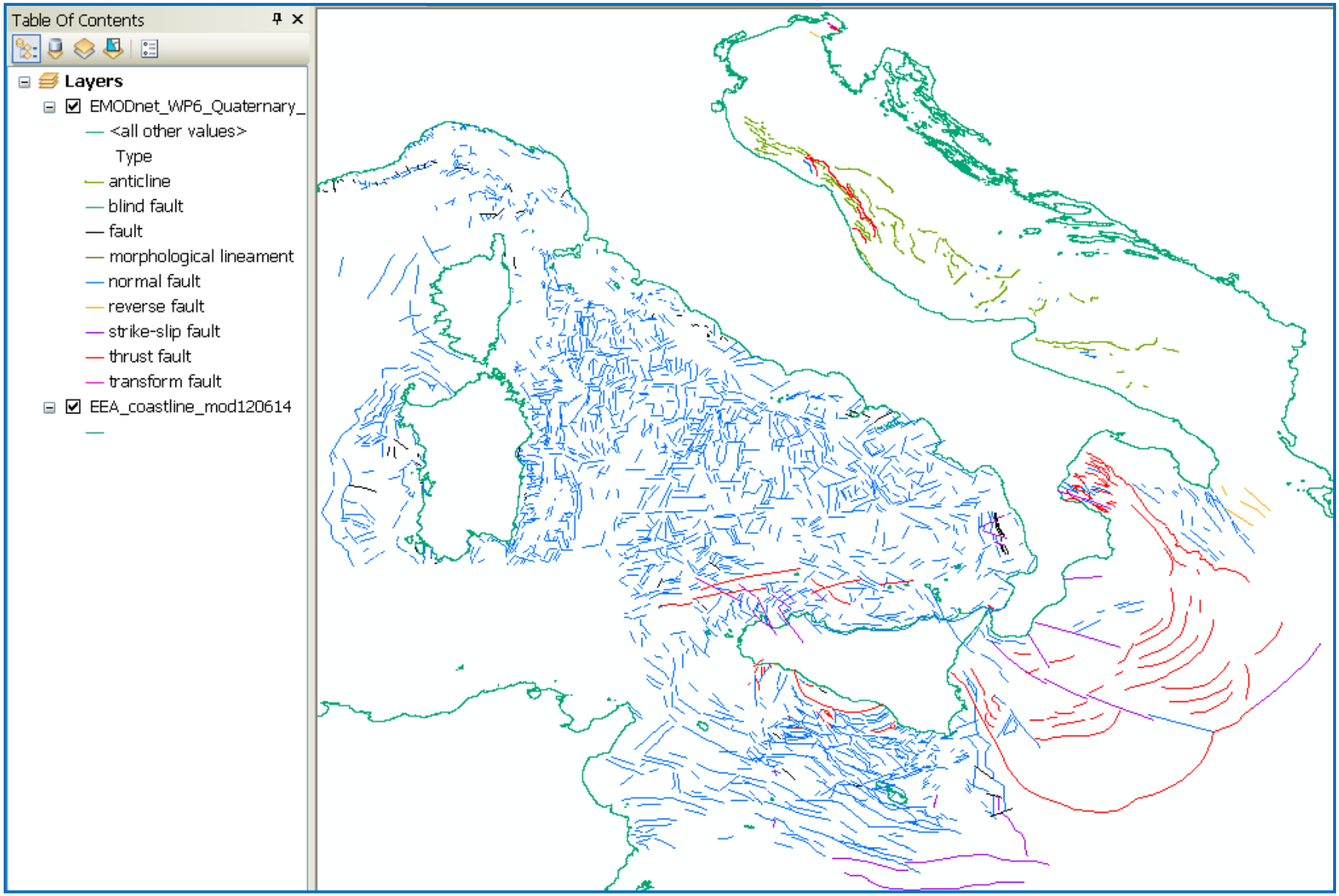
CNR – ISMAR

OGS

Dipartimento di Scienze della Terra e del Mare dell'Università di Palermo

Dipartimento di Matematica e Geoscienze dell'Università di Trieste

WP6 Tettonica – risultati italiani



WP6 Vulcani – tabella degli attributi

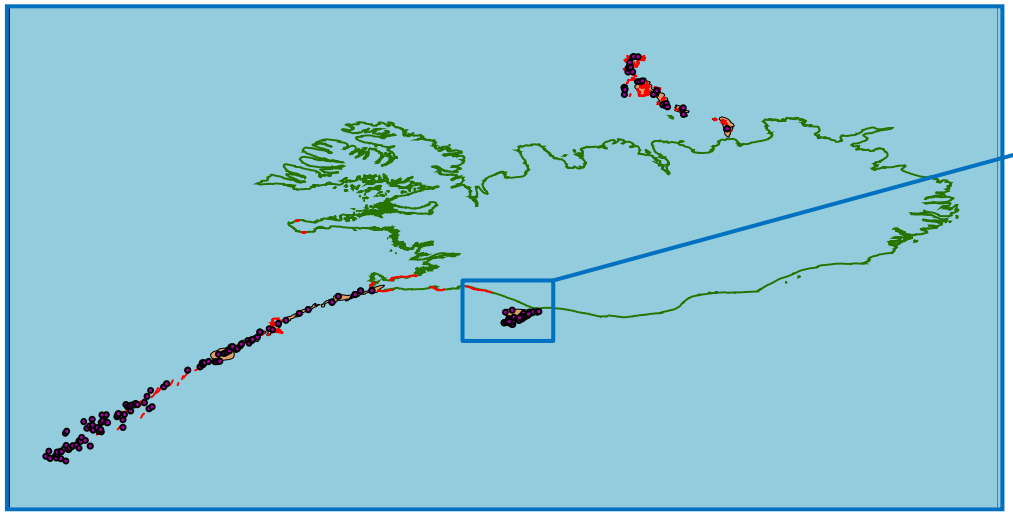
Feature	Status	Format	Definition	Description	Reference	Remarks
Vcc_pt, Vcc_lin, Vcc_pol	mandatory	Text (8)	points, polylines, polygons	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		Polygons can be extended across the coastline in order to represent full extension of volcanoes including portions on land.
Name		Text (50)	literature name			
Activity_Age (old: Last eruption)		Text (50)	date or chronostratigraphy (radiometric datation)	Indicate the age or the range of activity until last eruption or specify if it is unknown		In case of radiometric datation, specify which method has been applied
Eruptions frequency		Numeric Long (6)	1=1-10, 2=10-100, 3=100-1000, 4=1000-10000 years, 0= not avalaible			
V_district/system		Text (50)	literature name	Volcanic district/area Volcanic system		Set of volcanic vents and/or centers sharing a common magmatic origin
Activity type		Text (50)	explosive (vulcanian, plinian, sub-plinian, hawaiian, strombolian), effusive, hydrotermal activity, mixed.			
VEI		Numeric Short (1)	VEI value (1-9), 0 = not avalaible	Volcanic Explosivity Index		
VEI age		Text (30)	date or geochronological unit of eruption associated to VEI			
Morphological type		Text (50)	caldera, cinder cone, composite/compound, cone, crater row, explosion crater, fissure vent, hydrothermal field, lava flow, lava cone, lava dome, lava plug, maar, pumice cone, pyroclastic cone, pyroclastic shield, scoria cone, shield, somma, stratovolcano, subglacial, tuff cone, tuff ring, tuya, volcanic field, volcanic neck, flank collapse, lava border			Description of the main features characterizing the volcanic structure
Height		Numeric Short (4)	meters	elevation above seafloor		
Chemical composition		Text (100)	Classes according to TAS (Total Alkali Silica)/ Magmatic series		R. W. Le Maitre (editor), A. Streckeisen, B. Zanettin, M. J. Le Bas, B. Bonin, P. Bateman, G. Bellieni, A. Dudek, S. Efremova, J. Keller, J. Lamere, P. A. Sabine, R. Schmid, H. Sorensen, and A. R. Woolley, Igneous Rocks: A Classification and Glossary of Terms, Recommendations of the International Union of Geological Sciences, Subcommission of the Systematics of Igneous Rocks. Cambridge University Press, 2002.	In case TAS cannot be adequately applied, specify the magmatic series
Fluid emissions		Text (20)	volcanic, unknown origin			mud volcanoes and non volcanic fluid emissions must be represented in a separate shapefile
References	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_vcc_pol_IT00001.doc			
Comment		Text (200)	free comments			In case of fluid emissions, specify composition and temperature of emission, if available

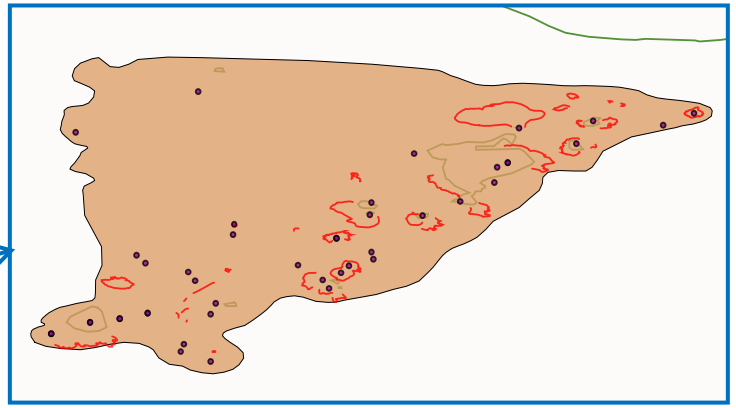
WP6 Vulcani – metodologia

Acquisizione di dati in forma puntuale, lineare o areale, in funzione del tipo di informazione di origine e del suo grado di dettaglio nell'ambito delle strutture di maggiori dimensioni.

Feature	Status	Format	Definition	Description	Reference	Remarks
Vcc_pt, Vcc_lin, Vcc_pol	mandatory	Text (8)	points, polylines, polygons	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		Polygons can be extended across the coastline in order to represent full extension of volcanoes including portions on land.

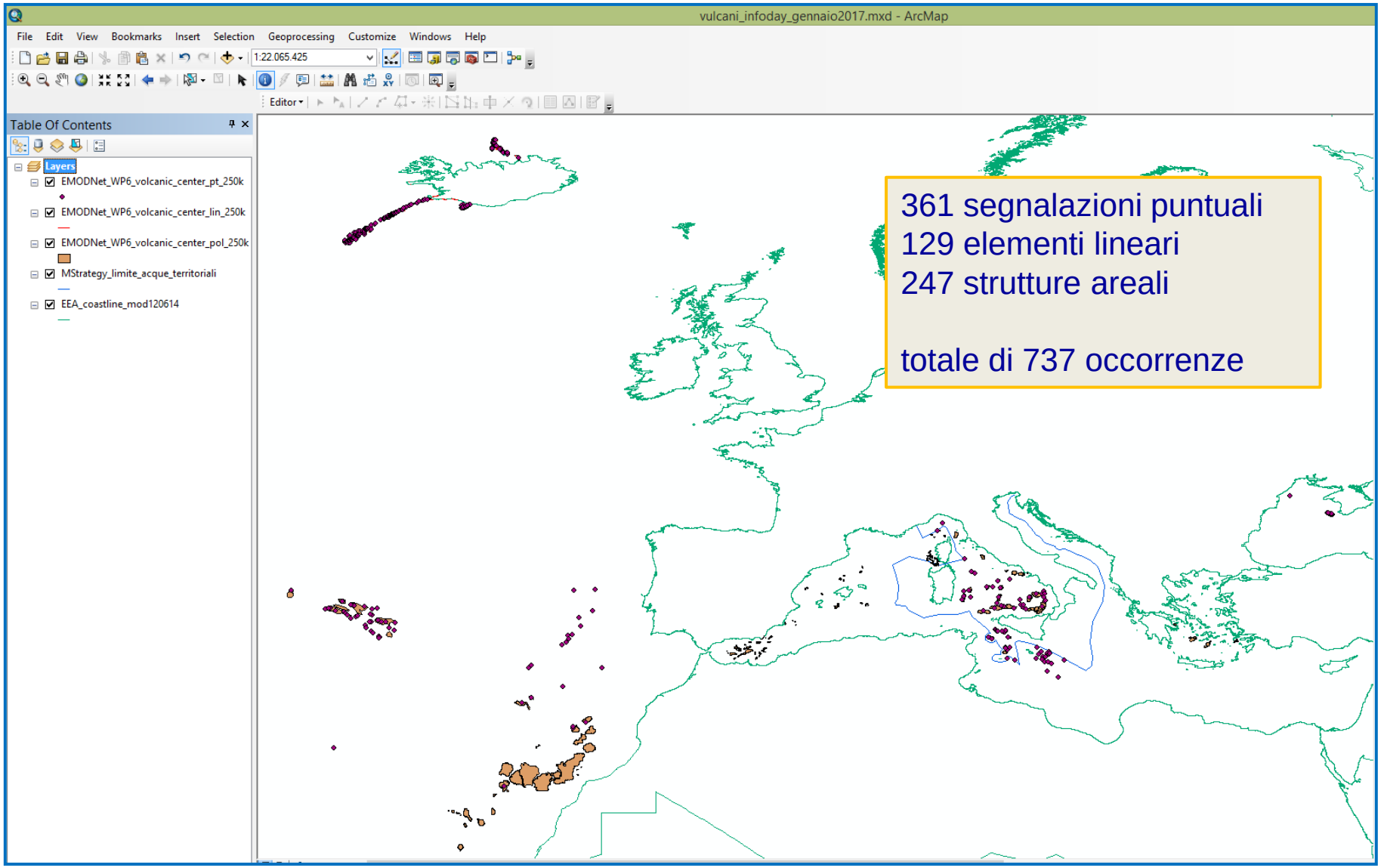
Islanda





Vestmannaeyjar
Volcanic system

WP6 Vulcani – distribuzione



WP6 Vulcani – contributi italiani

ROMA TRE UNIVERSITÀ DEGLI STUDI

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

Per i mari italiani i dati sono stati raccolti e censiti dalla Università di RomaTRE, in collaborazione con ISPRA, attraverso una apposita Convenzione nell'ambito di un Protocollo d'intesa.

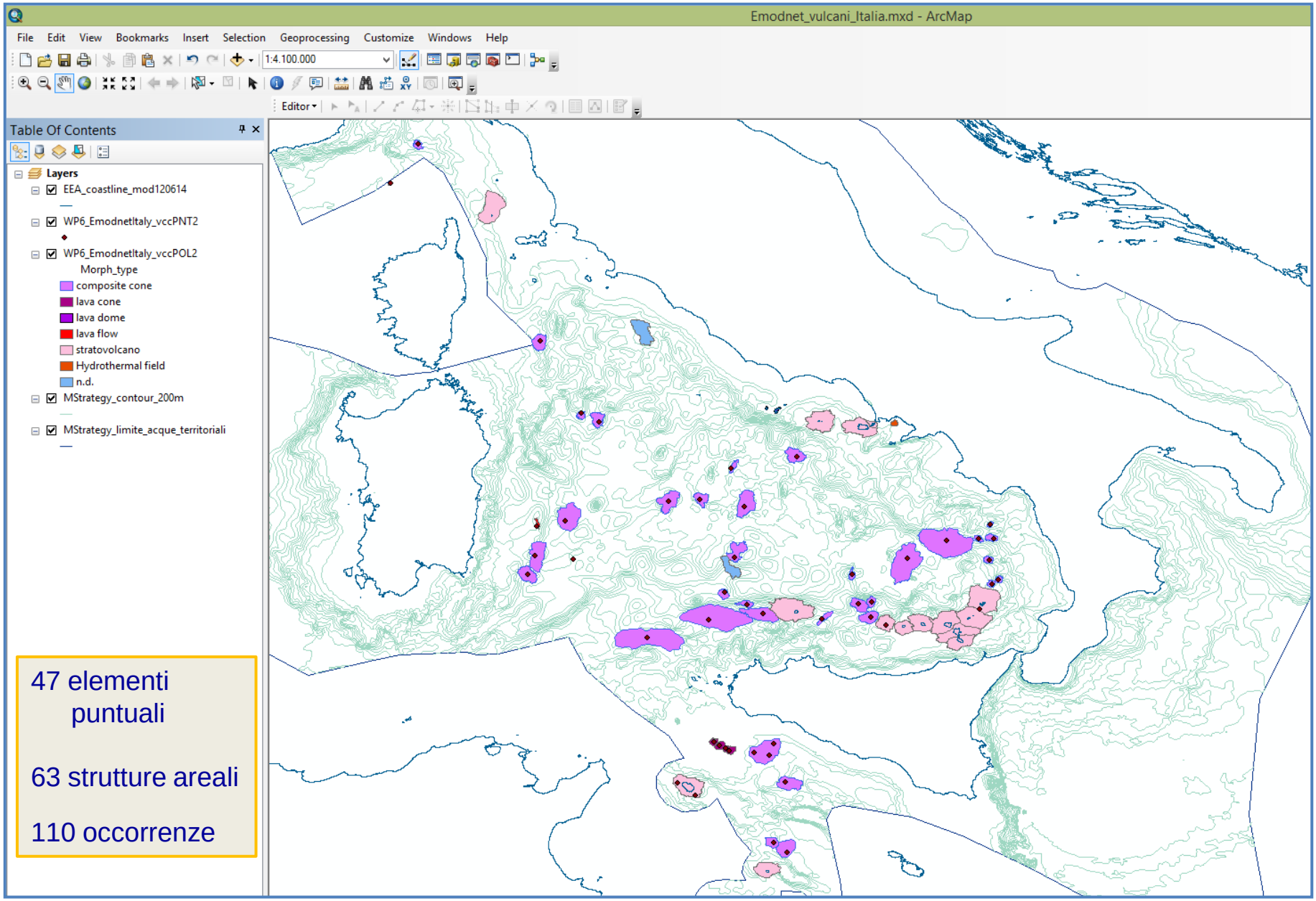
I risultati ottenuti sono andati ben oltre quanto previsto per il Progetto Emodnet: la mole di dati censiti, interpretati e standardizzati dai colleghi di RomaTRE ha portato allo sviluppo di un database originale e più completo.

Table

WP6_EmodnetItaly_vccPOL2

FID	Shape *	Id	Vcc_pol	References	Name	Morph_type	Comment	Erupt_Fr	Volc_Distr	Act_type	VEI	VEI_age	Height	Chem_Compo	Fluid_Emis	Activity_R
29	Polygon	0	IT00001	References_vcc_pol_IT00001.doc	Aceste/Tiberio	composite cone		0	N Sicily	Effusive	0		1074	Hawaiite to trachite and metam		5 Ma
9	Polygon	0	IT00002	References_vcc_pol_IT00002.doc	Albatros/Cicerone	composite cone		0	Roman-Neapolitan	Effusive	0		1436	Potassic rocks		
14	Polygon	0	IT00003	References_vcc_pol_IT00003.doc	Alcione	composite cone		0	Aeolian arc	Effusive	0		1101	High-K calcalkaline basalts		1.3 - 0.1 Ma
22	Polygon	0	IT00004	References_vcc_pol_IT00004.doc	Alfil	composite cone	Also known as Alfil Bank or Linosa	0	Sicily channel	Effusive	0		549			
33	Polygon	0	IT00005	References_vcc_pol_IT00005.doc	Alicudi	stratovolcano		0	Aeolian arc	Mixed	3	28 ka	2157	Calcalkaline basalts, basaltic a		90 - 30 ka
24	Polygon	0	IT00006	References_vcc_pol_IT00006.doc	Anchise	composite cone	K/Ar age.	0	N Sicily	Effusive	0		1208	High-K calcalkaline to shoshoni		5.2 - 3.6 ka
49	Polygon	0	IT00007	References_vcc_pol_IT00007.doc	Anfitrite	lava cone		0	Sicily channel	Effusive	0		46			
62	Polygon	0	IT00008	References_vcc_pol_IT00008.doc	Augusto	composite cone	Fragments of continental crusts an	0	uncertain		0		1021	Submarine crystalline outcrops		
60	Polygon	0	IT00009	References_vcc_pol_IT00009.doc	Banco della Montagna	Hydrothermal field	Submarine hydrothermal/gas-hydrat	0	Roman-Neapolitan	hydrother	0		20	Major CO2, then H2S, CH4 and	volcanic origin	? - Present
37	Polygon	0	IT00010	References_vcc_pol_IT00010.doc	Capraia	stratovolcano	K/Ar and 40Ar/39Ar age.	0	Corsica-Tuscan	Mixed	0		388	High-K calcalkaline rocks; from		9.5 - 6.9 Ma
39	Polygon	0	IT00011	References_vcc_pol_IT00011.doc	Casoni	lava cone	Young submarine age, Dredging of	0	Aeolian arc	Effusive	0		166	Pillow basalts and breccias		? - Present
30	Polygon	0	IT00012	References_vcc_pol_IT00012.doc	Columbus	composite cone	CROP section M-2A/I (Finetti, 2005).	0	W Tyrrheninan	Effusive	0		1088	Basalts		
21	Polygon	0	IT00013	References_vcc_pol_IT00013.doc	Cornacya/Sarcya	composite cone	40Ar/39Ar age: 12.6 +- 0.3 Ma	0	Corsica-Tuscan	Effusive	0		829	Shoshonites and calcalkaline r		20 - 12 Ma
4	Polygon	0	IT00014	References_vcc_pol_IT00014.doc	Cornaglia	composite cone	Volcanic body.	0	uncertain	Effusive	0		1684			10 Ma
58	Polygon	0	IT00015	References_vcc_pol_IT00015.doc	Creusa	composite cone	Presumed by references authors a	0	N Sicily	Effusive	0		575			
6	Polygon	0	IT00016	References_vcc_pol_IT00016.doc	D'Ancona	composite cone	Also known as D'Ancona Ridge.	0	Central Tyrrhenian	Effusive	0		781	Basalts		
12	Polygon	0	IT00017	References_vcc_pol_IT00017.doc	Diamante	composite cone	Outcrop of acoustic crystalline bas	0	Aeolian arc	Effusive	0		542			
45	Polygon	0	IT00018	References_vcc_pol_IT00018.doc	Drepano	composite cone		0	N Sicily	Effusive	0		1029	Basalts, ophiolites and metamo		5 Ma
23	Polygon	0	IT00019	References_vcc_pol_IT00019.doc	Empedocle	composite cone	Multiple seamount (Nerita, Graham,	0	Sicily channel	Effusive	0		277			
26	Polygon	0	IT00020	References_vcc_pol_IT00020.doc	Enarete	composite cone	Temp up to 5 °C above normal Temp	0	Aeolian arc	Effusive	0		1830	Shoshonites	volcanic origin	0.78 - 0.67 Ma
13	Polygon	0	IT00021	References_vcc_pol_IT00021.doc	Enotrio	composite cone	Outcrop of acoustic crystalline bas	0	Aeolian arc	Effusive	0		120			
27	Polygon	0	IT00022	References_vcc_pol_IT00022.doc	Eolo	stratovolcano	K/Ar age, +-0.06 Ma. Mn/Fe, 3He h	0	Aeolian arc	Mixed	0		1161	Shoshonitic basalts, dacites an	volcanic origin	0.85 - 0.64 Ma
2	Polygon	0	IT00023	References_vcc_pol_IT00023.doc	Etruschi	composite cone	Samples at ODP654 site were date	0	W Tyrrheninan	Effusive	0		695	Hawaiite		Plio-Quaternary
51	Polygon	0	IT00024	References_vcc_pnt_IT00024.doc	Euridice	lava cone		0	Sicily channel	Effusive	0		23			
32	Polygon	0	IT00025	References_vcc_pol_IT00025.doc	Filicudi	stratovolcano	40Ar/39Ar age	0	Aeolian arc	Mixed	3	40 ka	2436	Mafic to intermediate compositi		1.02 - 0.04 Ma

WP6 Vulcani - risultati italiani



47 elementi puntuali

63 strutture areali

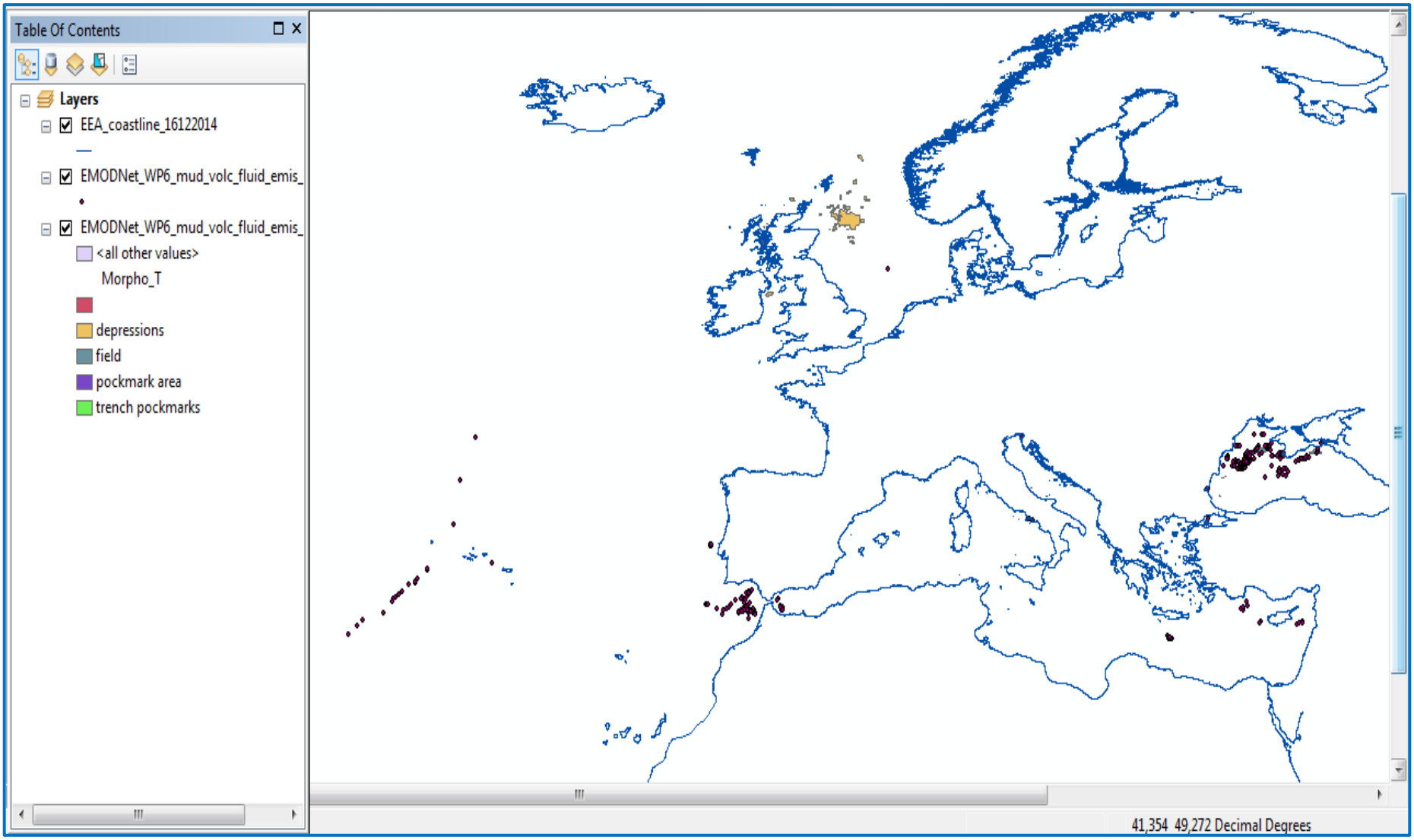
110 occorrenze

WP6 Emissioni fluide non vulcaniche – tabella degli attributi

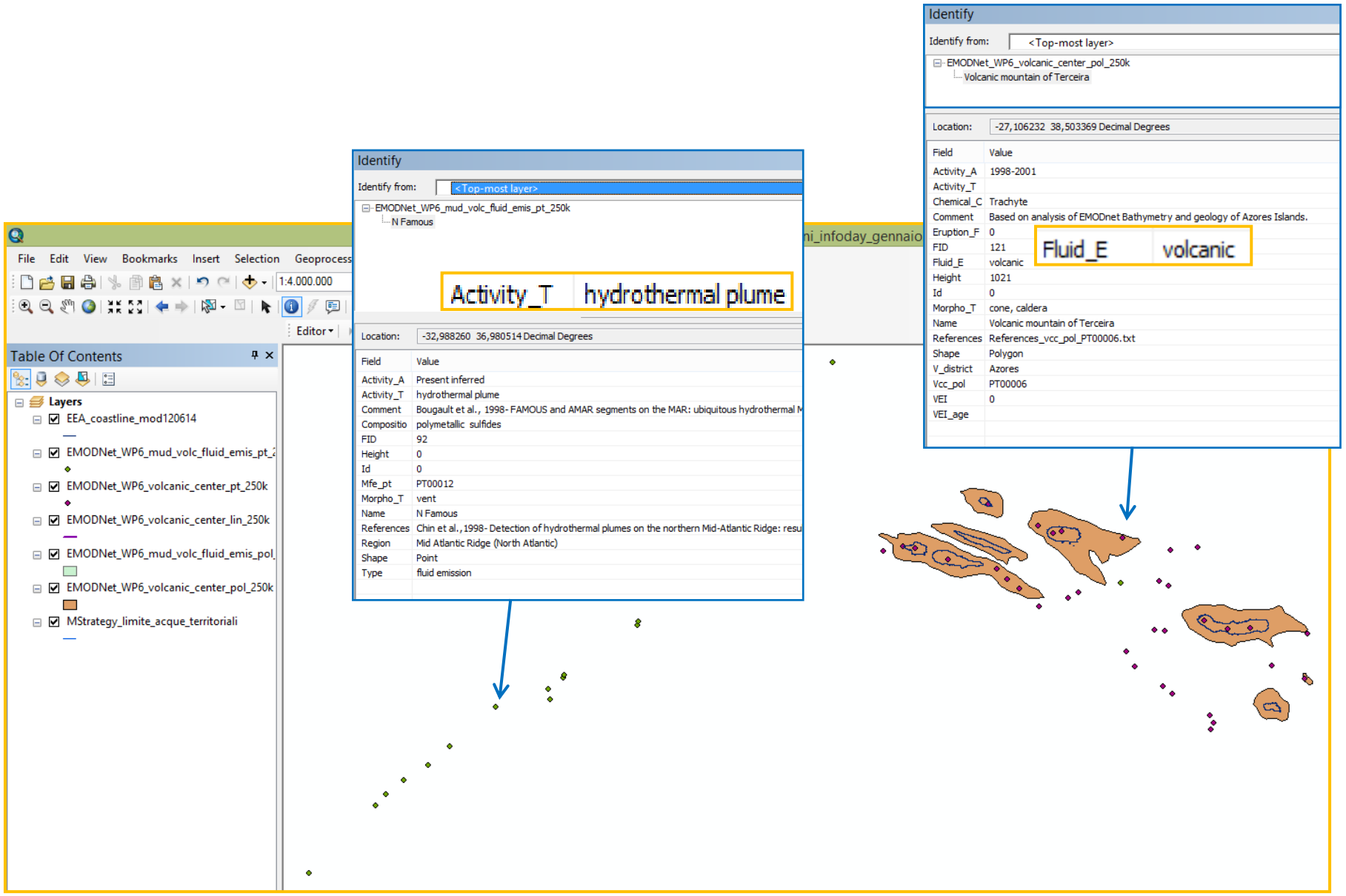
Un distinto strato informativo è stato previsto in corso d'opera per dare opportuno risalto ai fenomeni di sicura natura non vulcanica.

Feature	Status	Format	Definition	Description	Reference	Remarks
Mfe_pt, Mfe_lin, Mfe_pol	mandatory	Text (8)	points, polylines, polygons	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		
Type		Text (50)	Mud volcanoes, fluid emissions,			
Name		Text (50)	literature name			
Region		Text (50)	Areas of distribution, regions of action, emissions provinces		Lyobomir I. Dimitrov (2002) - Mud volcanoes—the most important pathway for degassing deeply buried sediments. Earth-Science Reviews 59	
Activity_Age		Text (50)	geochronology	Indicate the age or the range of activity		
Activity type		Text (50)	if possible describe the activity type or classification			
Morphological type		Text (50)	caldera,composite/compound, cone, crater, field, ring, depression, pockmark area, seep, vent, fissure vent,			
Height		Numeric Short (4)	meters	elevation above seafloor		
Composition		Text (100)	chemical composition and temperature; for mud volcanoes also lithology			
References	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_vcc_pol_IT00001.doc			
Comment		Text (200)	free comments			

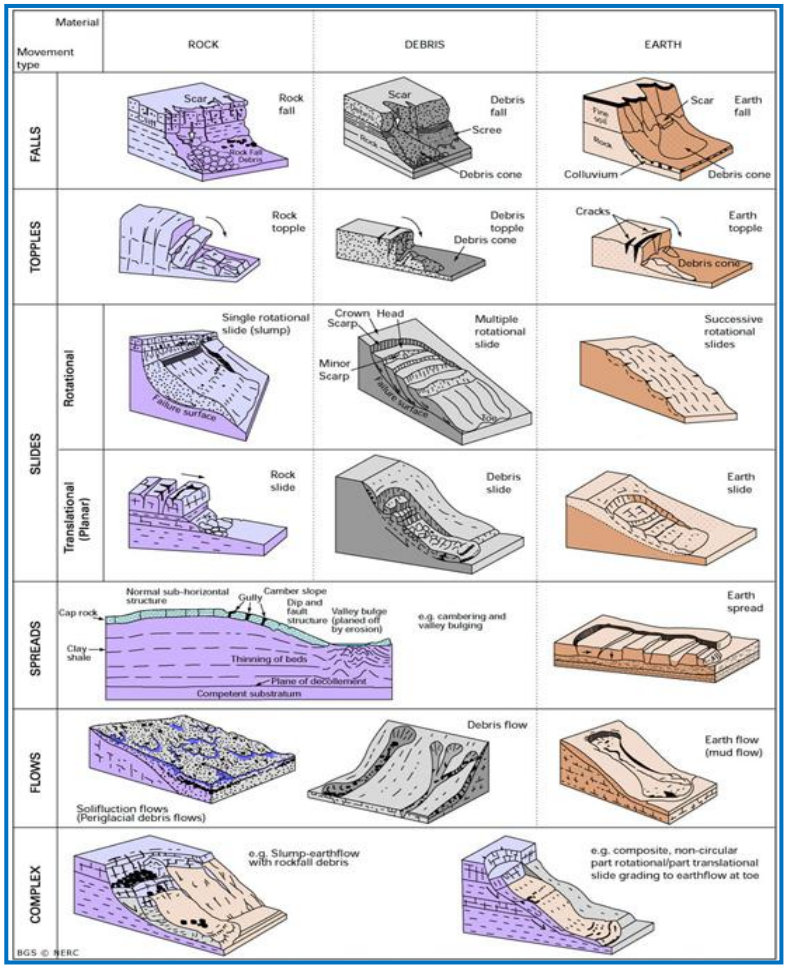
WP6 Emissioni fluide non vulcaniche – risultati



WP6 Emissioni fluide non vulcaniche – risultati



WP6 Frane – classificazione



La classificazione adottata è quella presente in INSPIRE - linee guida Rischi Naturali (Varnes, 1978 modificata e DoE, 1990)

- I due criteri principali su cui si basa la classificazione sono:
- tipo di movimento
- tipo di materiale coinvolto nel movimento

La combinazione dei due termini dà luogo ad un gran numero di casi (rock fall, rock topple, debris flow, ecc.).

Complex: una frana complessa è una frana che presenta almeno due tipi di movimento in sequenza temporale

WP6 Frane – tabella degli attributi poligoni e punti

A	B	C	D	E	F	G
Feature	Status	Format	Definition	Description	Reference	Remarks
Sls_pt, Sls_pol	mandatory	Text (8)	points or polygons	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		Polygons can be extended across the coastline in order to represent full extension of landslides including portions on land.
Age		Text (50)	geochronology/ ancient, recent	Indicate geochronologic unit where possible or specify only if it is ancient or recent		
Volume		Numeric Double (10)	cubic meters			
Thickness		Numeric Long (5)	meters	Maximum thickness of the displaced mass or, alternatively, evaluated average thickness		
Type		Text (50)	landslide, fall, topple, slide, rotational slide, translational slide, flow, lateral spread, complex landslide, slide/flow, translational slide/flow, turbidity current/debris flow, avalanche, creep, deep-seated gravitational slope deformations (DSGSD), turbidity currents, area of mass movements, zones of net erosion	**DSGSD:** huge slope failures, as rock flow and lateral spread in homogeneous rocks or in brittle formation overlying ductile material; **creep:** sediment deformation features with limited displacement and differential depositional bedforms. **Area of mass movement**: area of downslope displacement of material, including settings where erosion and deposition occur as a continuous downslope process (e.g. canyons).	INSPIRE description in slopegravitational	outcropping or buried
Source area		Text (10)	above, below (sea level)			
Lithology		Text (50)	rock, debris, mud			mandatory in case Type = flow
Name		Text (50)	literature name			
Slope gradient		Numeric Short (2)	percentage (%)	express slope gradient as a percentage, "difference in altitude divided by planimetric distance multiplied 100"		
References	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_sls_pol_IT00001.doc			
Comment		Text (200)	free comments			

WP6 Frane – tabella degli attributi linee

shp_line						
Sls_lin	mandatory	Text (8)	polylines	unique identifier code (two letters country code, which corresponds to ISO3166- code e.g. "IT" plus progressive numbers that identify each spatial occurrence in the map e.g. "IT00001", "IT00002", "IT00003", etc.)		
Age		Text (50)	geochronology/ ancient, recent	Indicate geochronologic unit where possible or specify only if it is ancient or recent		
Scarp length		Numeric Long (6)	meters	Edge of the main scarp	Dikau R., Brunsden, D., Schnott L. & Ibsen M.-L. (1996) - Landslide recognition, pp.251.	A steep surface on the undisturbed ground at the upper edge of the landslide, caused by movement of the displaced material. It is the exposed part of the surface of rupture
Scarp height		Numeric Short (4)	meters	Height of the surface of rupture, if totally exposed, or maximum height difference between the top of the displaced material and the edge of the main scarp.		
References	mandatory	Text (200)	in case of long text, fill with the name of a file.doc named "References + the identifier code" as in the following example: References_sls_lin_IT00001.doc			
Comment		Text (200)	free comments			

WP6 Frane – reperimento dati Italia

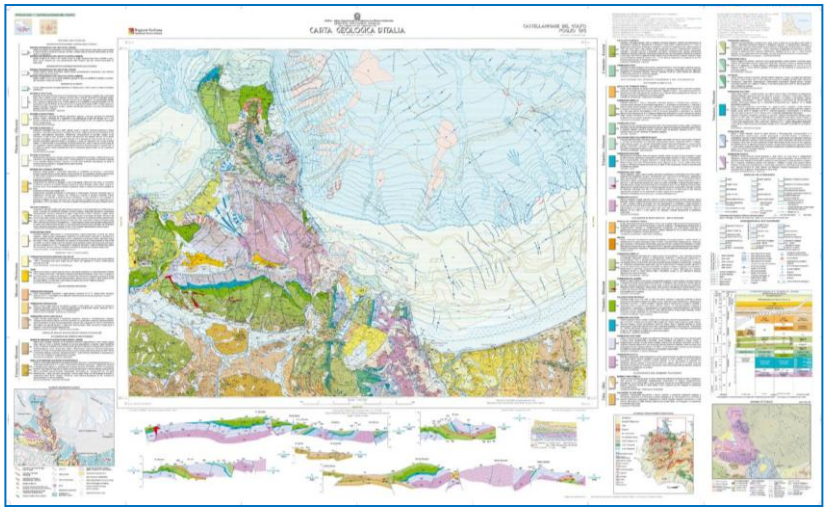
Per i mari italiani la raccolta e l'elaborazione dei dati è stata effettuata interamente dall'ISPRA.

Le informazioni sulle frane, relativamente alla distribuzione spaziale e alle caratteristiche, sono state ottenute da:

- Progetto CARG – Cartografia Geologica Nazionale in Scala 1:50.000
- Progetto CARG - Carta Geologica dei Mari Italiani in Scala 1:250.000
- Database sulle frane sottomarine (Camerlenghi A., Urgeles R. & Fantoni L.- A Database on Submarine Landslides of the Mediterranean Sea. D.C. Mosher et al. (eds.), *Submarine Mass Movements and Their Consequences*, 503 Advances in Natural and Technological Hazards Research, Vol 28, © Springer Science + Business Media B.V. 2010) reso disponibile dal Prof. Camerlenghi (Istituto OGS)
- Letteratura

WP6 Frane – reperimento dati Italia

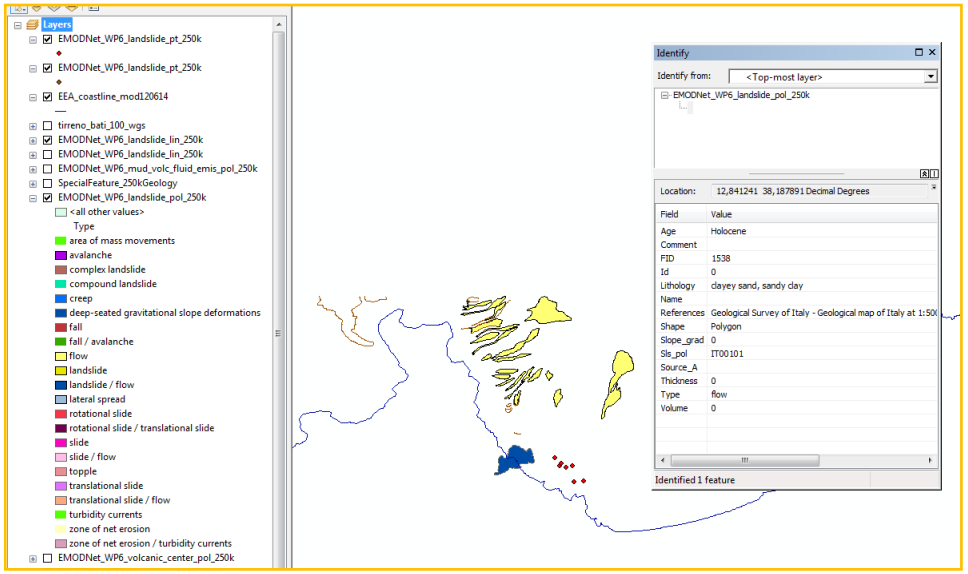
CARTOGRAFIA CARG IN SCALA 1:50.000



Rappresentazione dei depositi di frana generici; mancano indicazioni sulla tipologia di movimento e di materiale.

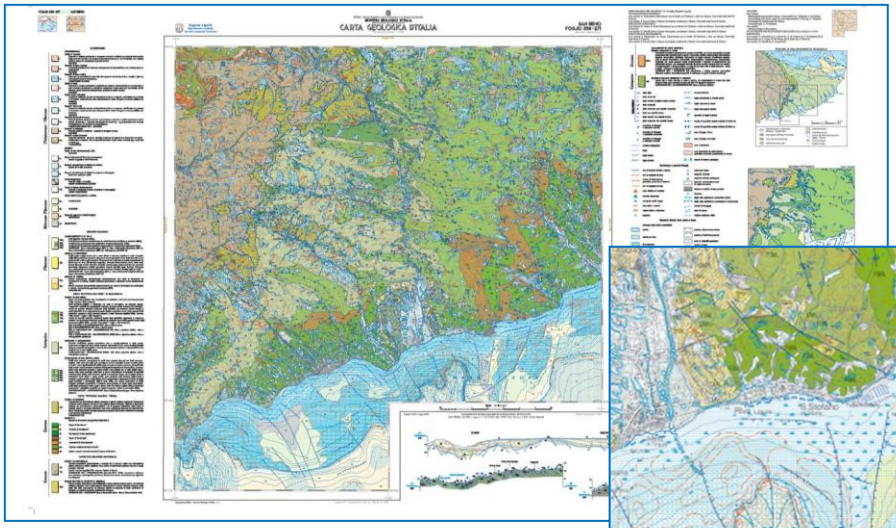
L'informazione cronologica spesso è di tipo generico: antico e recente.

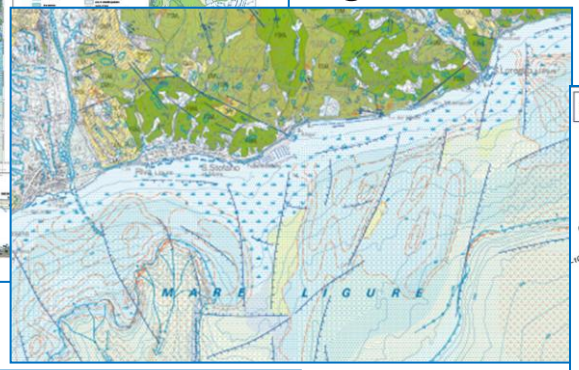
Approfondimenti sono spesso presenti nel testo e nelle figure delle Note Illustrative o in schemi a margine dei fogli

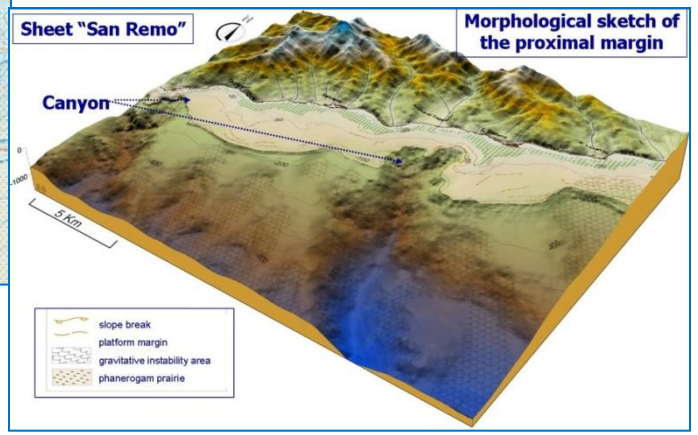


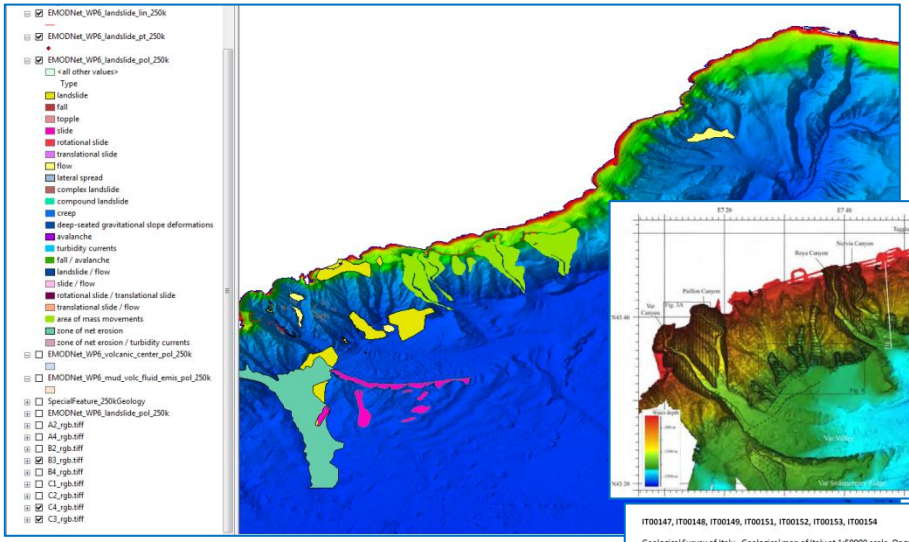
WP6 Frane – reperimento dati Italia

Foglio 258 San Remo e dettaglio della scarpata di ponente del Bacino Ligure, interessata da instabilità gravitativa diffusa





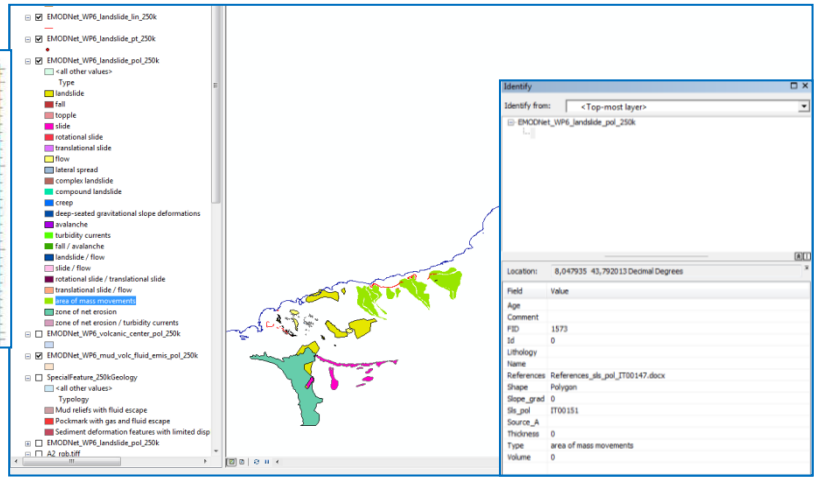




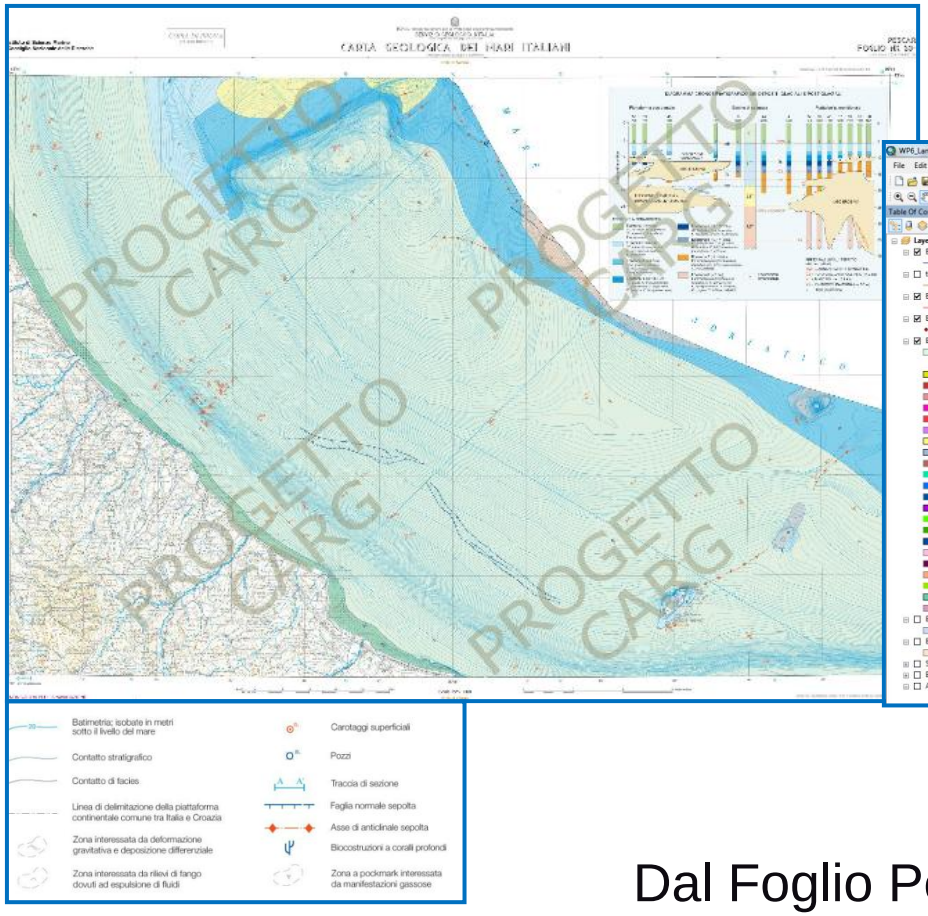
IT00147, IT00148, IT00149, IT00151, IT00152, IT00153, IT00154

Geological Survey of Italy - Geological map of Italy at 1:50000 scale. Ongoing mapping Project.

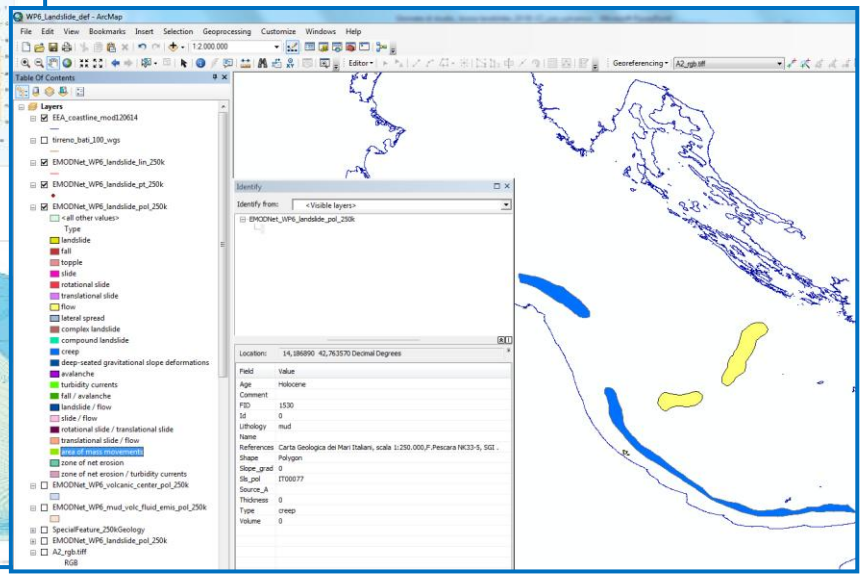
Migeon S., Cattaneo A., Hassoun V., Larroque C., Corradi N., Fanucci F., Dano A., Mercier de Lepinay B., Sage F., Gorini C. (2011) - Morphology, distribution and origin of recent submarine landslides of the Ligurian Margin (North-Western Mediterranean): some insights into geohazard assessment. Marine Geophysical Research, 32, pp 225-243.



WP6 Frane – reperimento dati Italia



CARTA DEI MARI ITALIANI
IN SCALA 1:250.000



Dal Foglio Pescara sono state ricavate le aree interessate da *creep* e i dati per la compilazione della tabella degli attributi

WP6 Frane – reperimento dati Italia

DATABASE DI CAMERLENGHI

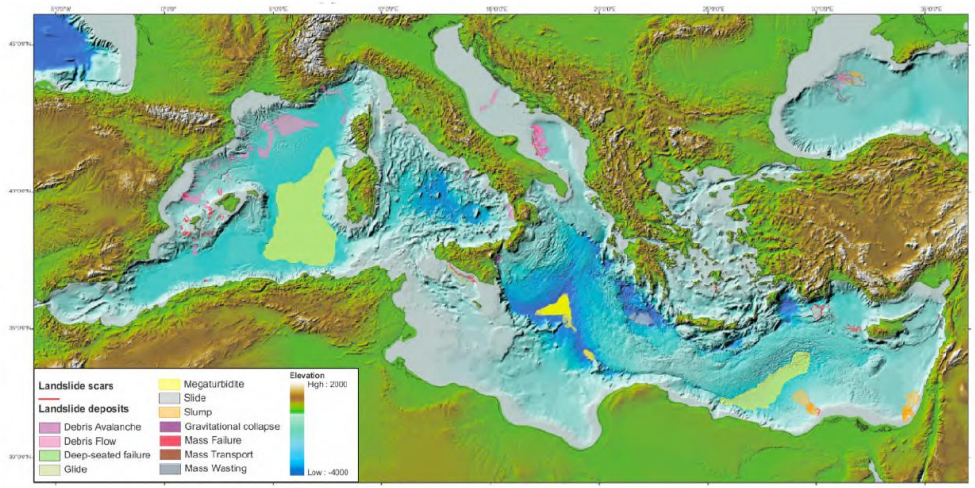
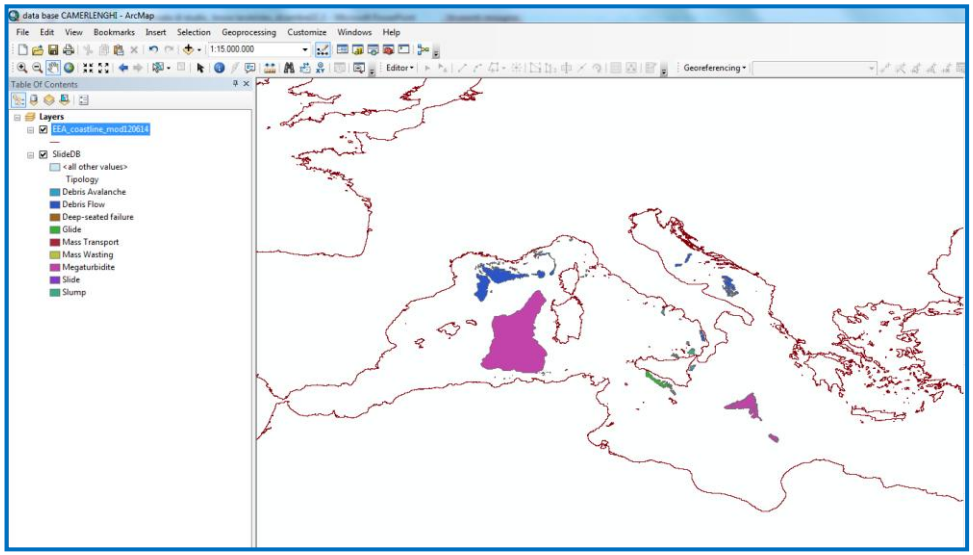


Figure 3. Distribution of known submarine landslides and megaturbidites in the Mediterranean Sea (Camerlenghi et al., 2009).

Rappresenta un importante *step* verso l'analisi del *geohazard* relativo alle frane sottomarine nel Mar Mediterraneo

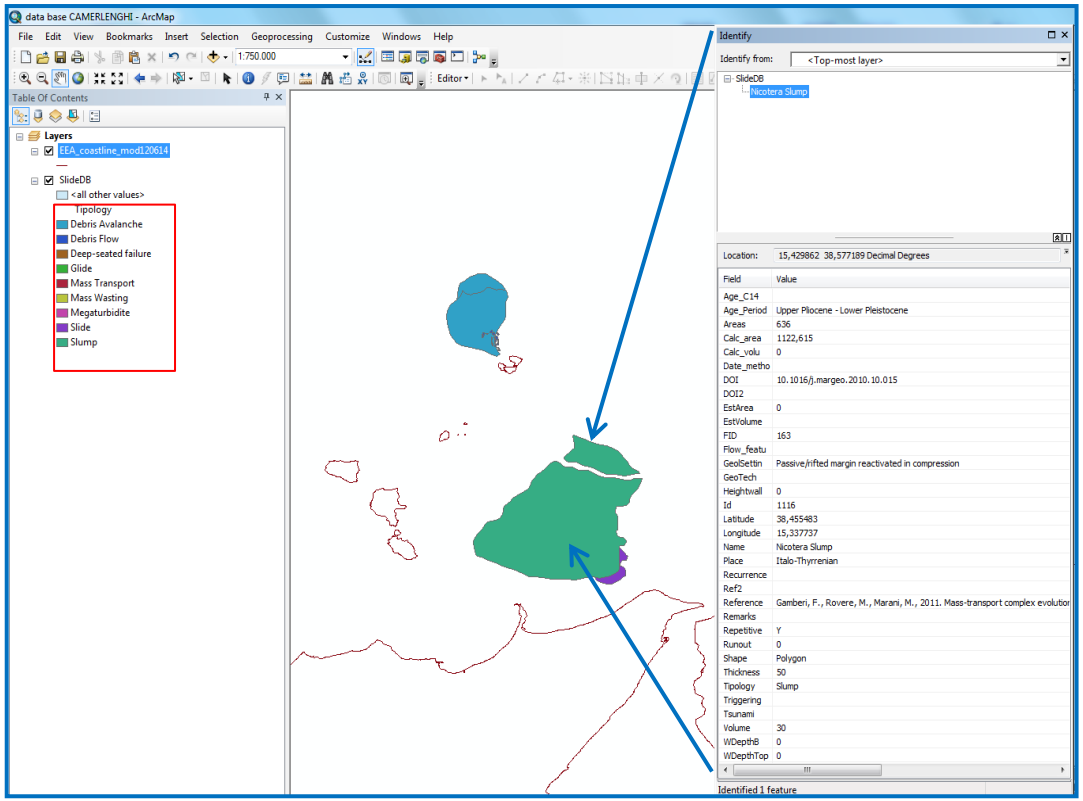
Si tratta di un *database in progress*, in cui la maggior parte dei dati è stata raccolta attraverso la letteratura scientifica. La distribuzione delle frane non è del tutto completa, in quanto risente della mancanza in alcune aree di rilievi geofisici ad alta risoluzione.



WP6 Frane – reperimento dati Italia

Esigenza di uniformare la terminologia a quella definita nella tabella degli attributi sulla base di INSPIRE.

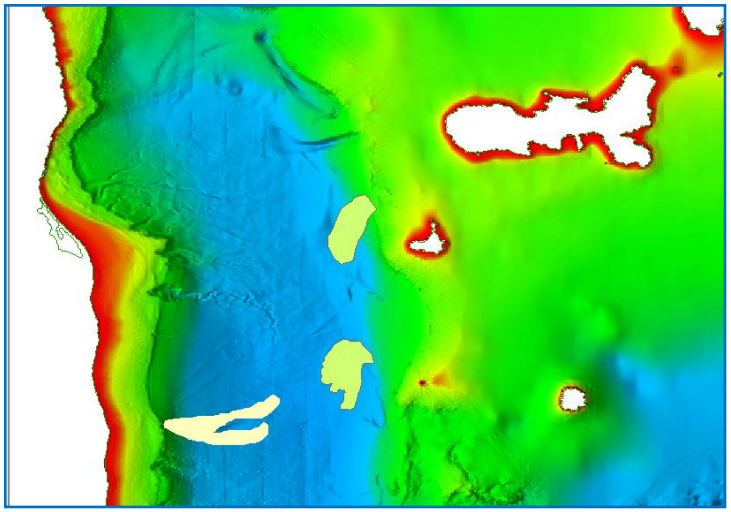
Nel Database di Camerlenghi non è stata seguita una specifica classificazione delle frane; gli Autori hanno scelto di utilizzare i termini presenti nei lavori originali.



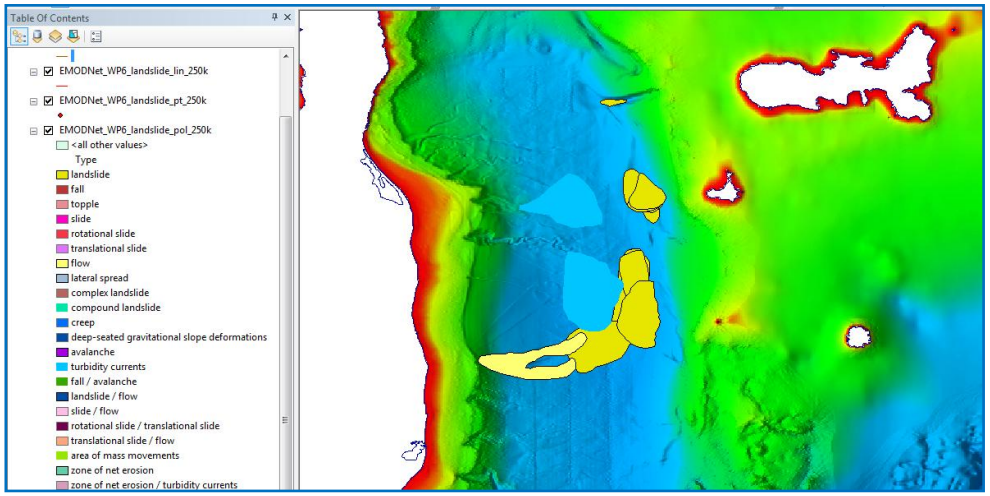
Dettaglio informazioni Database Camerlenghi

Nella legenda è possibile osservare la presenza di termini differenti per lo stesso tipo di frana (ad es. "*slide*" e "*glide*" per le frane di scorrimento traslativo) e l'utilizzo di termini generici come "*mass-wasting*" o "*mass-transport*".

WP6 Frane – reperimento dati Italia

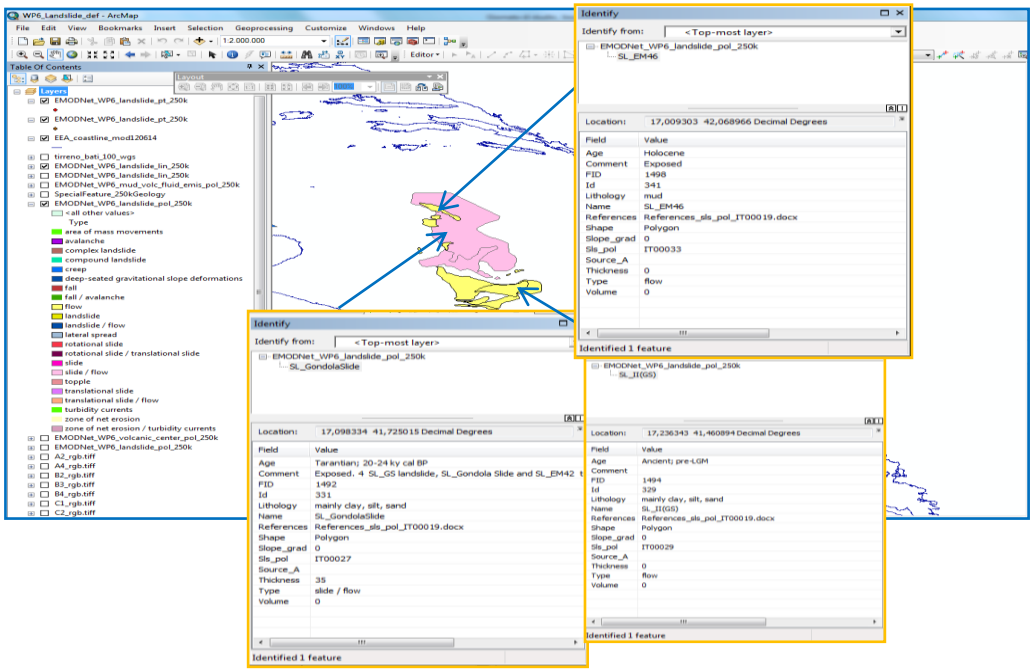


Database Camerlenghi

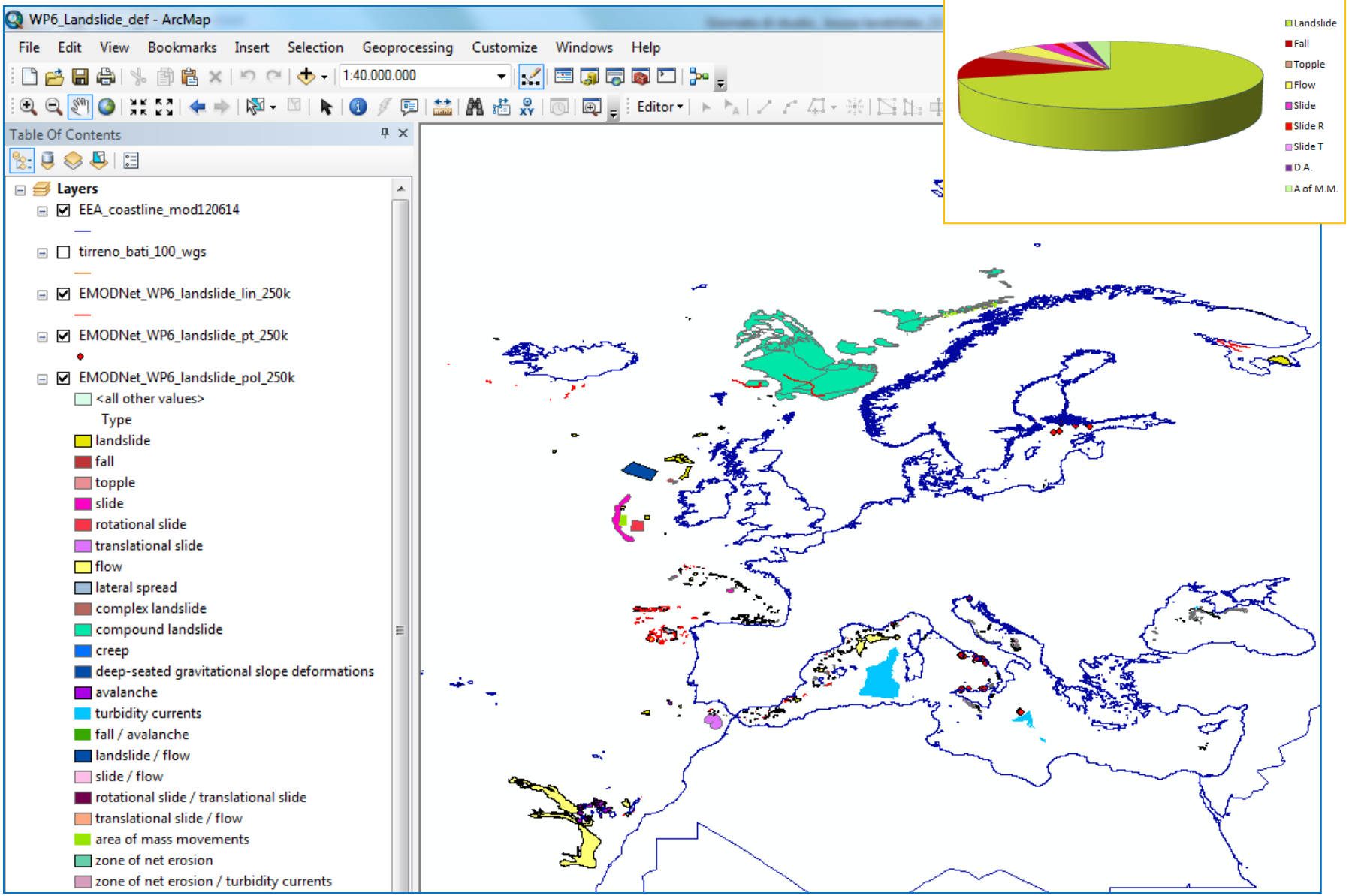


WP6 Database landslides

<u>modifiche</u> ed
<u>integrazioni</u> sono state apportate sia nella rappresentazione che nelle tabelle degli attributi, sulla base della rilettura dei lavori citati o della letteratura più aggiornata

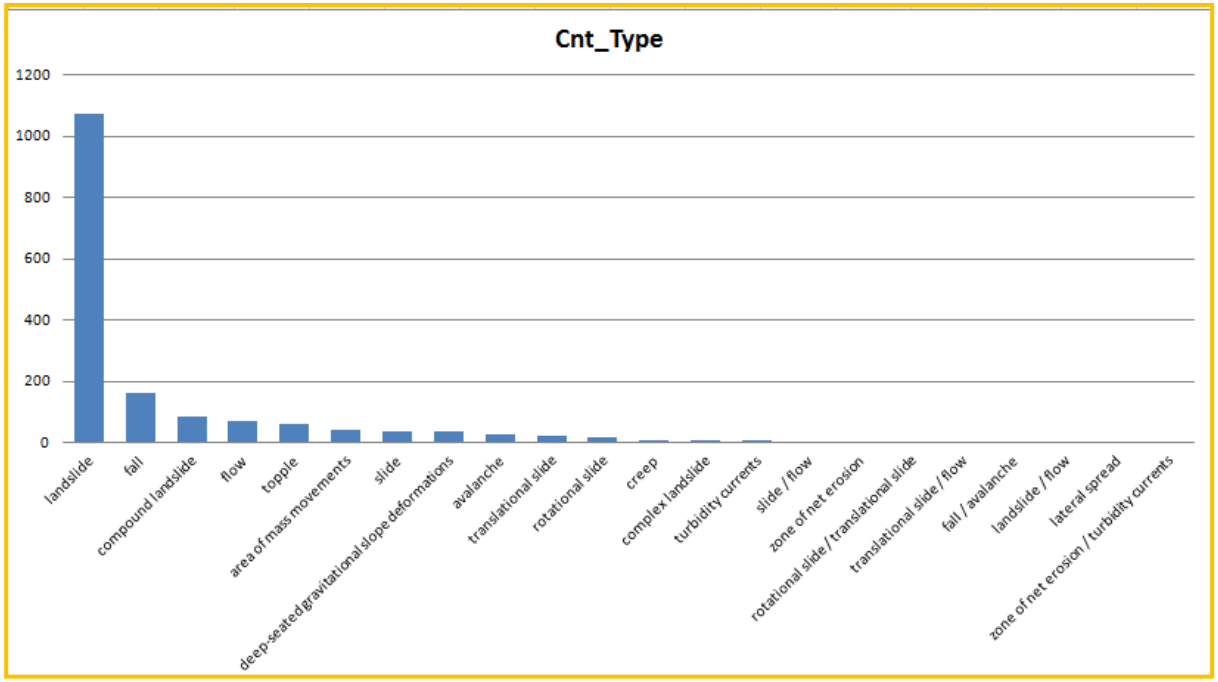


WP6 Frane – distribuzione



WP6 Frane – risultati

Totale occorrenze poligoni : 1681



Totale occorrenze punti : 57

Totale occorrenze linee : 953

WP6 Considerazioni e attività futura

- Per i quattro strati informativi Tettonica, Vulcani, Emissione fluide non vulcaniche e Frane sottomarine del WP6 è stato raccolto un gran numero di occorrenze con relative informazioni, armonizzate a livello europeo.

- Non tutti gli eventi sono stati identificati e i dati forniti risultano talora non completamente omogenei e completi, soprattutto in considerazione della eterogeneità dei contributi forniti. I motivi sono disparati: differenti approcci di studio, difficoltà di elaborazione dei dati preesistenti e totale indisponibilità di dati per alcune aree.

- Per il futuro si auspica:

  - infittimento dei dati laddove possibile

  - incrocio delle informazioni dei differenti strati informativi per lo sviluppo di ulteriori prodotti tematici, soprattutto finalizzati alle valutazioni sulla probabilità di occorrenza degli eventi.

GRAZIE PER L'ATTENZIONE