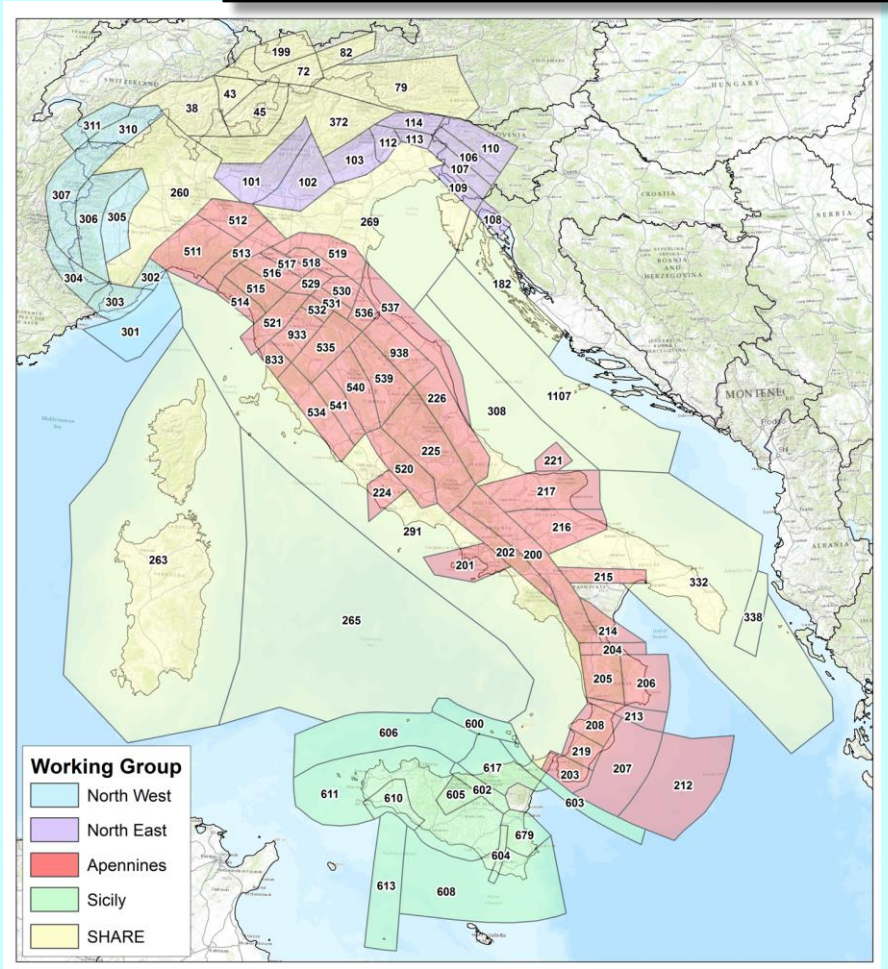
La nuova mappa di pericolosità sismica e il contributo per la MPS16 – Modello A1



OGS

UNIVERSITÀ DEGLI STUDI FIRENZE
DST
DIPARTIMENTO DI SCIENZE DELLA TERRA

UNIVERSITÀ DEGLI STUDI DI UDINE

UNIVERSITÀ degli STUDI di CATANIA

CNR
Istituto di Geoscienze e Georisorse

Università degli Studi di Genova
DISTAV

Regione Emilia-Romagna
servizio geologico sismico e dei suoli

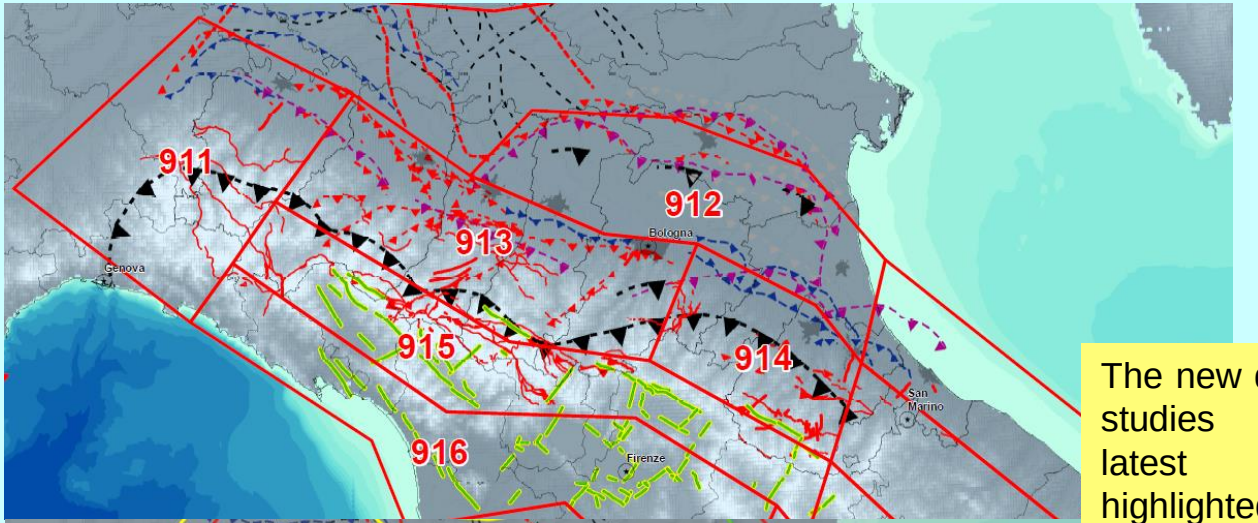
Istituto Nazionale di Geofisica e Vulcanologia

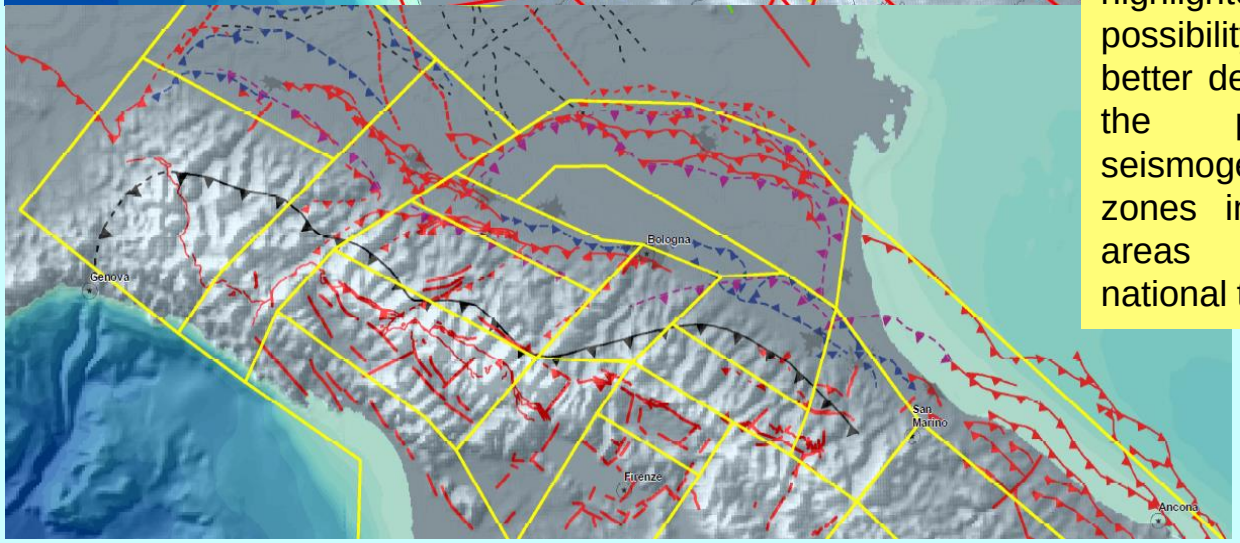
- **Progetto MPS16 DPC-INGV (2015)**

- **Coordinato dal CPS – Centro di Pericolosità Sismica INGV**
- **Modello A1 sviluppato da OGS – esperti di varie Università e ER**
- **I modelli che partecipano alla MPS16 sono 11**

- **Il team OGS ha interagito con il coordimanento CPS per migliorare/modificare in varie fasi le parti relative alle modalità di calcolo**
- **Sono stati seguiti alcuni suggerimenti forniti da reviewer esterni**
- **La Commissione Grandi Rischi supervisiona i lavori**

- **La mappa finale MPS16 verrà prodotta pesando in maniera differenziata i vari modelli concorrenti**





The new data and studies of the latest years highlighted the possibility of a better definition of the potentially seismogenic zones in several areas of the national territory.

Apennines

F. Sani (UniFI)
G. Corti (CNR_FI)
M. Bonini (CNR_FI)
L. Martelli (REG_ER)

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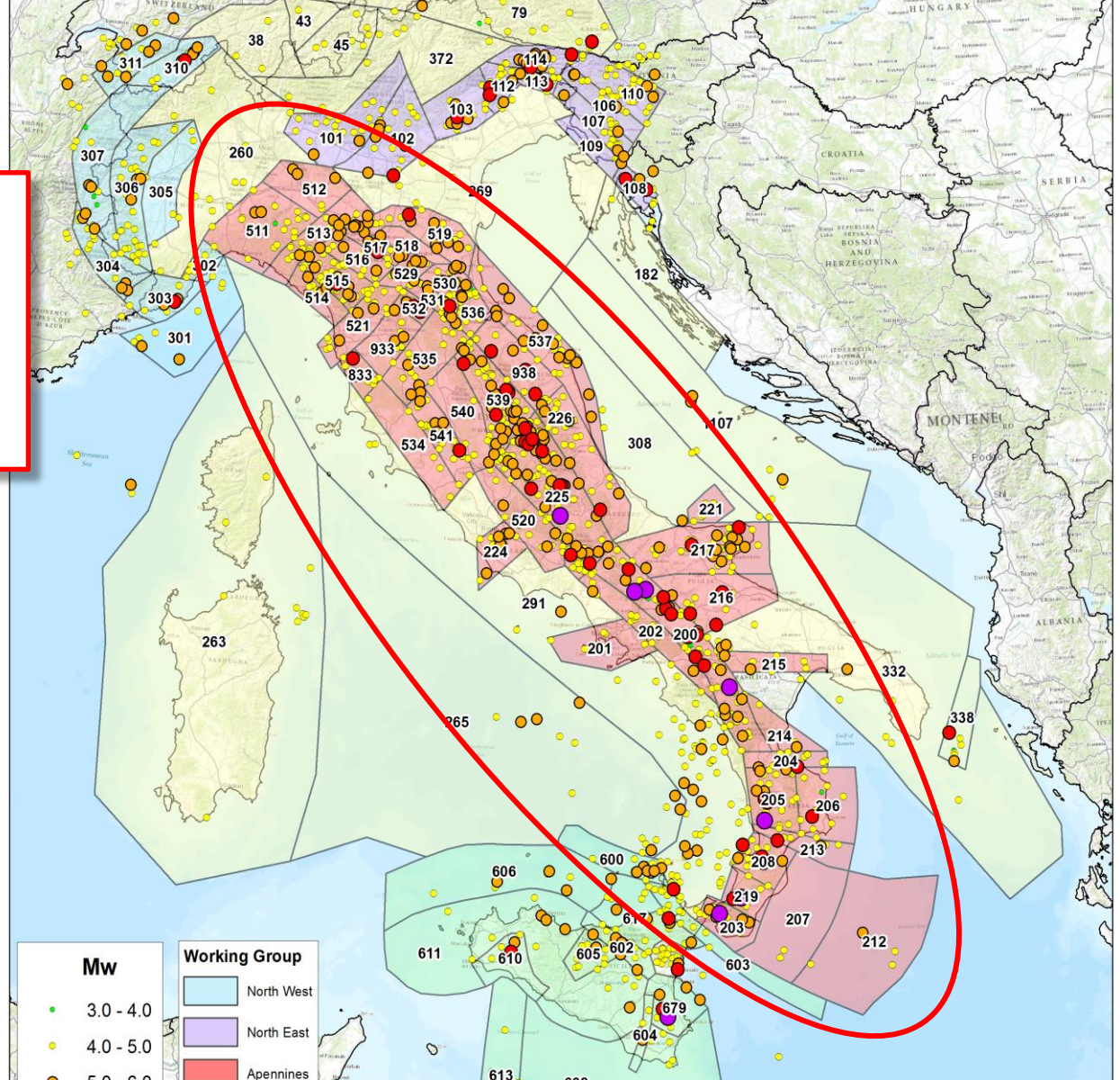

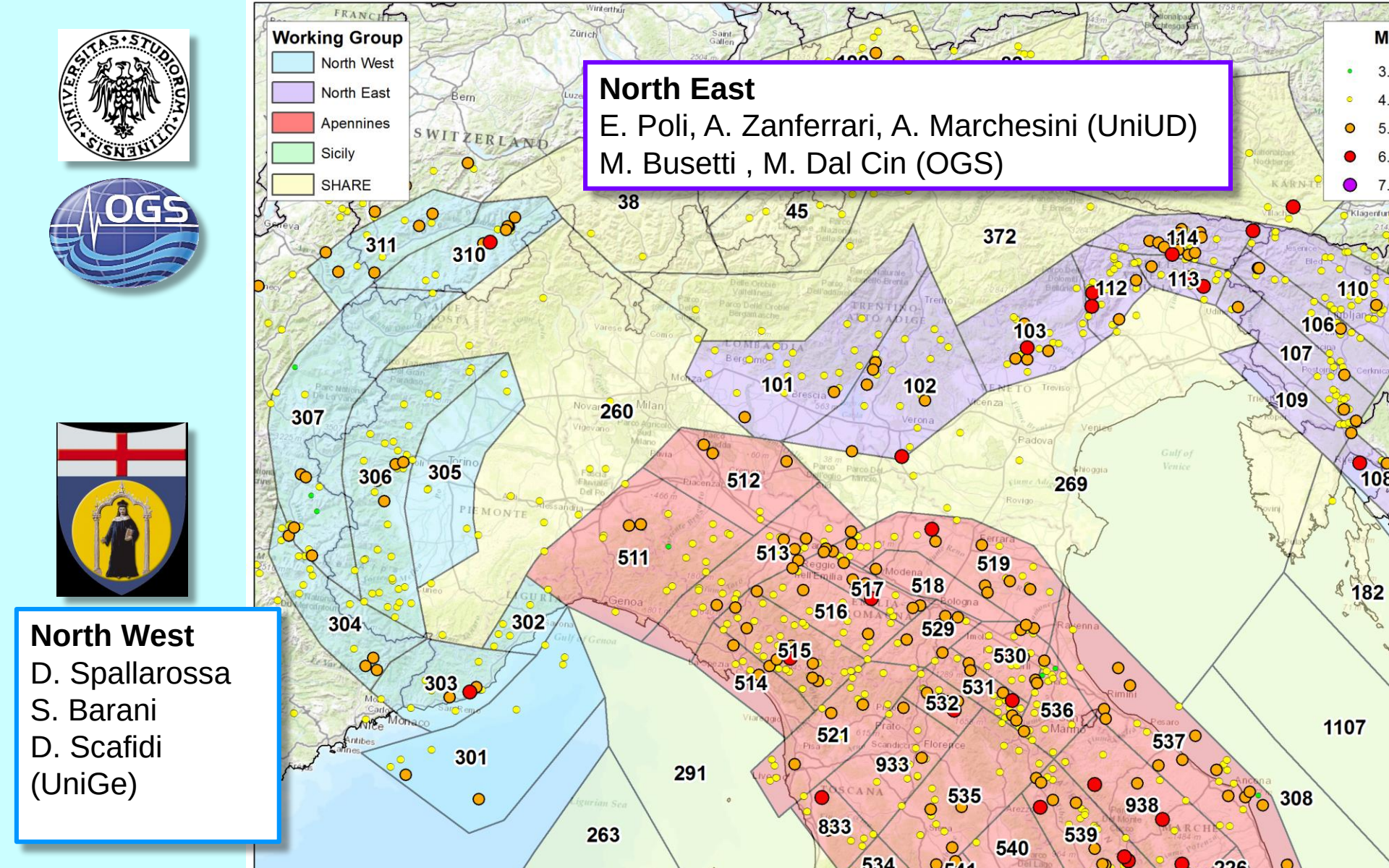
Working Group
North West
North East
Apennines
Sicily
SHARE
North East
E. Poli, A. Zanferrari, A. Marchesini (UniUD)
M. Busetti , M. Dal Cin (OGS)
North West
D. Spallarossa
S. Barani
D. Scafidi
(UniGe)

Sicily

C. Monaco
G. Barreca
(UniCT)

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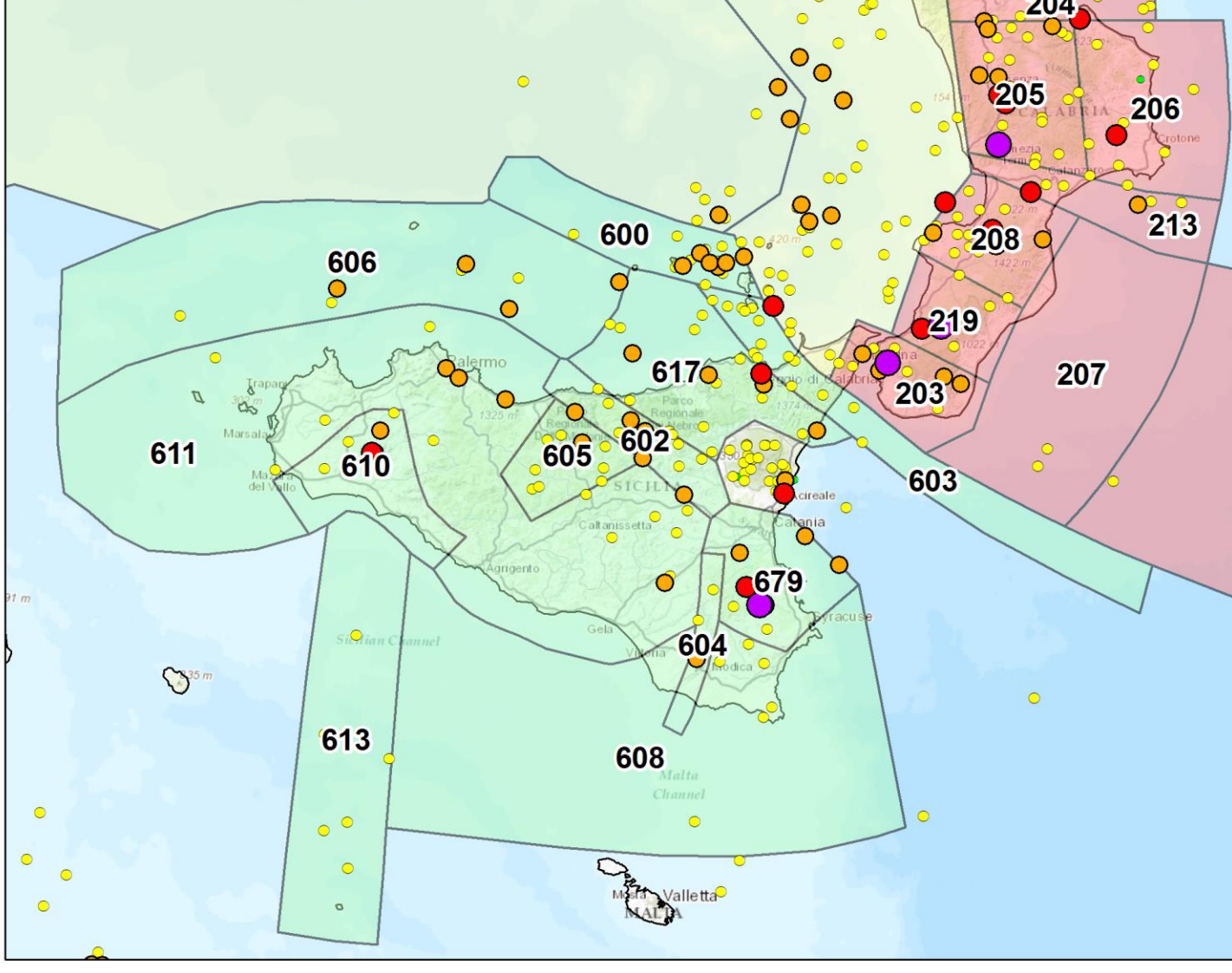
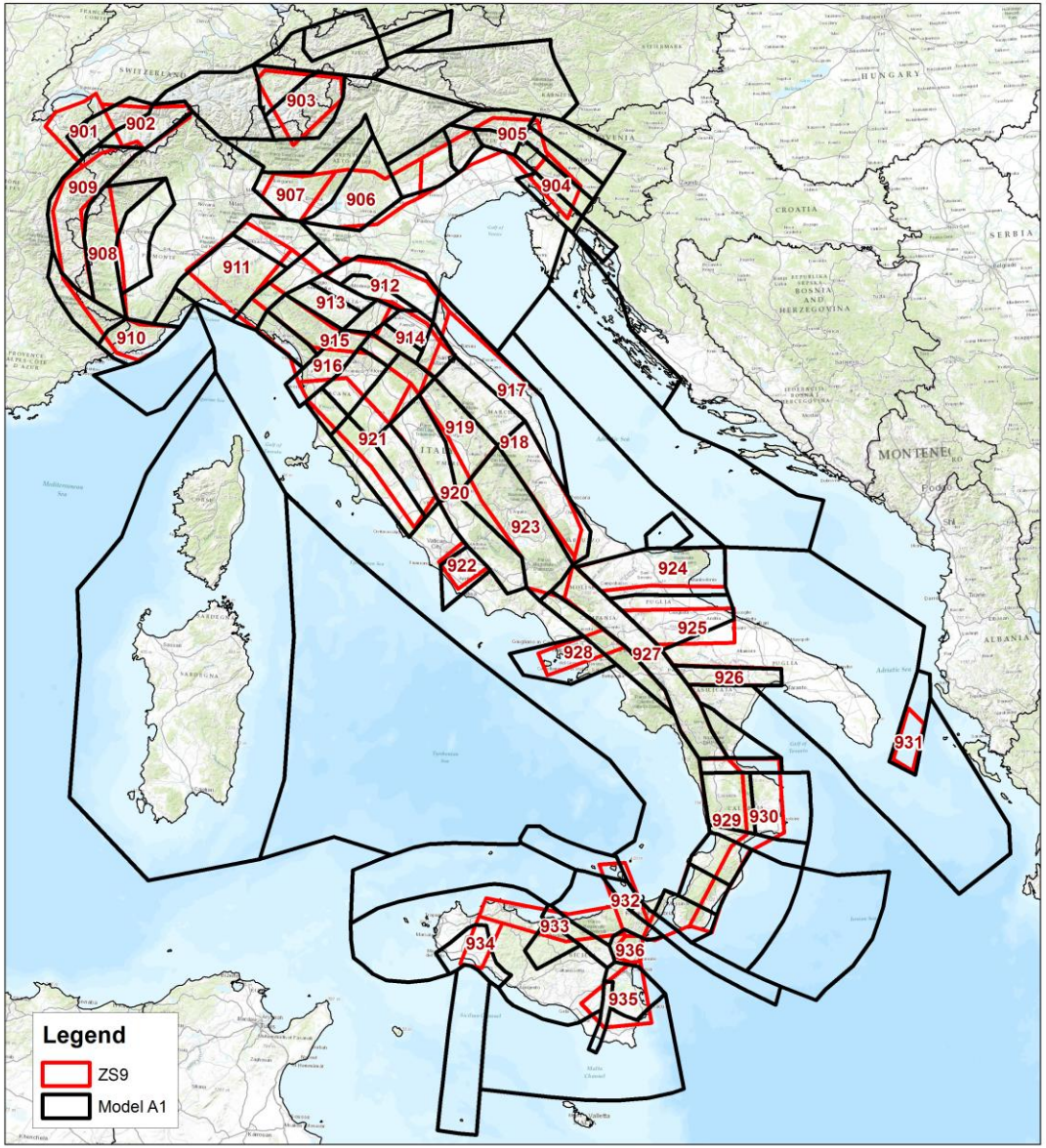
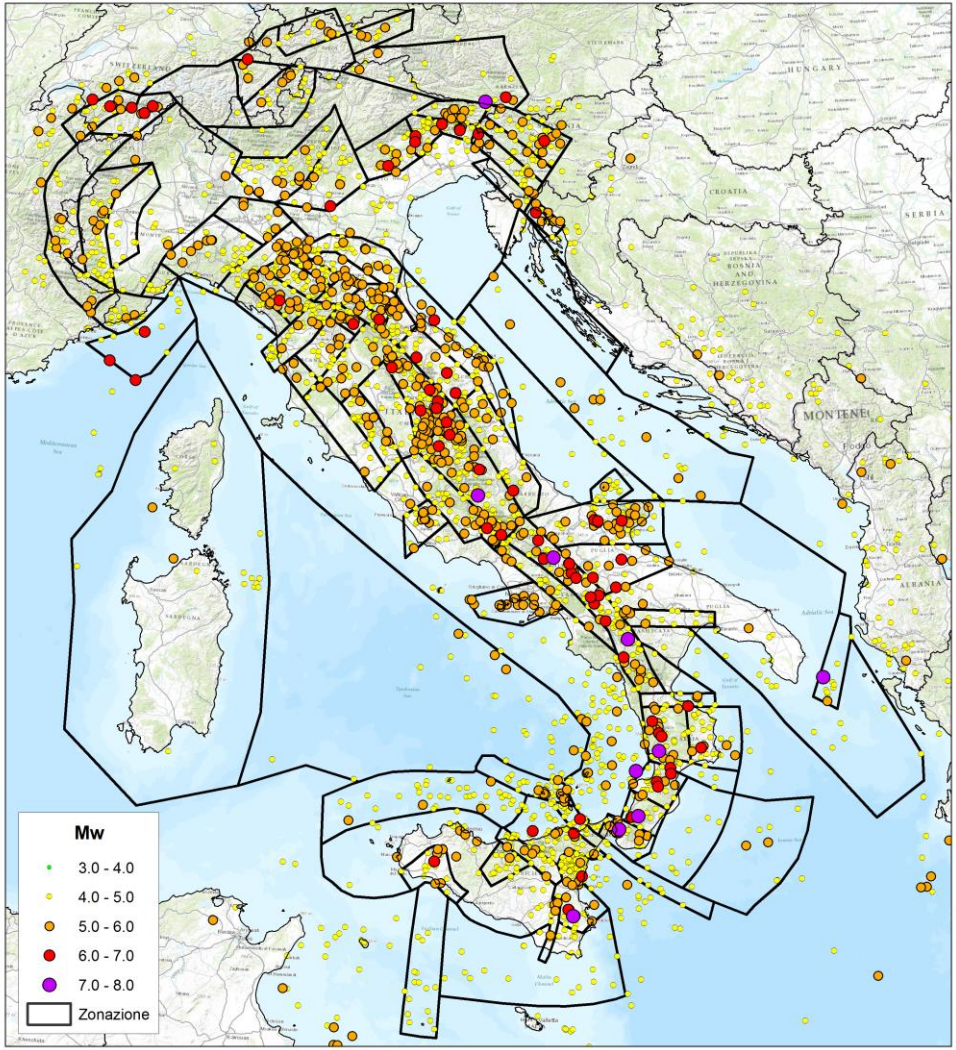




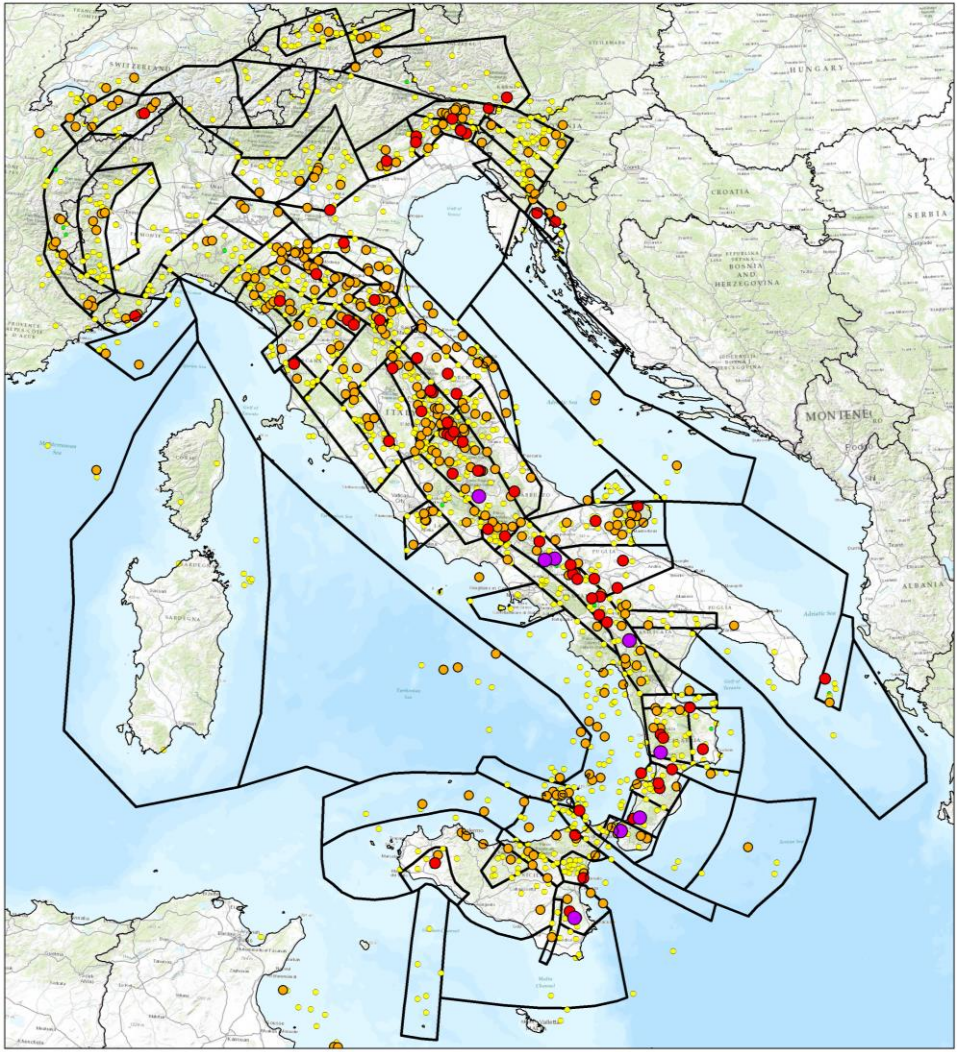
Team OGS

M. Santulin*
A.Tamaro
D. Slejko
A. Rebez

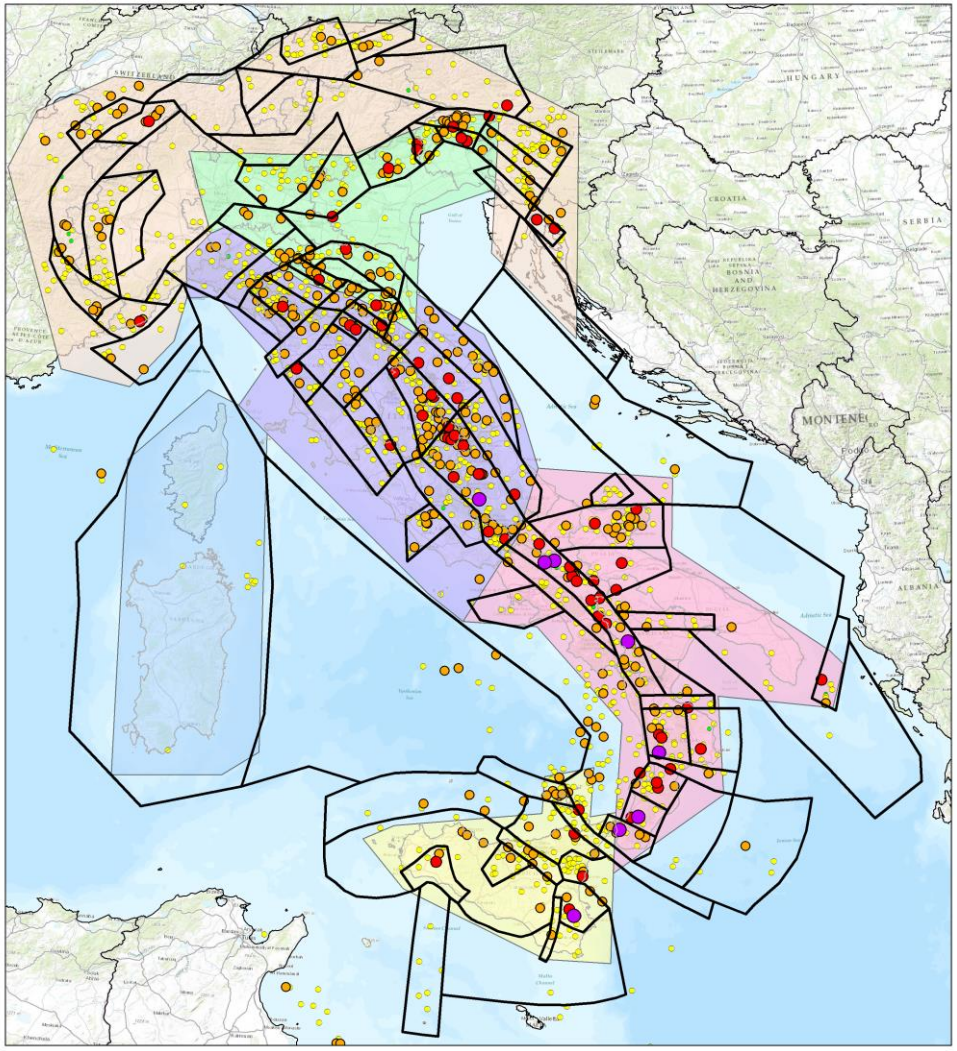
* INGV c/o OGS



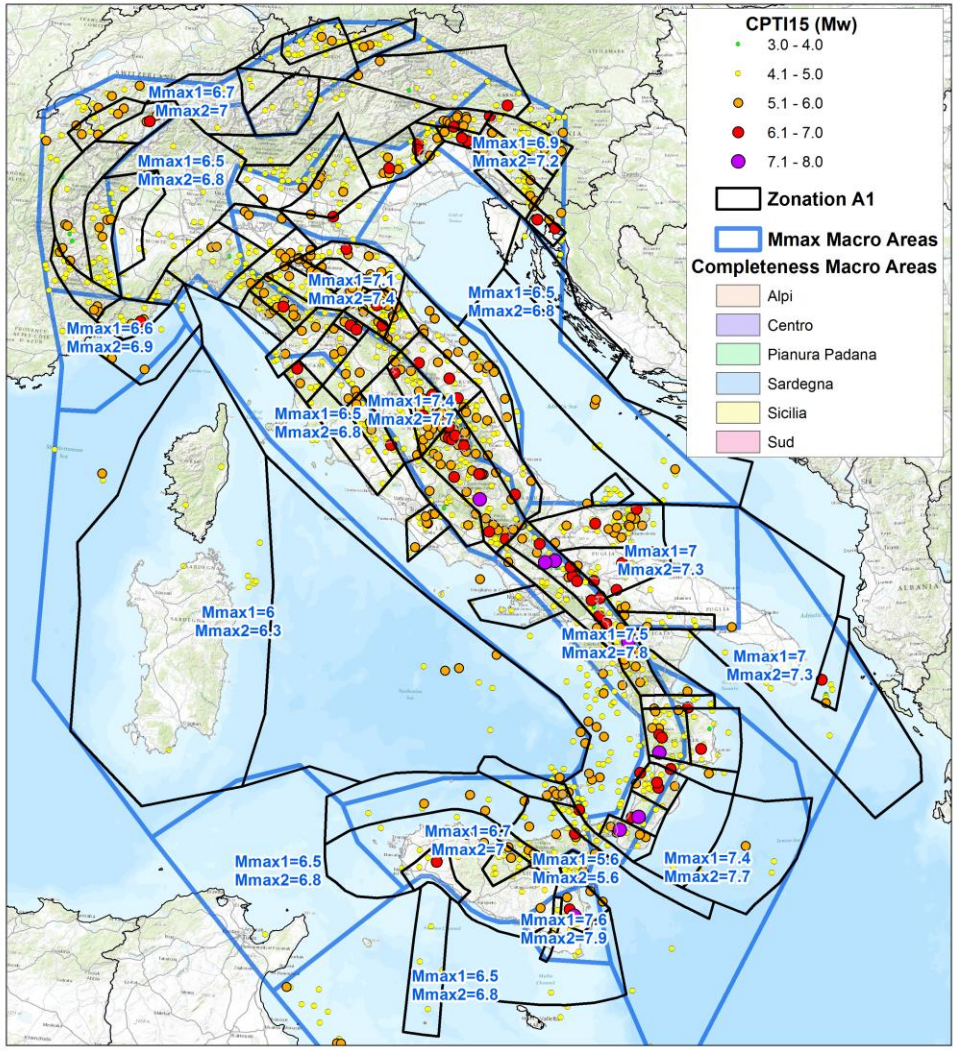
Zonation A1 and earthquakes M>4
(CPTI11 + ISIDE)



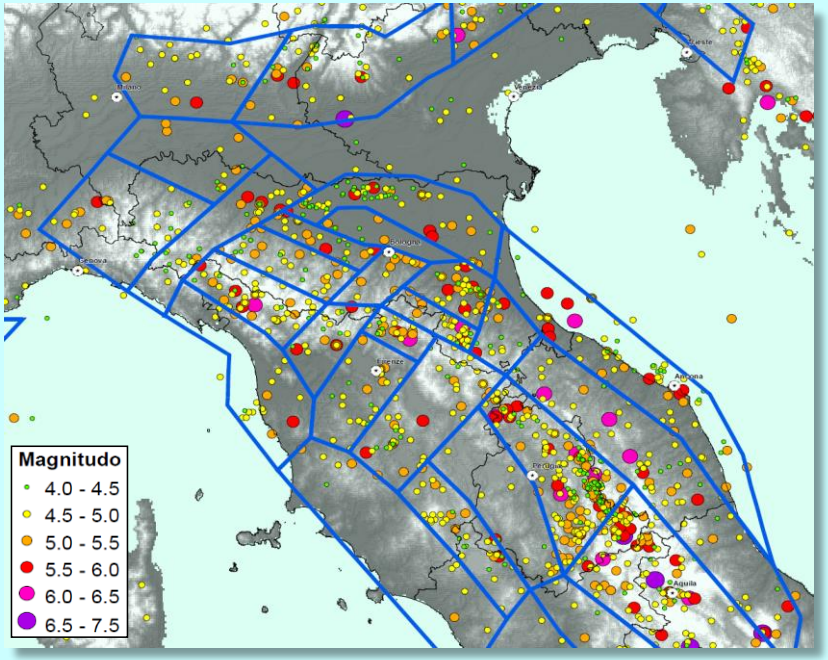
Zonation A1 and earthquakes M>4
(CPTI15)

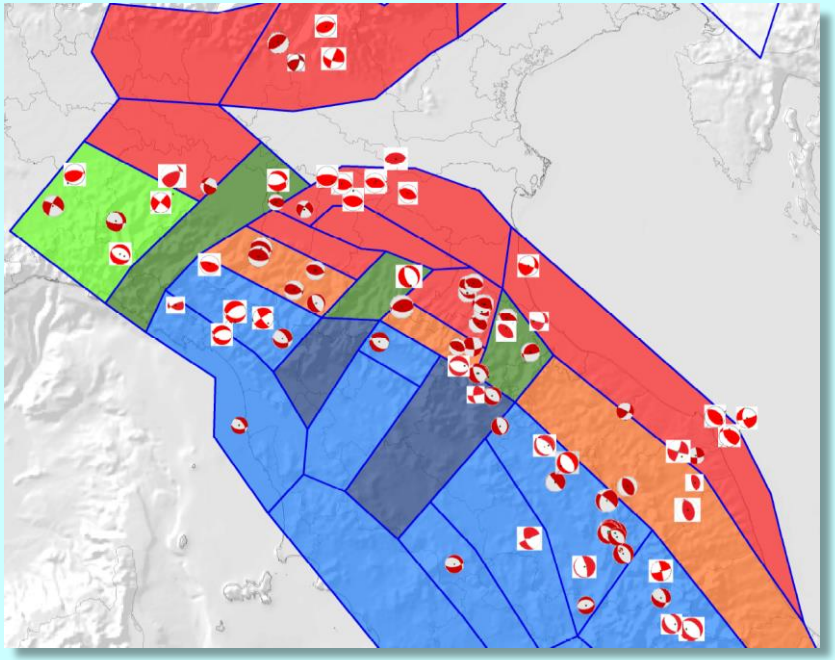


Completeness Macro Areas



Mmax Macro Areas





The new zonation has been defined taking into account the available information on:

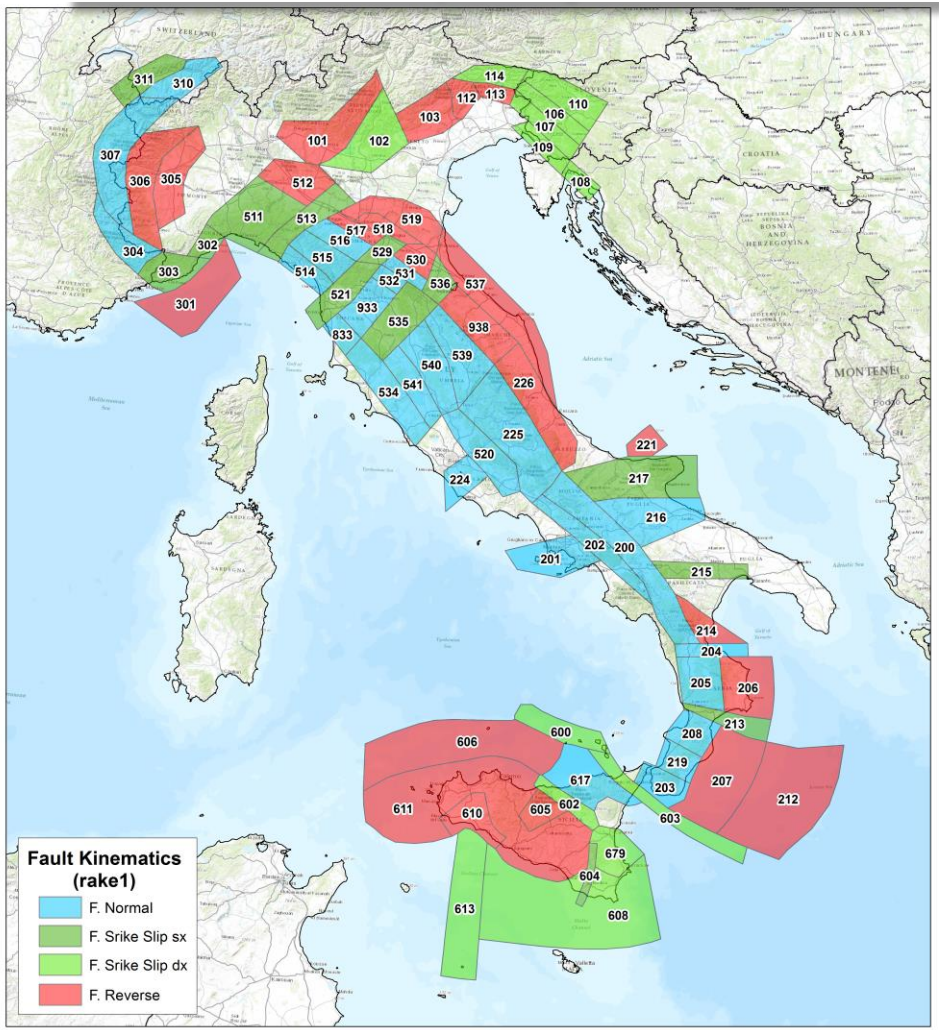
- epicentral distribution of earthquakes from the historical catalogue CPTI15 and regional instrumental bulletins;
- observed and/or estimated maximum magnitude;
- focal mechanisms from European-Mediterranean RCMT catalogue;
- hypocentral depth - geometry, type and kinematics of potentially active or recent (Quaternary) structures identified on the basis of morphological and structural data and integrated with the sources from the database of the Italian seismogenic sources DISS 3.2.0 and the available literature.

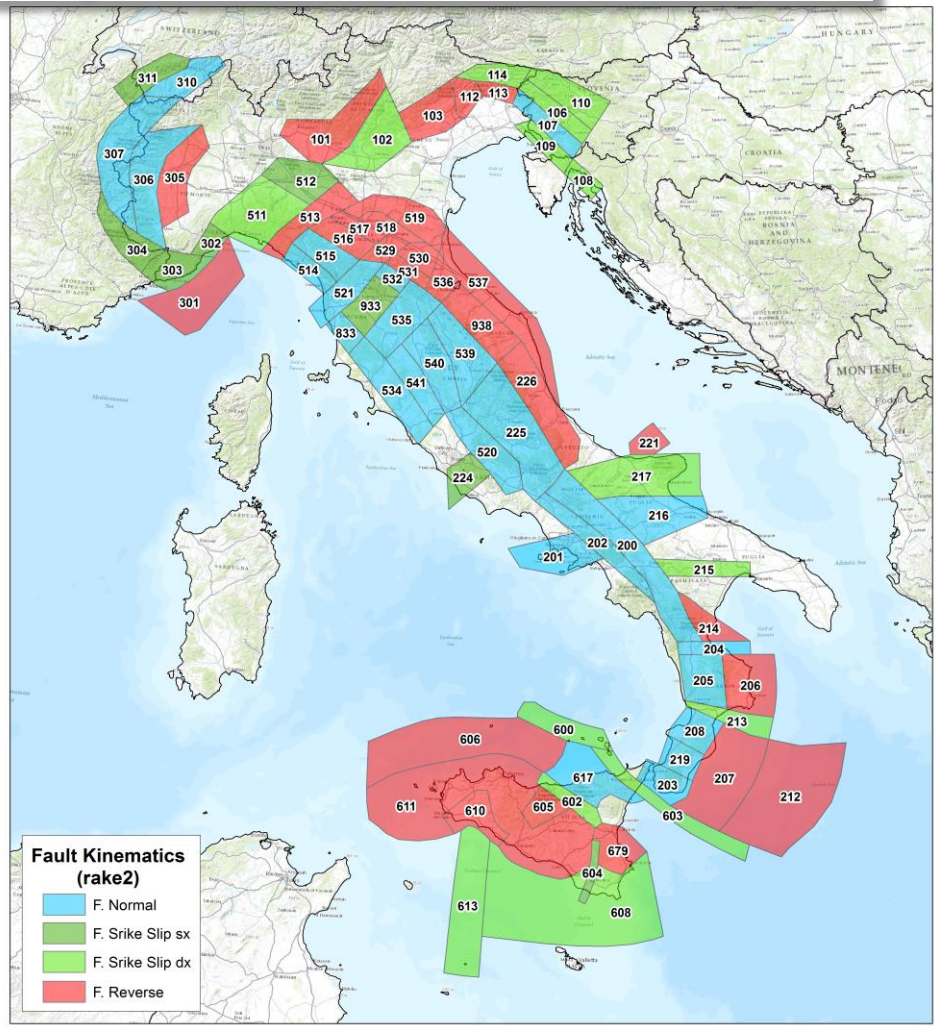
The A1 model zonation takes full advantage of the potential of the software OpenQuake: for each zone, **two rupture mechanisms** have been considered possible (different or not, depending on the information available); in such cases, various estimates of the percentage of occurrence have been assigned.

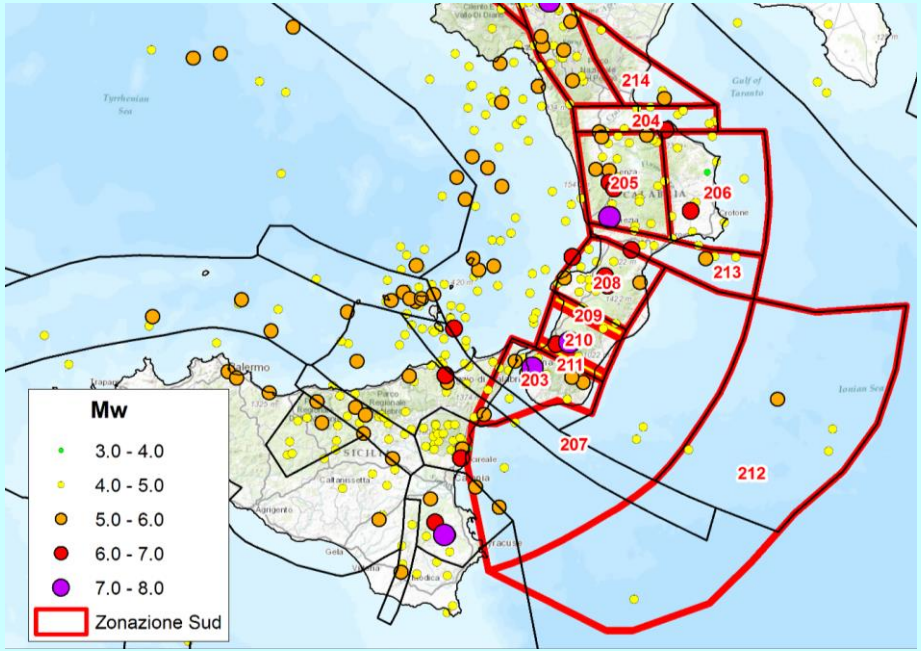
Zone	Geometry	Fault type	Depth (km)	M_{max}
Pieghe Ferraresi	S-SSW/45	Reverse	5-15	6.1
Pieghe Emiliane	S-SSW/45	Reverse(Strike Slip)	5-30	5.5
Nonantola-Budrio	S-SSW/15-30	Reverse	15-35	5.5
Taro-Enza	NE-SW (S/45-60)	Strike Slip(Reverse)	5-30	5.5
Appennino emiliano	N/75 (S/45-60)	Normal(Reverse)	5-10 (10-35)	5.5
Basso Appennino emiliano-margine	S/45-60	Reverse	10-30	6
Reno-Setta	NNE-SSW (S/45-60)	Strike Slip(Reverse)	5-15 (15-35)	5.5
Basso Appennino romagnolo-margine	S/30-45	Reverse	5-35	6.1
Appennino romagnolo	NE/70 (SSW/15-30)	Normal(Reverse)	3-10 (10-25)	6
Savio-Marecchia	NNE-SSW (SSW/30)	Strike Slip(Reverse)	5-15 (15-25)	6
Garfagnana	NE/60-70(60%) SW/60-70(40%) (NE-SW)	Normal (Normal)	5-15 (10-20)	6.5 (5.1)

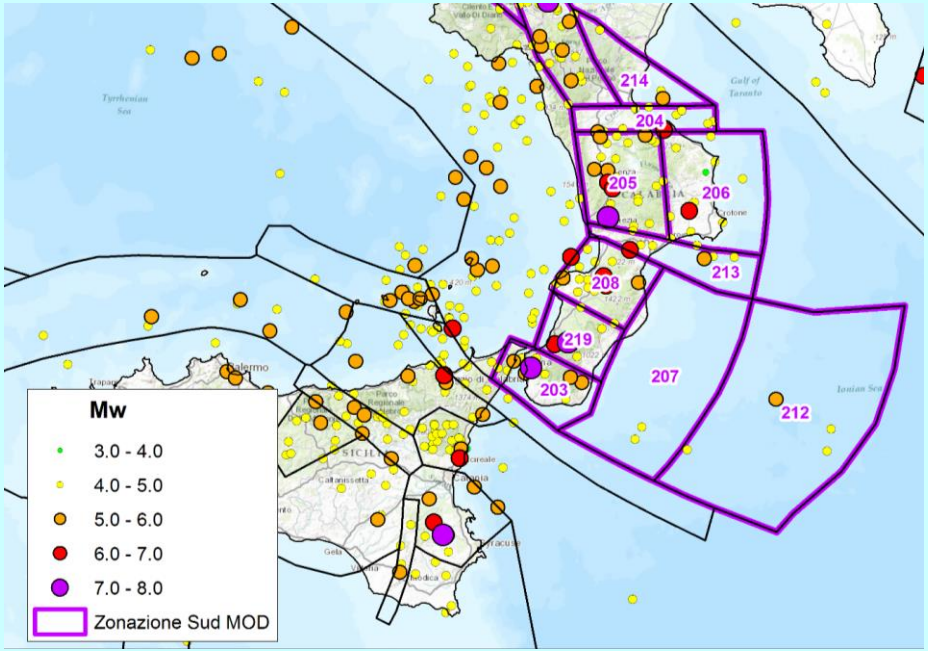
id	name	usd	lsd	strike1	strike2	dip1	dip2	rake1	rake2	npw1	npw2	hd	hdw
519	Pieghe Ferraresi	5	15	90	120	45	45	90	90	0.5	0.5	10	1
512	Pieghe Emiliane	5	30	90	180	45	90	90	0	0.8	0.2	18	1
518	Nonantola-Budrio	15	35	90	120	15	30	90	90	0.5	0.5	23	1
513	Taro-Enza	5	30	225	90	90	53	0	90	0.8	0.2	18	1
516	Appennino emiliano	1	20	270	90	65	30	-90	90	0.8	0.2	8	1
517	Margine emiliano	10	30	90	90	45	60	90	90	0.5	0.5	20	1
529	Reno-Setta	1	35	210	90	90	53	0	90	0.8	0.2	6 25	0.8 0.2
530	Margine romagnolo	5	35	90	90	30	45	90	90	0.5	0.5	6	1
531	Appennino romagnolo	3	10	315	120	65	30	-90	90	0.8	0.2	6	1
536	Savio-Marecchia	1	25	210	120	90	30	0	90	0.8	0.2	6 20	0.8 0.2
515	Garfagnana	1	20	315	135	65	65	-90	-90	0.6	0.4	5 15	0.8 0.2

The A1 model zonation takes full advantage of the potential of the software OpenQuake: for each zone, **two rupture mechanisms** have been considered possible (different or not, depending on the information available); in such cases, various estimates of the percentage of occurrence have been assigned.

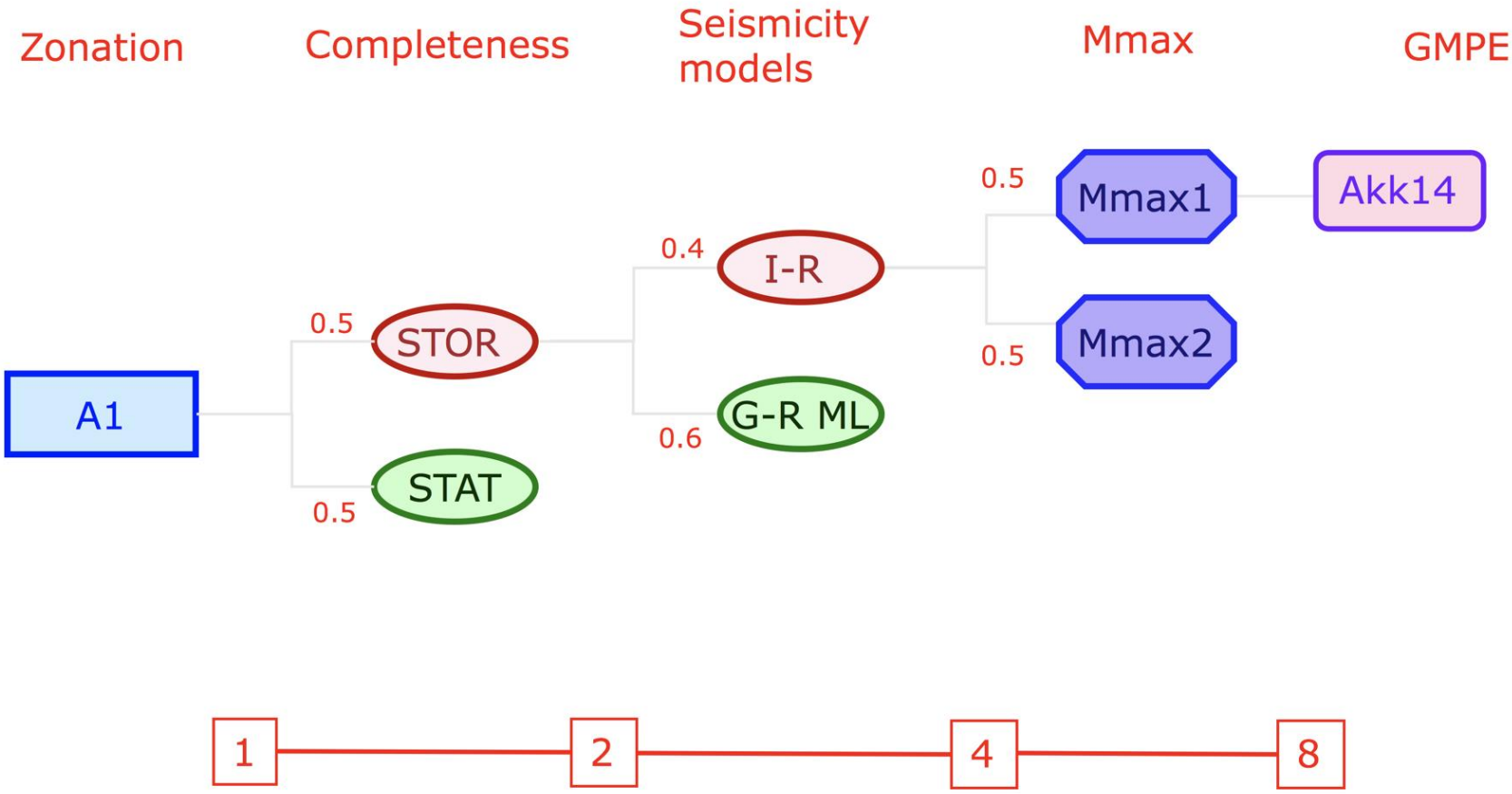






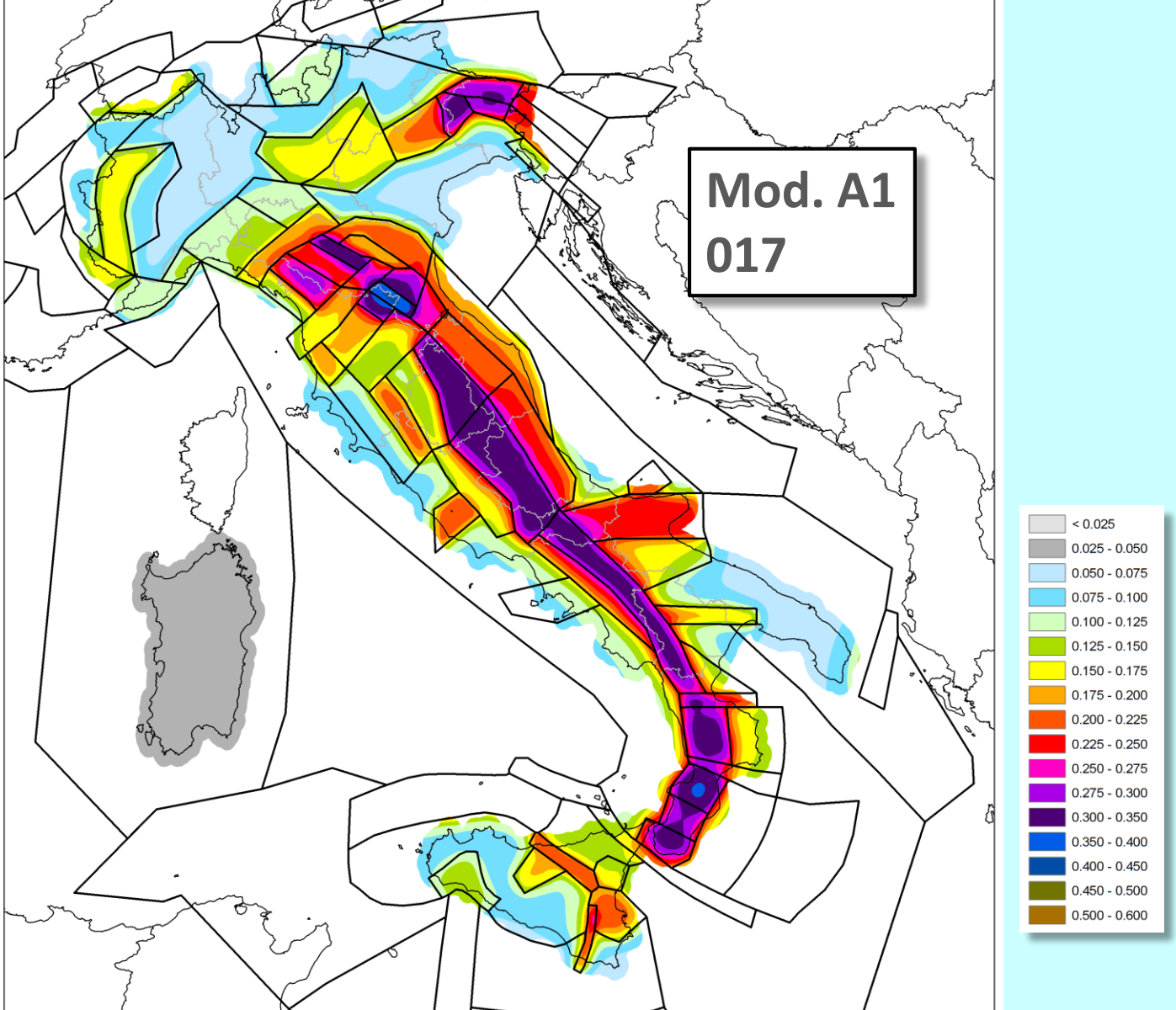


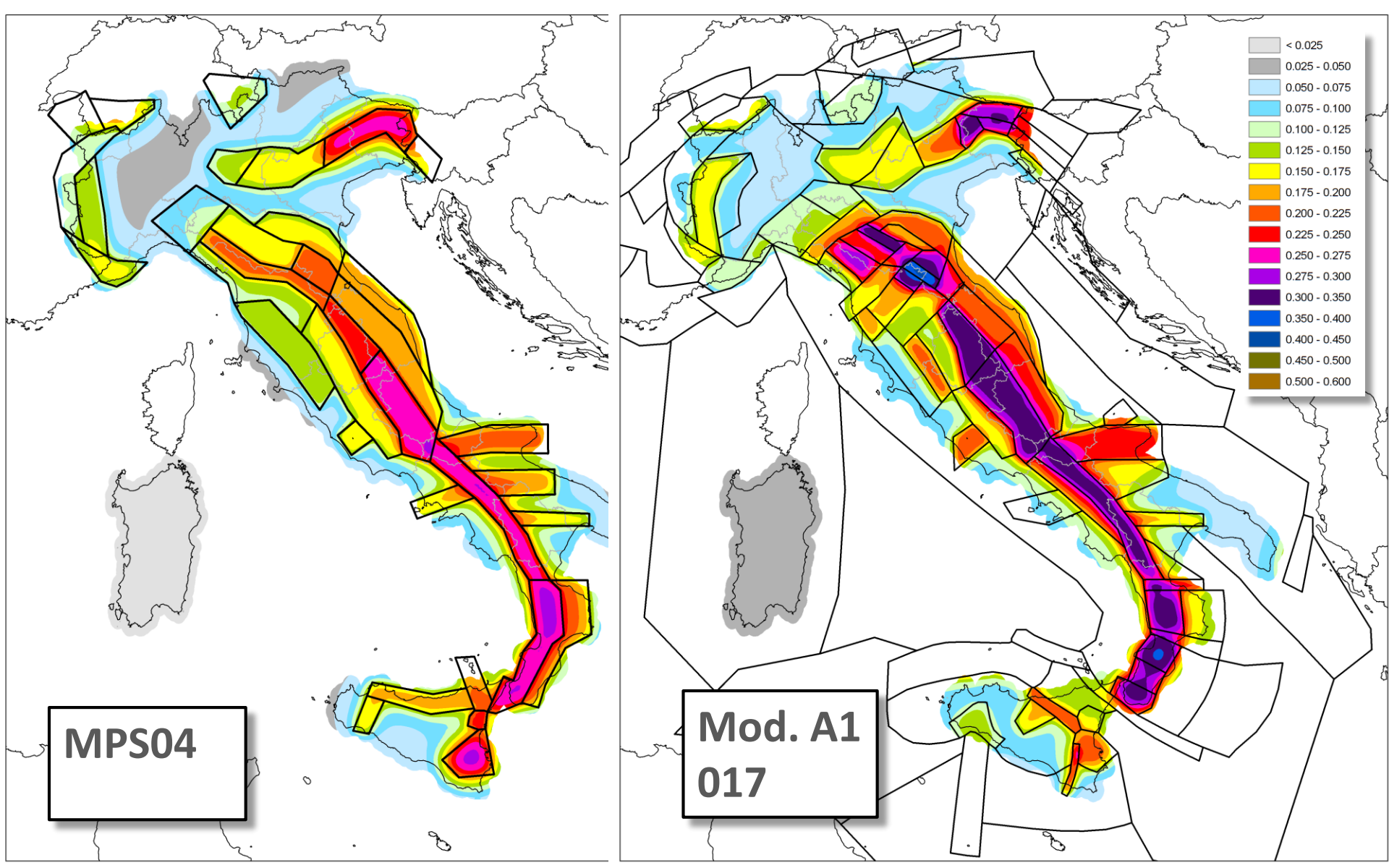
As example we had to change the geometry **of 3 areas in Calabria and 3 in Sicily** as they were empty of earthquake or with unrealistic rates and a and b values of the GR, leading (in Calabria) to anomalous PGA values.



Logic tree

2017


Mod. A1
017
< 0.025
0.025 - 0.050
0.050 - 0.075
0.075 - 0.100
0.100 - 0.125
0.125 - 0.150
0.150 - 0.175
0.175 - 0.200
0.200 - 0.225
0.225 - 0.250
0.250 - 0.275
0.275 - 0.300
0.300 - 0.350
0.350 - 0.400
0.400 - 0.450
0.450 - 0.500
0.500 - 0.600


MPS04
Mod. A1
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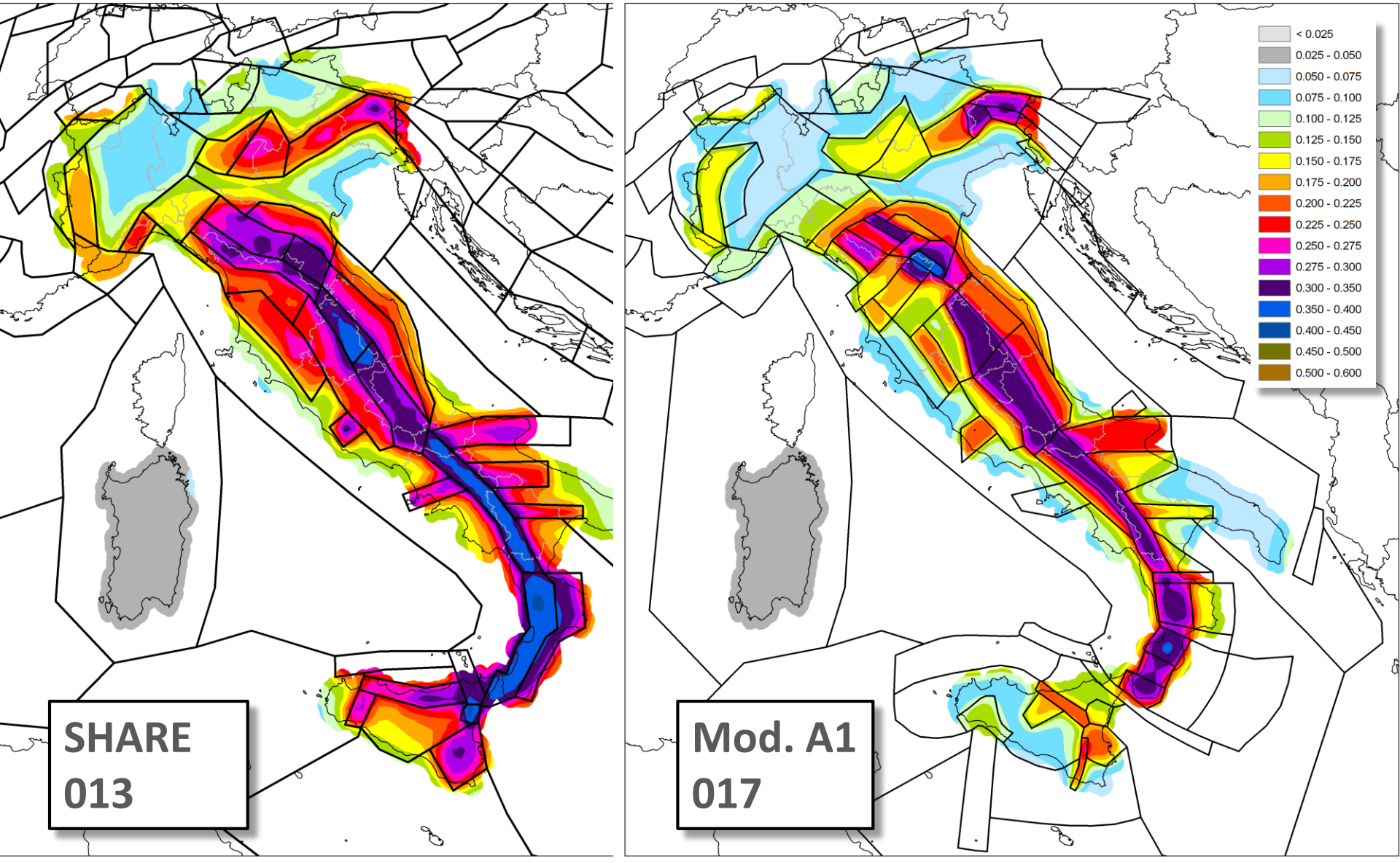
< 0.025
0.025 - 0.050
0.050 - 0.075
0.075 - 0.100
0.100 - 0.125
0.125 - 0.150
0.150 - 0.175
0.175 - 0.200
0.200 - 0.225
0.225 - 0.250
0.250 - 0.275
0.275 - 0.300
0.300 - 0.350
0.350 - 0.400
0.400 - 0.450
0.450 - 0.500
0.500 - 0.600


SHARE
013
Mod. A1
017
< 0.025
0.025 - 0.050
0.050 - 0.075
0.075 - 0.100
0.100 - 0.125
0.125 - 0.150
0.150 - 0.175
0.175 - 0.200
0.200 - 0.225
0.225 - 0.250
0.250 - 0.275
0.275 - 0.300
0.300 - 0.350
0.350 - 0.400
0.400 - 0.450
0.450 - 0.500
0.500 - 0.600

MPS16 Project
Model A1

OGS

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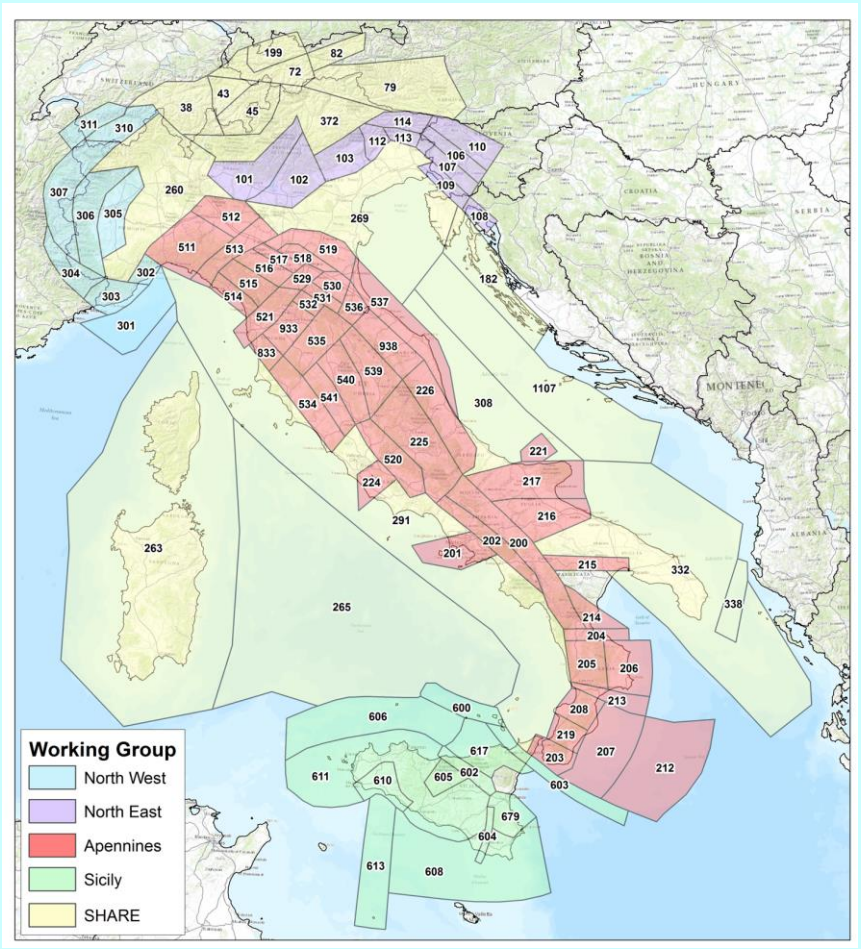

Grazie per l'attenzione