High resolution seismicity relocation and implications on the seismogenesis at the junction between the southeastern Alps and external Dinarides

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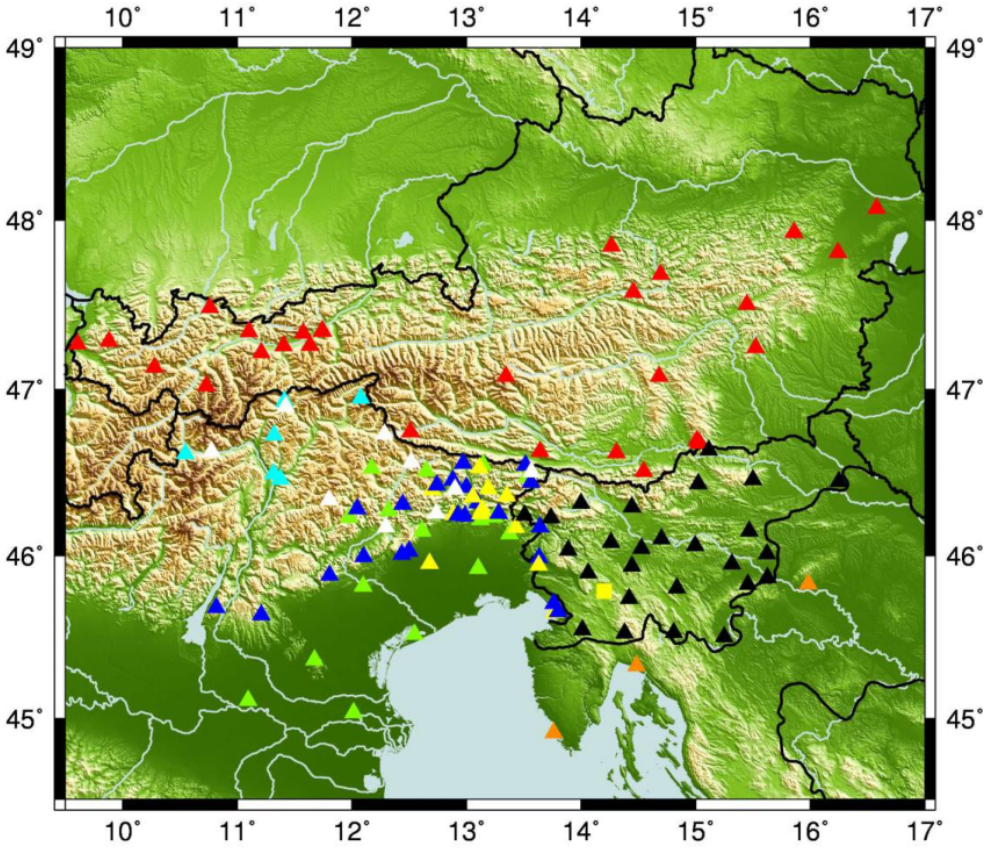
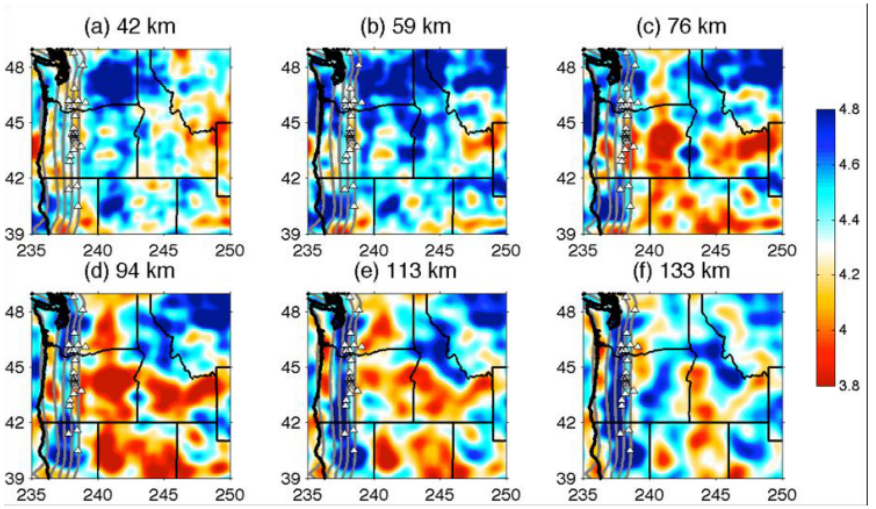
Central and Eastern European Earthquake Research Network – CE^{3}RN



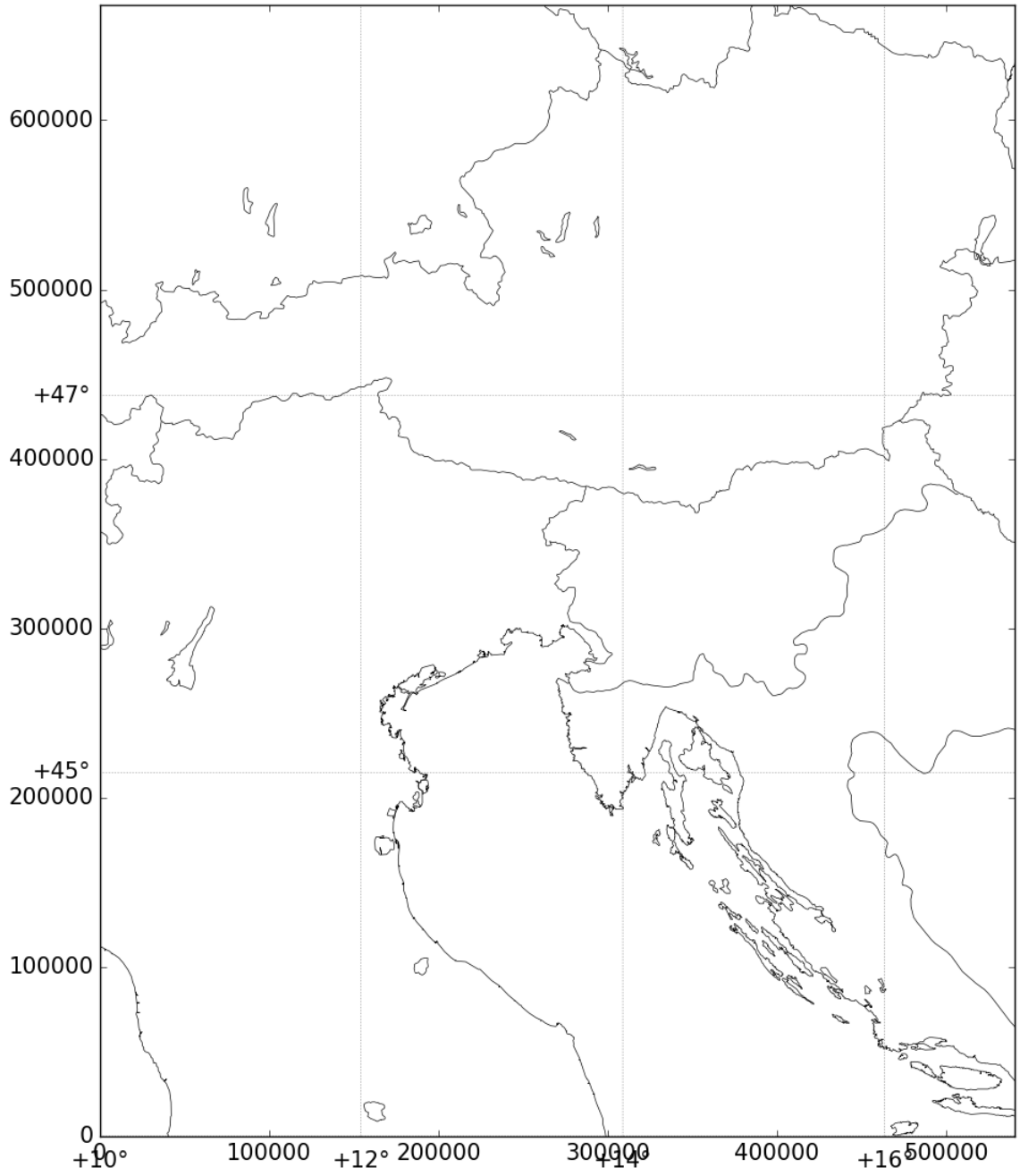
- FRIULI VENEZIA GIULIA ACCELEROMETRIC NETWORK (DMG)
- NE ITALY BROADBAND NETWORK (OGS/DMG)
- SEISMIC NETWORK OF THE REPUBLIC OF SLOVENIA (ARSO)
- SEISMIC NETWORK OF AUSTRIA (ZAMG)
- SEISMIC NETWORK OF CROATIA (UNIV. ZAGREB)
- FRIULI VENETO SP NETWORK (OGS)
- SOUTH TYROL BB NETWORK (PROV. BZ)
- HAREIA PROJECT ACCELEROMETRIC STATIONS

Good station coverage →
large datasets, good catalogue locations

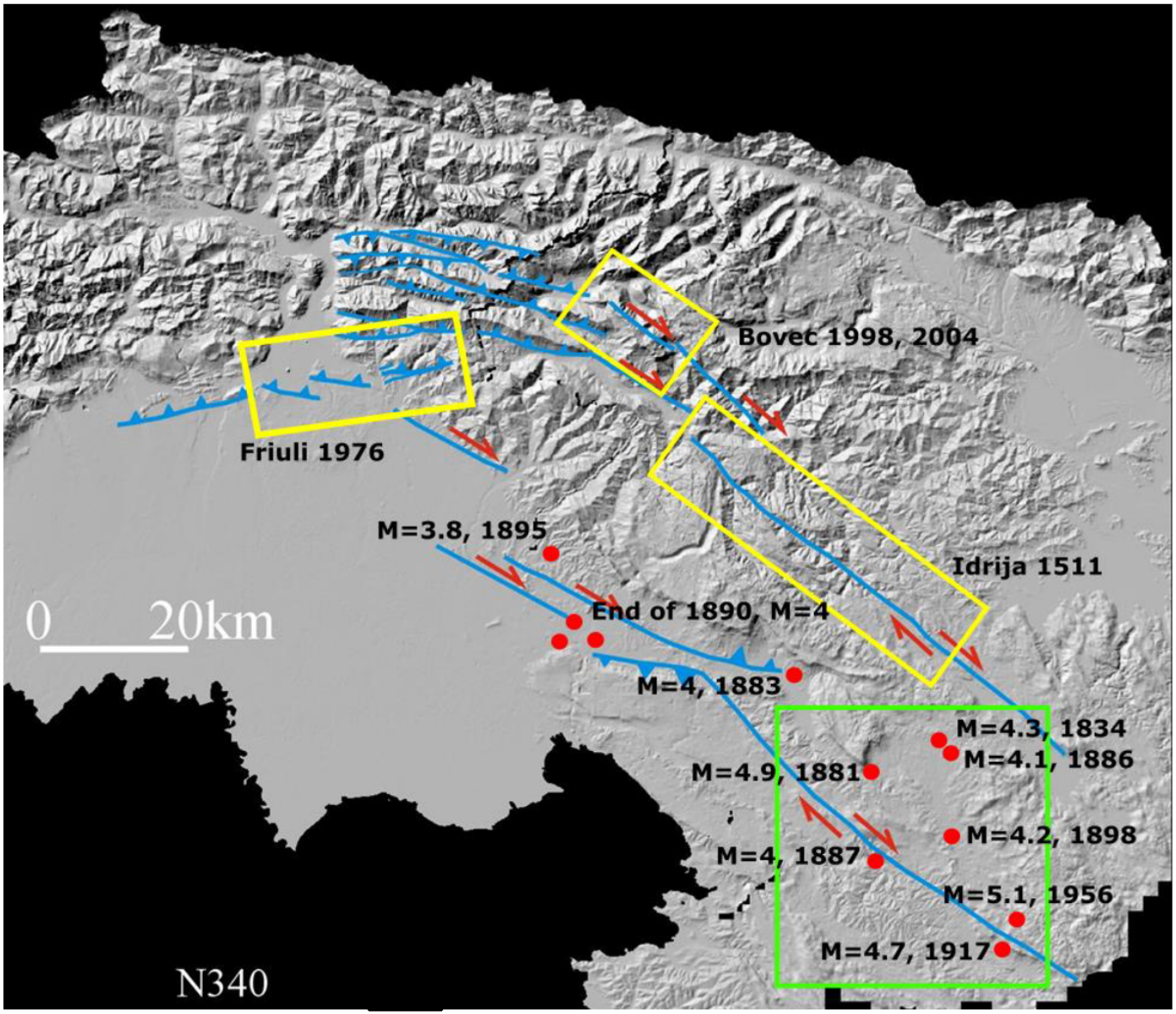
(Not actual model)



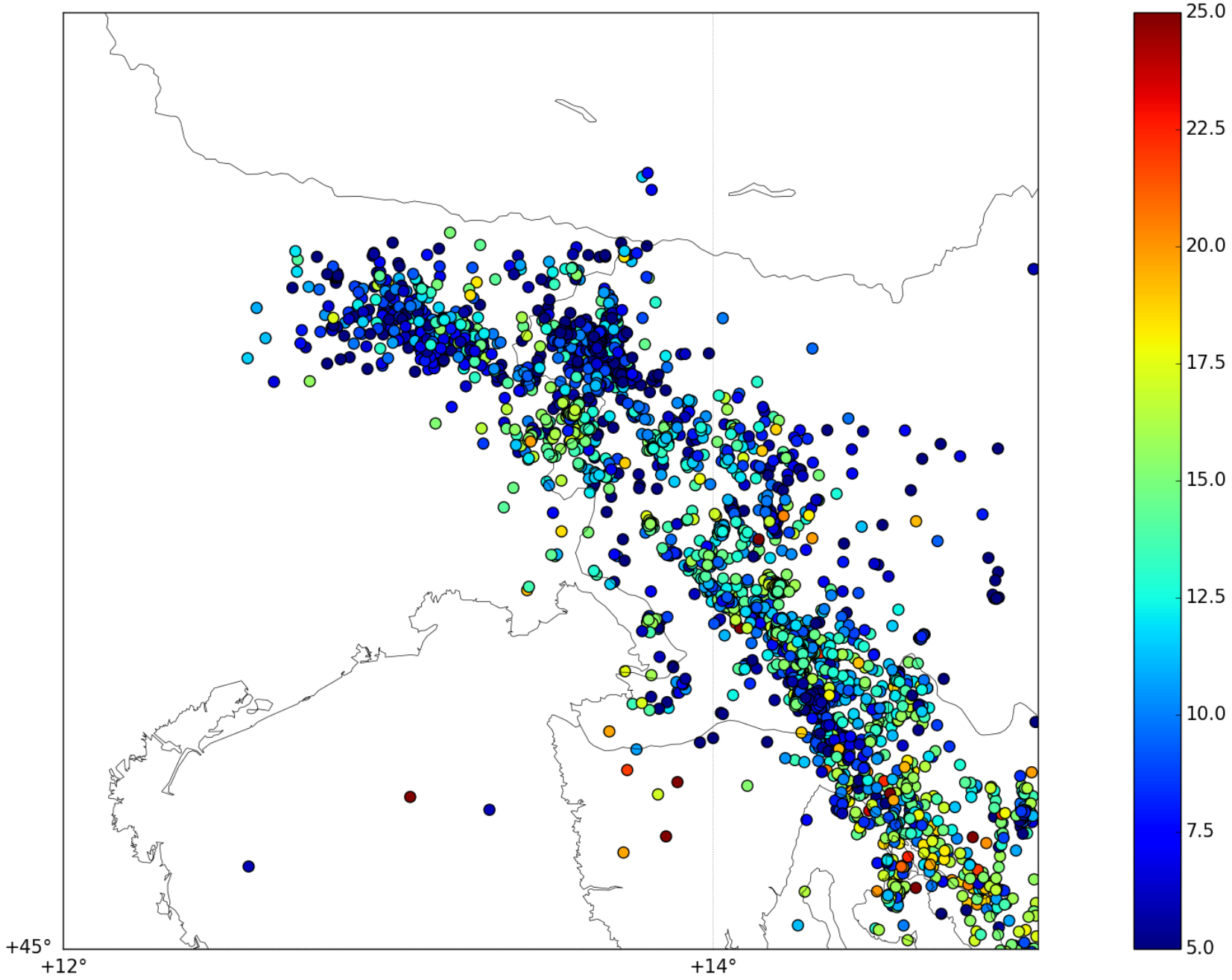
New 3d velocity model, used for high resolution double differential earthquake relocation (Guidarelli et al., 2015)

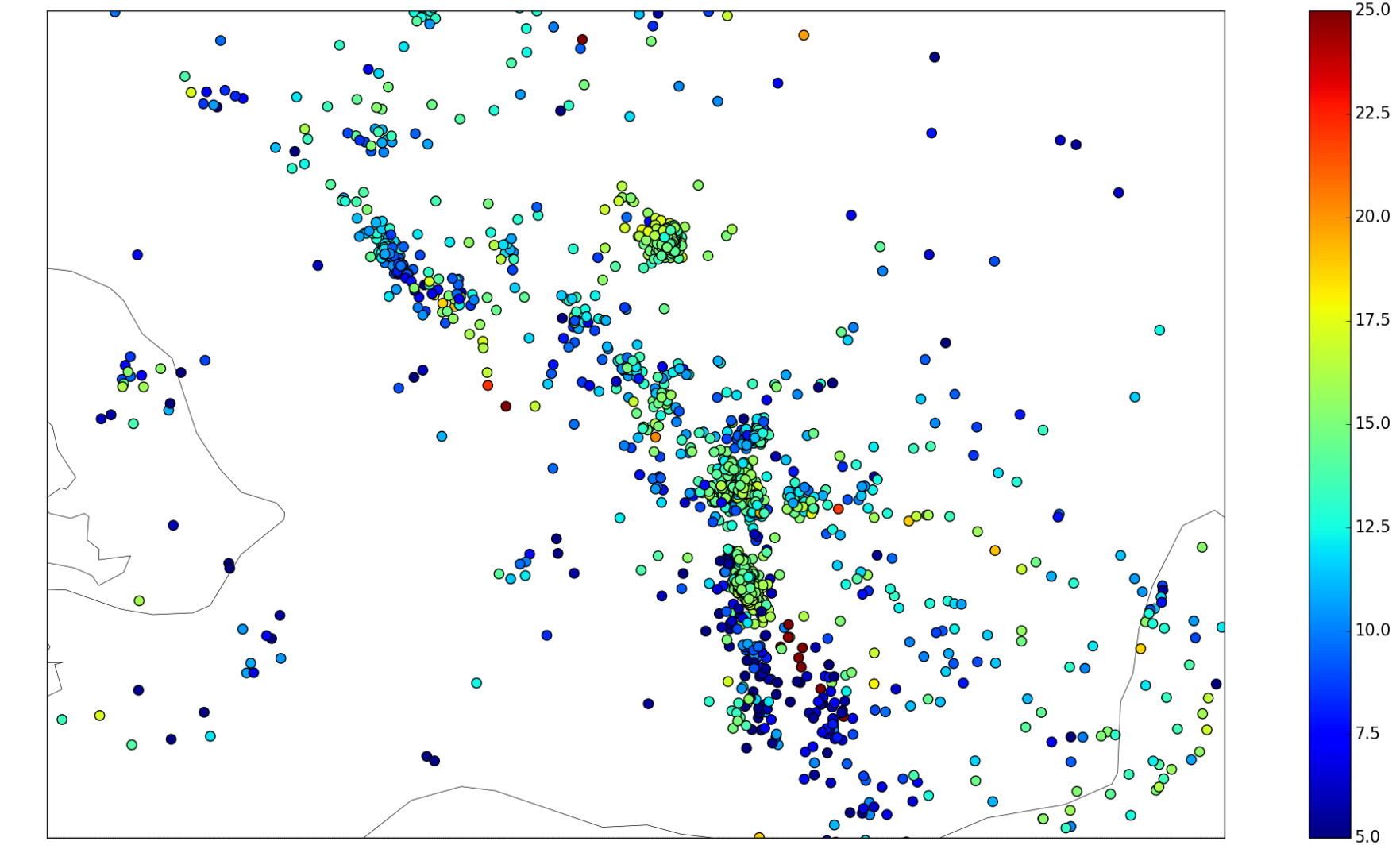

600000
500000
+47°
400000
300000
+45°
200000
100000
0
+10°
100000
+12°
200000
300000
+14°
400000
+16°
500000

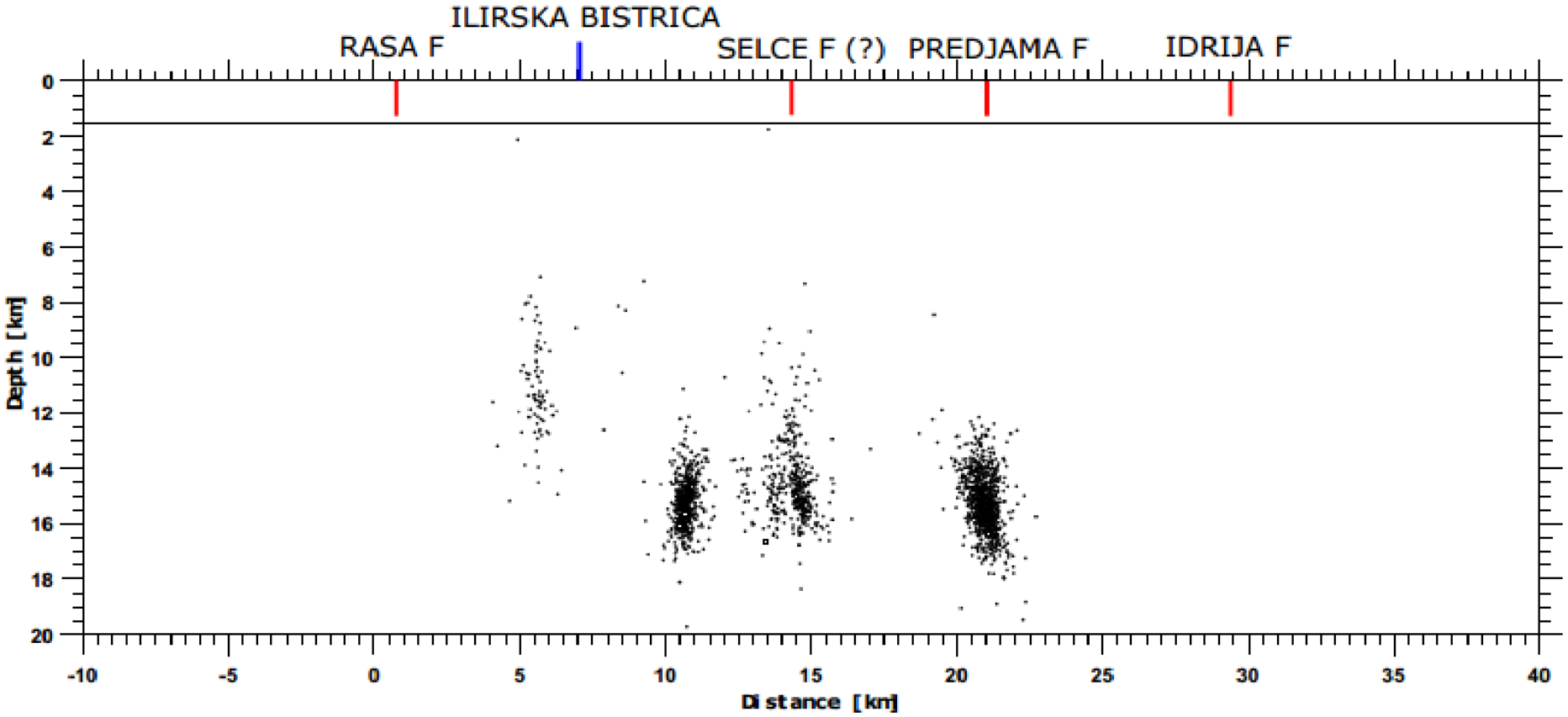
Map of active faults and main earthquakes - Aoudia, 1998



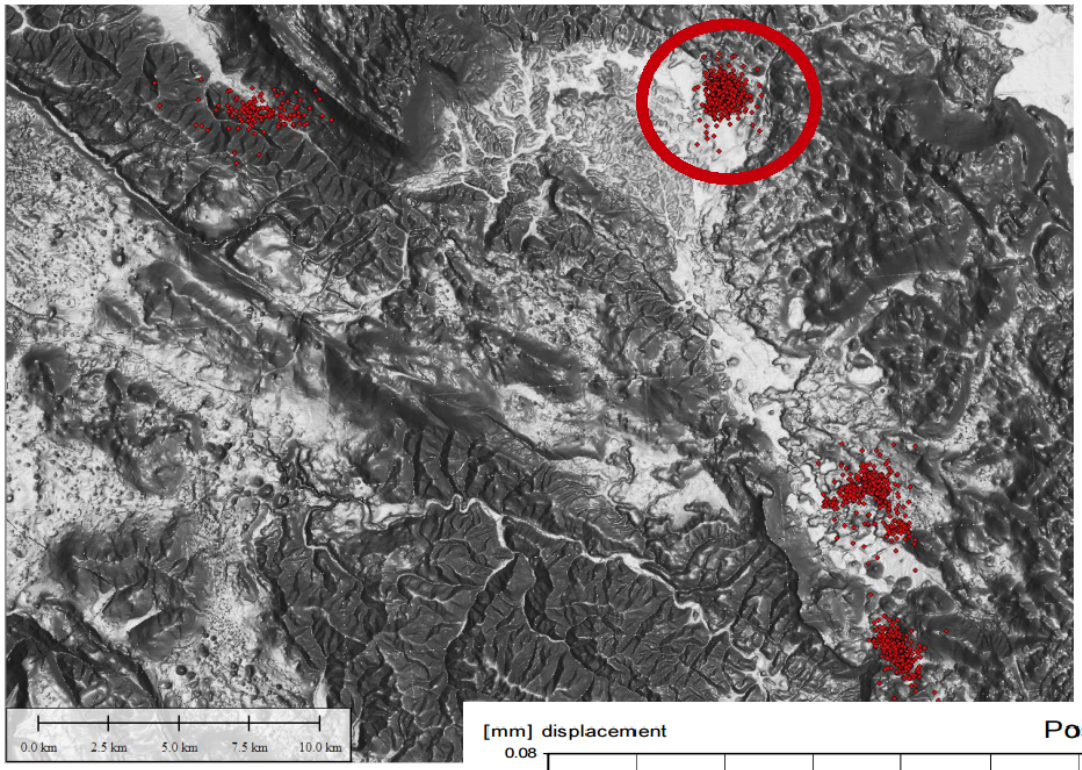
Historical seismicity from AHEAD Working Group. AHEAD, the European Archive of Historical Earthquake Data.
1976 Friuli earthquake, Aoudia et al., GRL- 2000
1998 Bovec earthquake,Bajc, Aoudia, GRL- 2001
1511 Idrija earthquake, Fitzko, Aoudia, Tectonics- 2005


+45°
+12°
+14°
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0

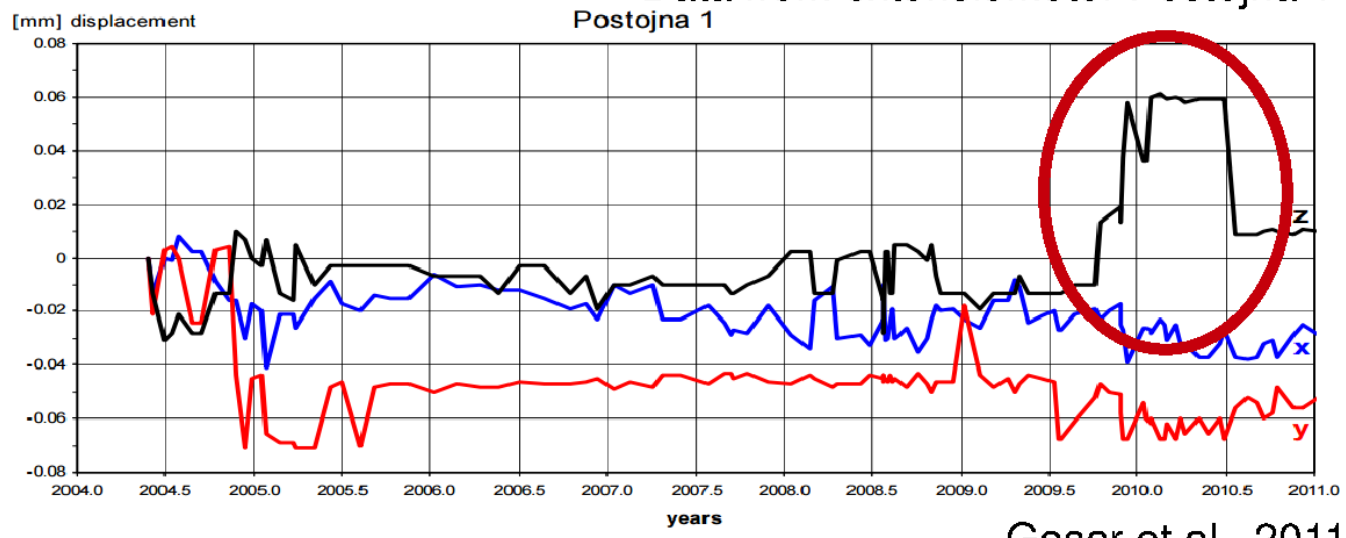

25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
+13.7423°


ILIRSKA BISTRICA
RASA F
SELCE F (?)
PREDJAMA F
IDRIJA F
Depth [km]
Distance [km]

So, what is the physics behind the swarms and mainshocks here?

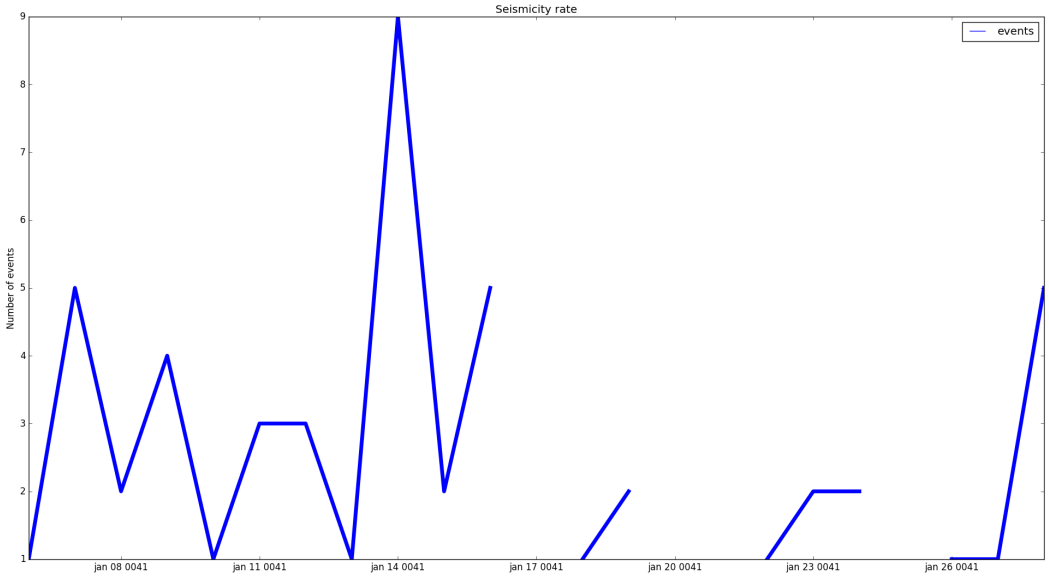


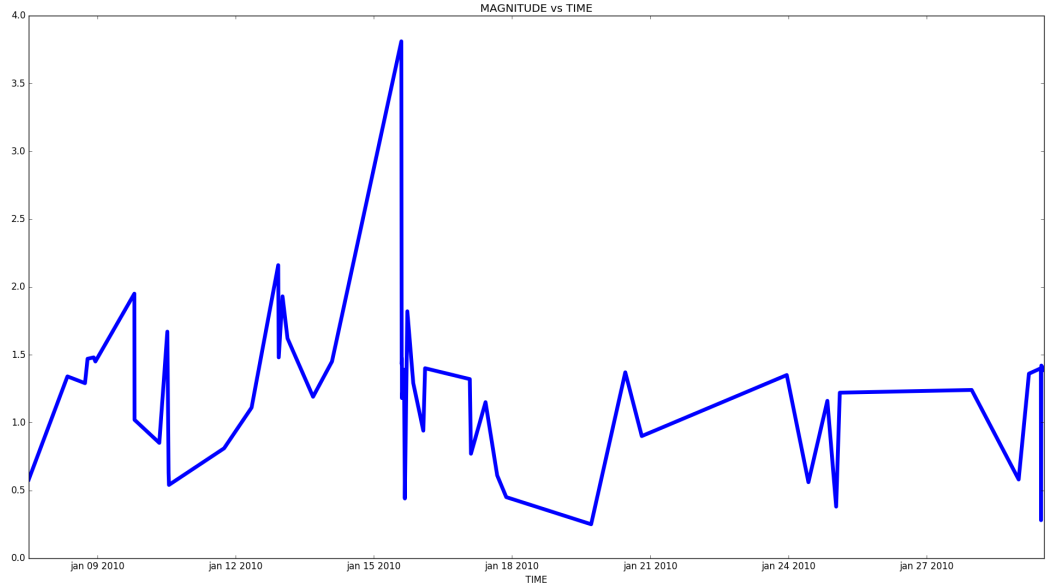
Data from extensiometer Postojna 1



Continuous GPS!

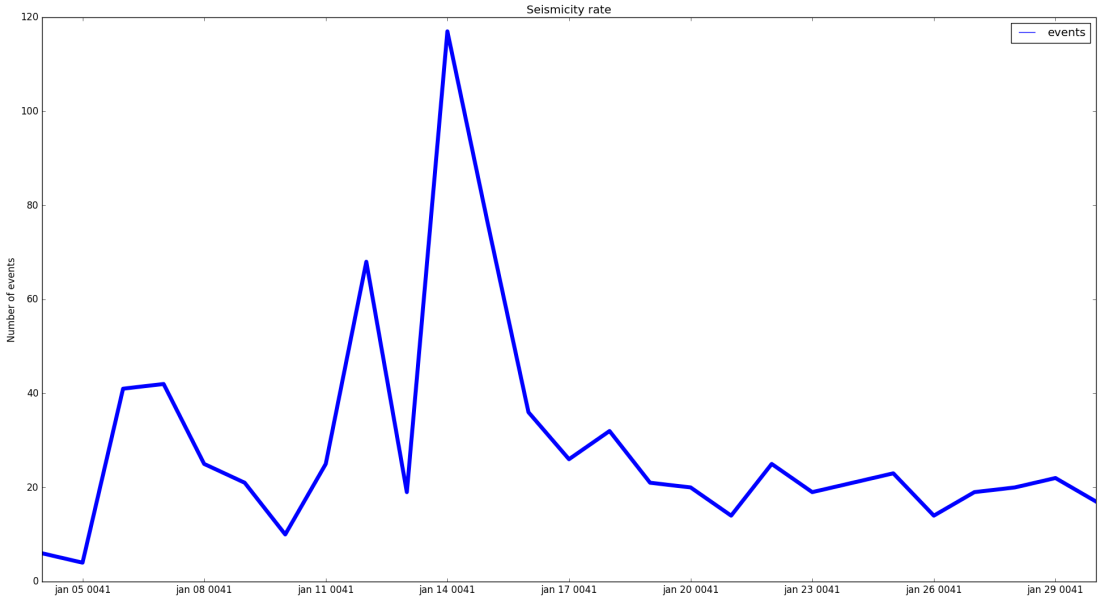
Gosar et al., 2011

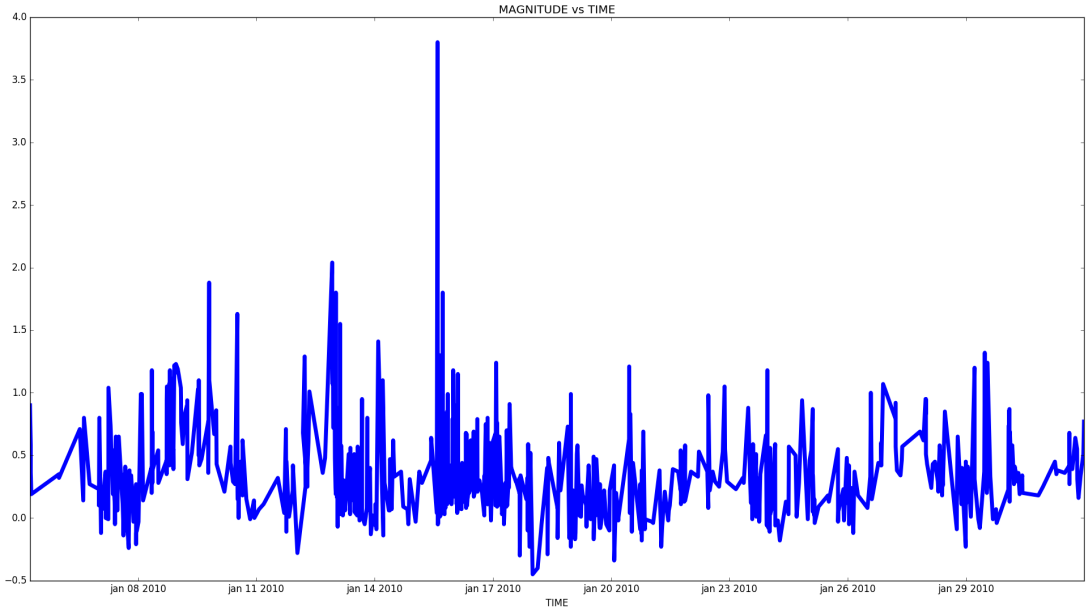




AUTOMATIC detections:

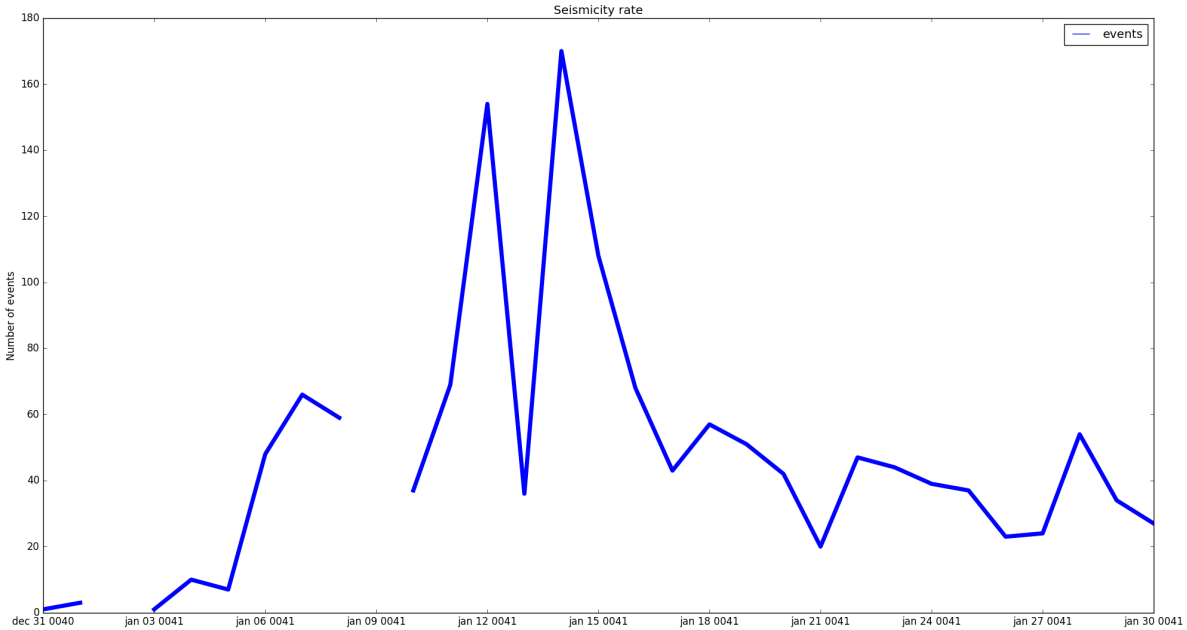
January 2010:
51 events
Mag min 0.5
Mag max 3.8





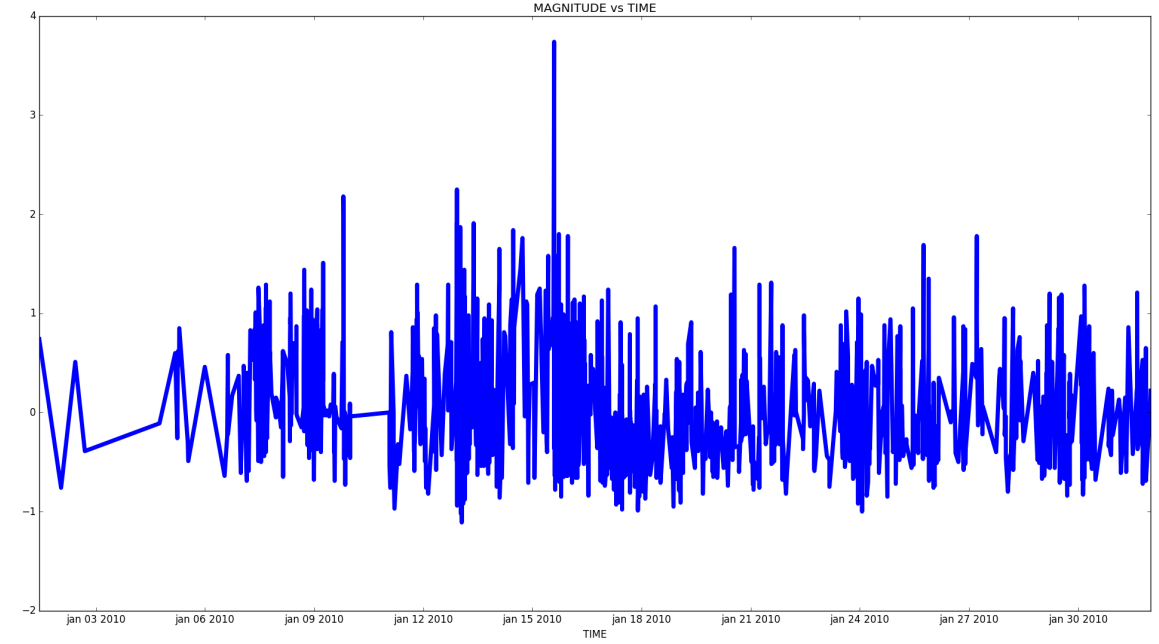
MANUAL relocations:

January 2010:
783 events
Mag min - 0.45
Mag max 3.8



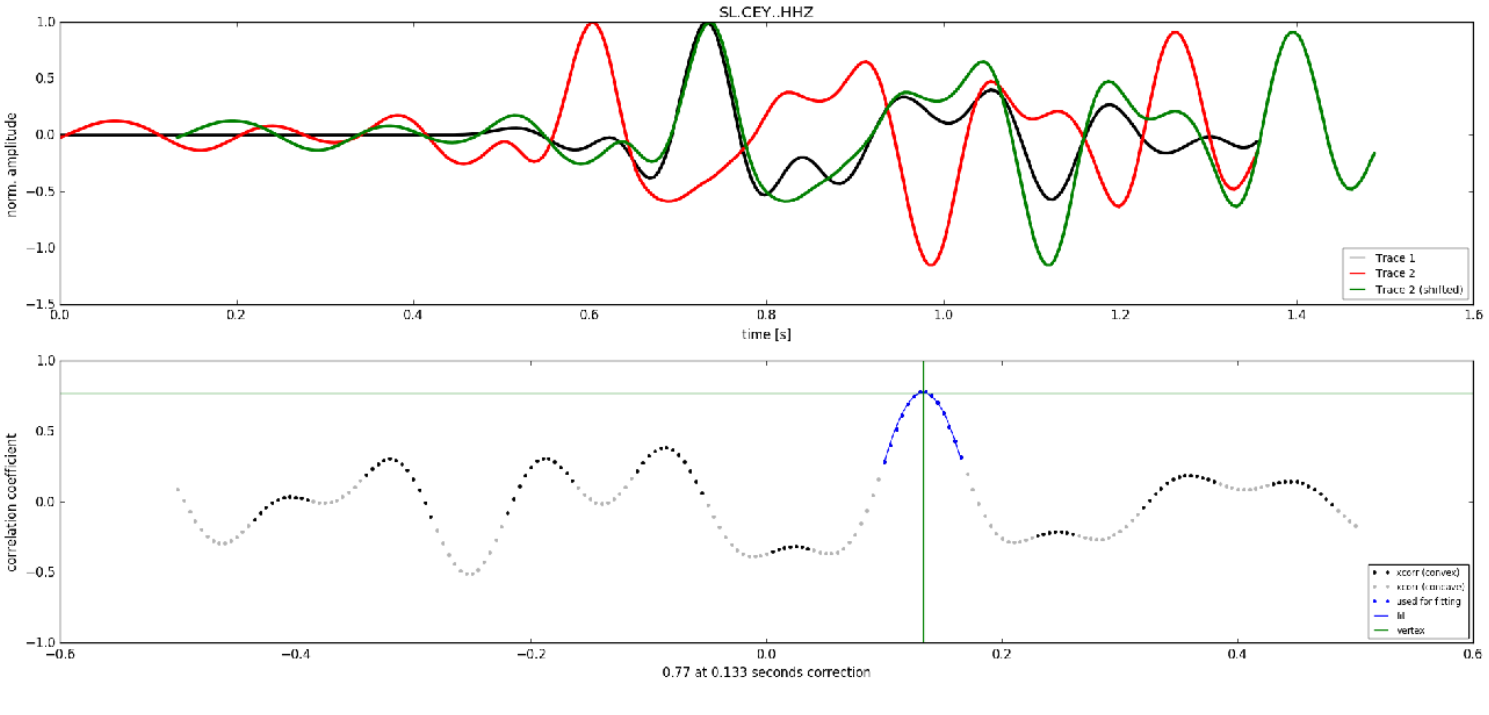
TEMPLATE relocations:

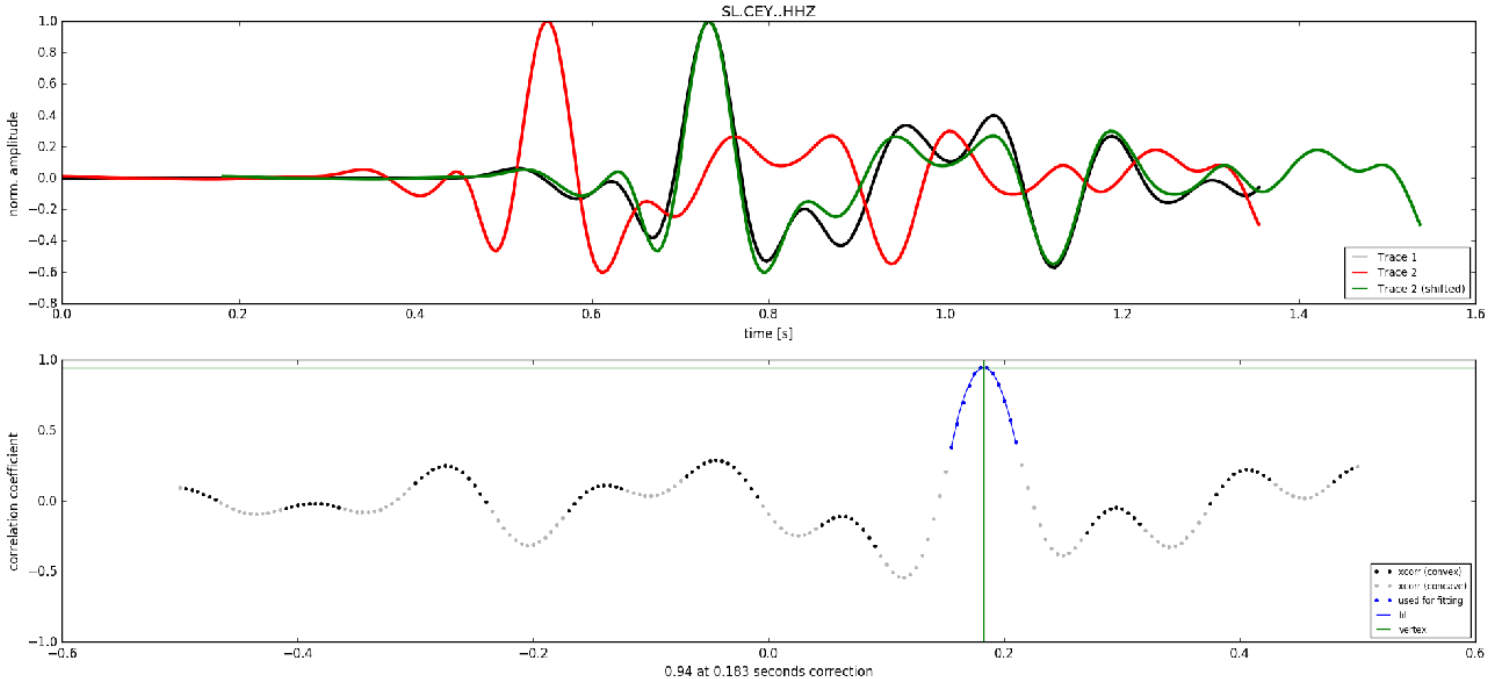
January 2010:
1379 events
Mag min – 1.0
Mag max 3.8



Codes written by Alessandro Vuan, OGS

In testing, Obspy


SL.CEY..HHZ
norm. amplitude
time [s]
Trace 1
Trace 2
Trace 2 (shifted)
correlation coefficient
xcorr (convex)
xcorr (concave)
used for fitting
ml
vertex
0.77 at 0.133 seconds correction


SL.CEY..HHZ
norm. amplitude
time [s]
Trace 1
Trace 2
Trace 2 (shifted)
correlation coefficient
xcorr (convex)
xcorr (concave)
used for fitting
ml
vertex
0.94 at 0.183 seconds correction