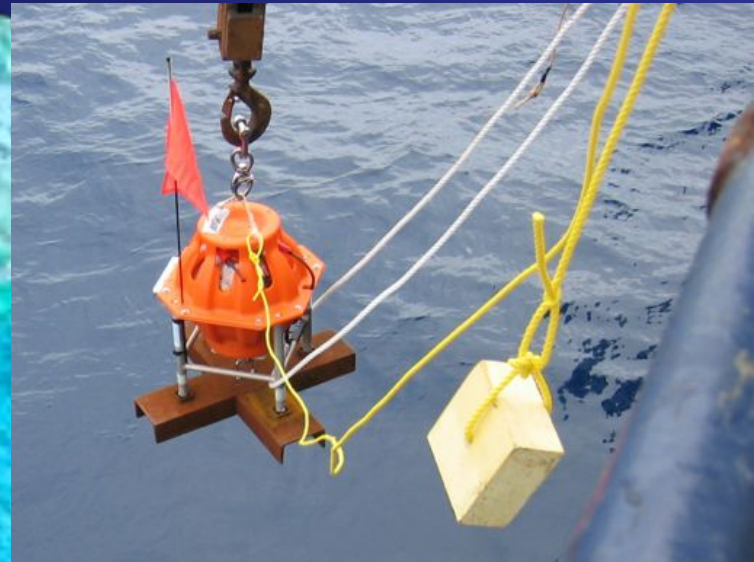
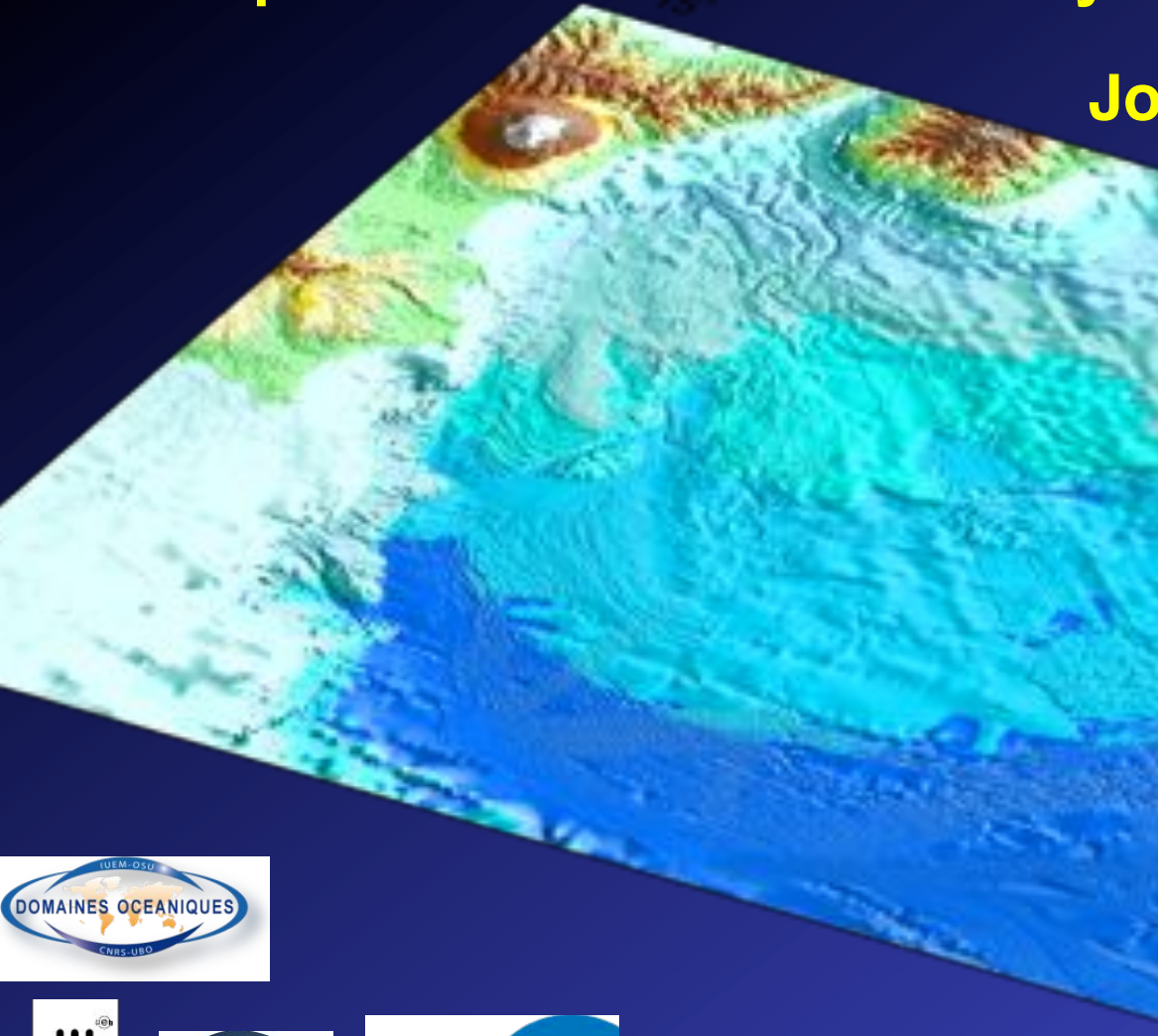


DIONYSUS project:

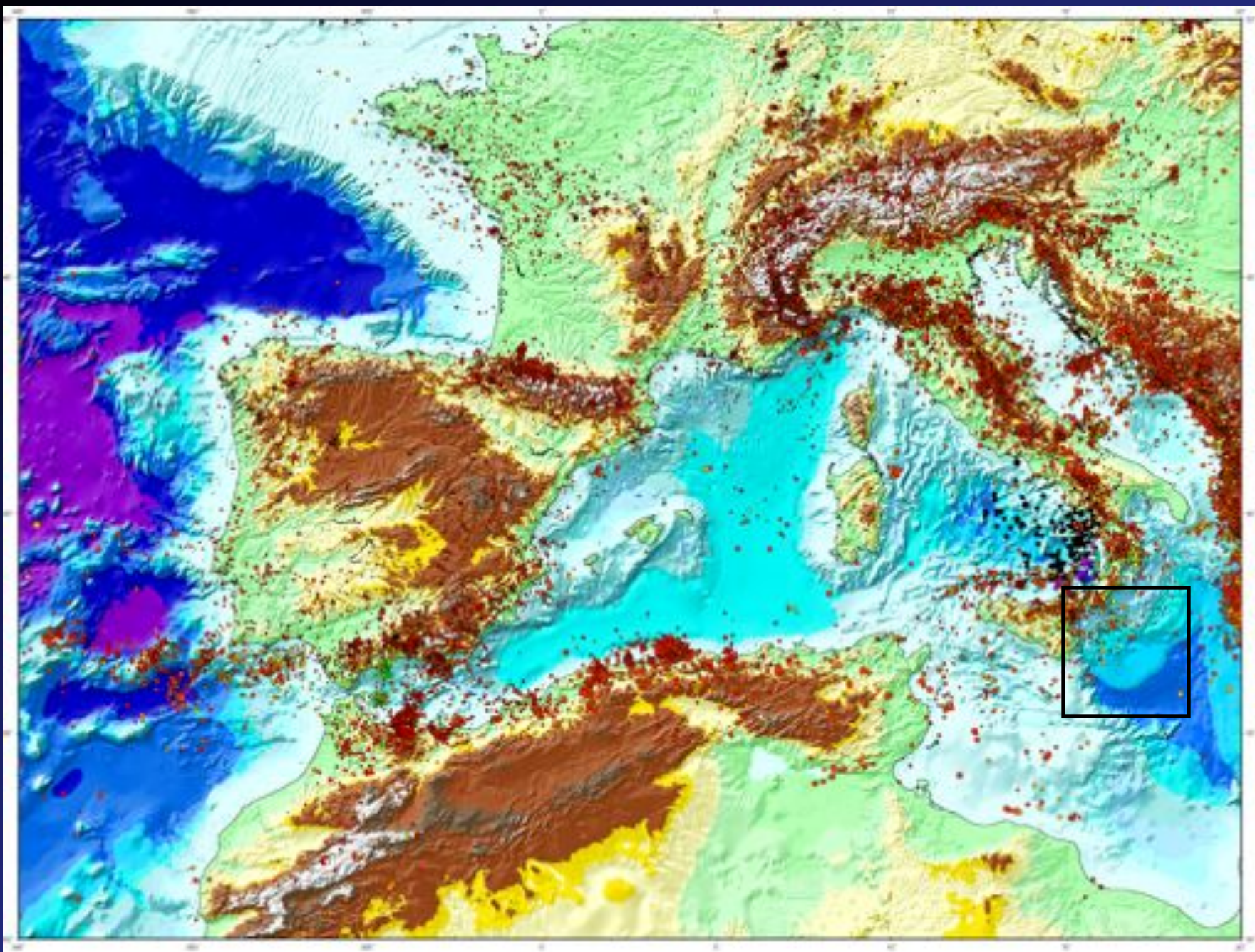
Deep structure of the East Sicily / Calabria margin

Journée OBS 23 mai 2014



M.-A. Gutscher (CNRS/ Univ. Brest)
F. Klingelhoefer (Ifremer)
H. Kopp, D. Klaeschen (Geomar, Kiel)

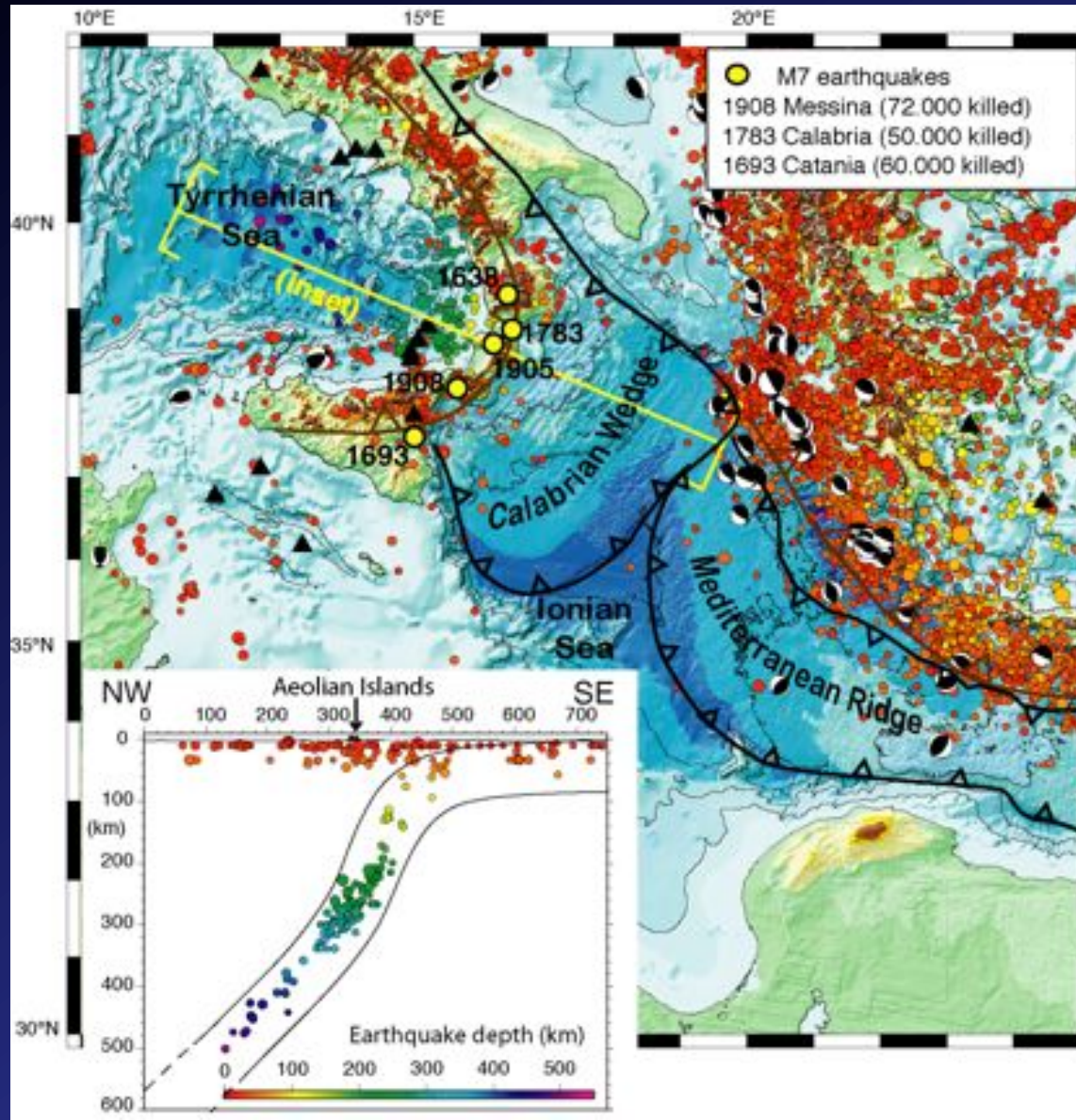




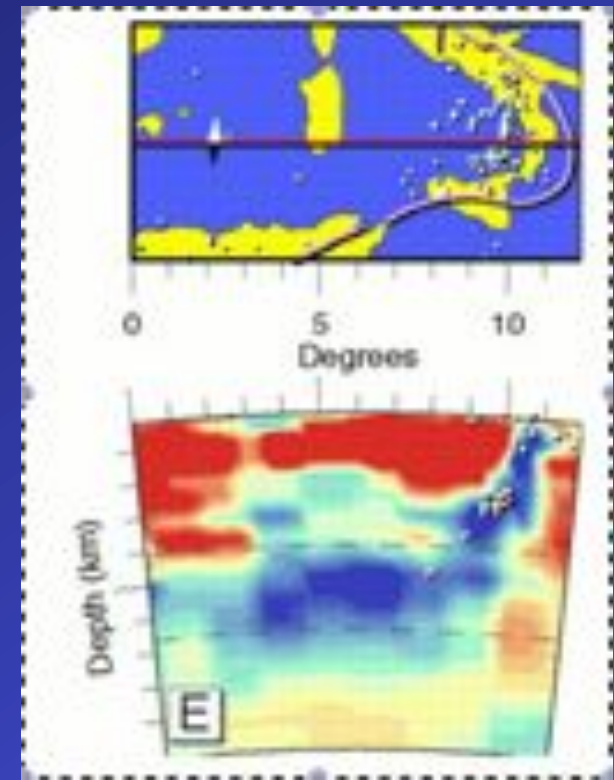
Calabria / E Sicily :

- Strong historical seismicity

- NW dipping subduction (WBZ >500 km)
- active volcanic arc (Aeolian islands)
- no shallow dipping thrust earthquakes



Is subduction still active?
(Could it generate magn. 8
megathrust earthquakes?)

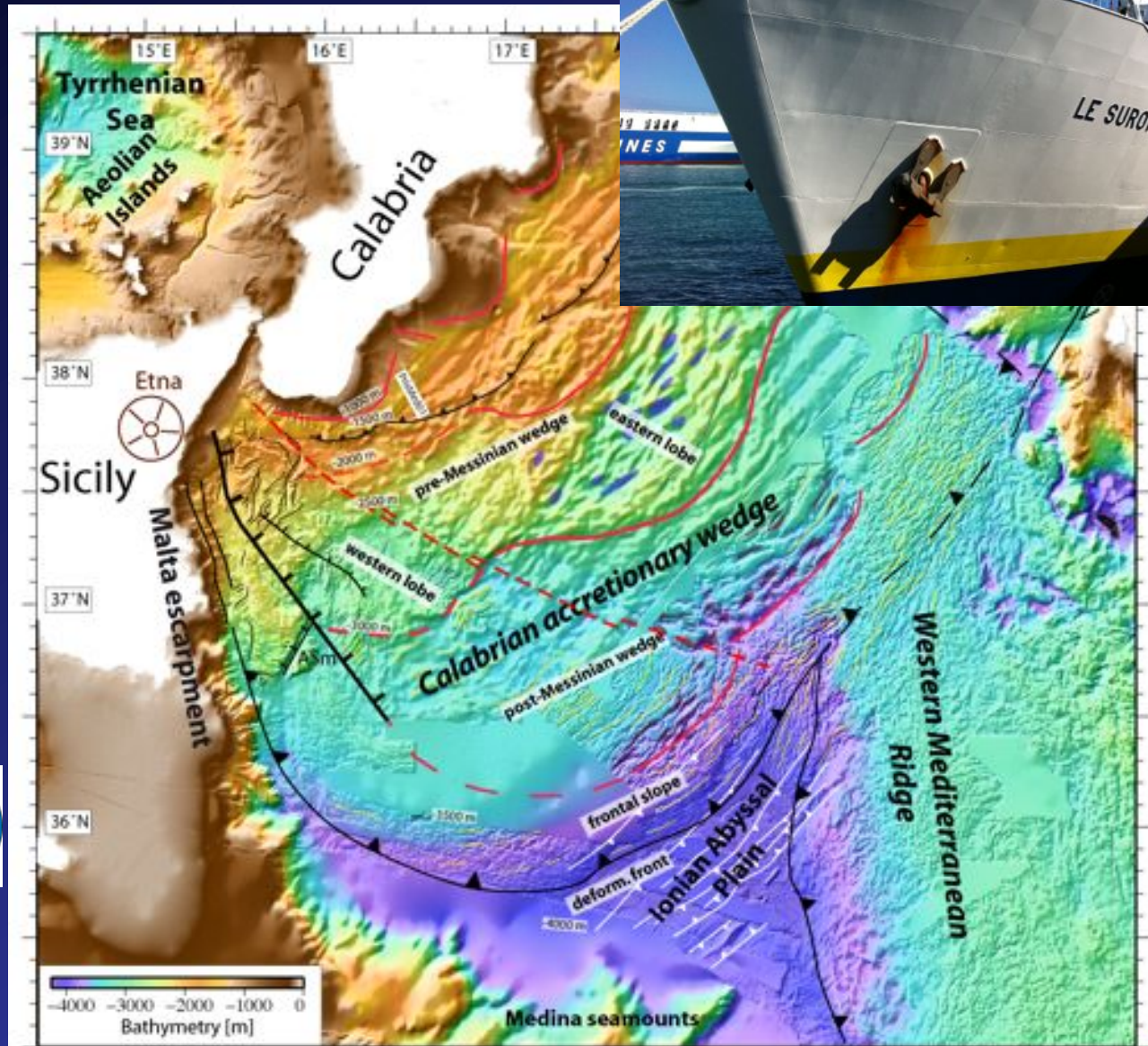


CIRCEE survey R/V Le Suroit

2 - 24 October 2013

Objectives :

- Active faults, sources of the 1169, 1693 events
- Paleoseismology, recurrence interval earthquakes & tsunamis by dating turbidites



Ifremer

Geo
AZUR
TERRE - Océan - Espace

Géosciences
Montpellier



L-UNIVERSITÀ TA' MALTA
UNIVERSITY OF MALTA



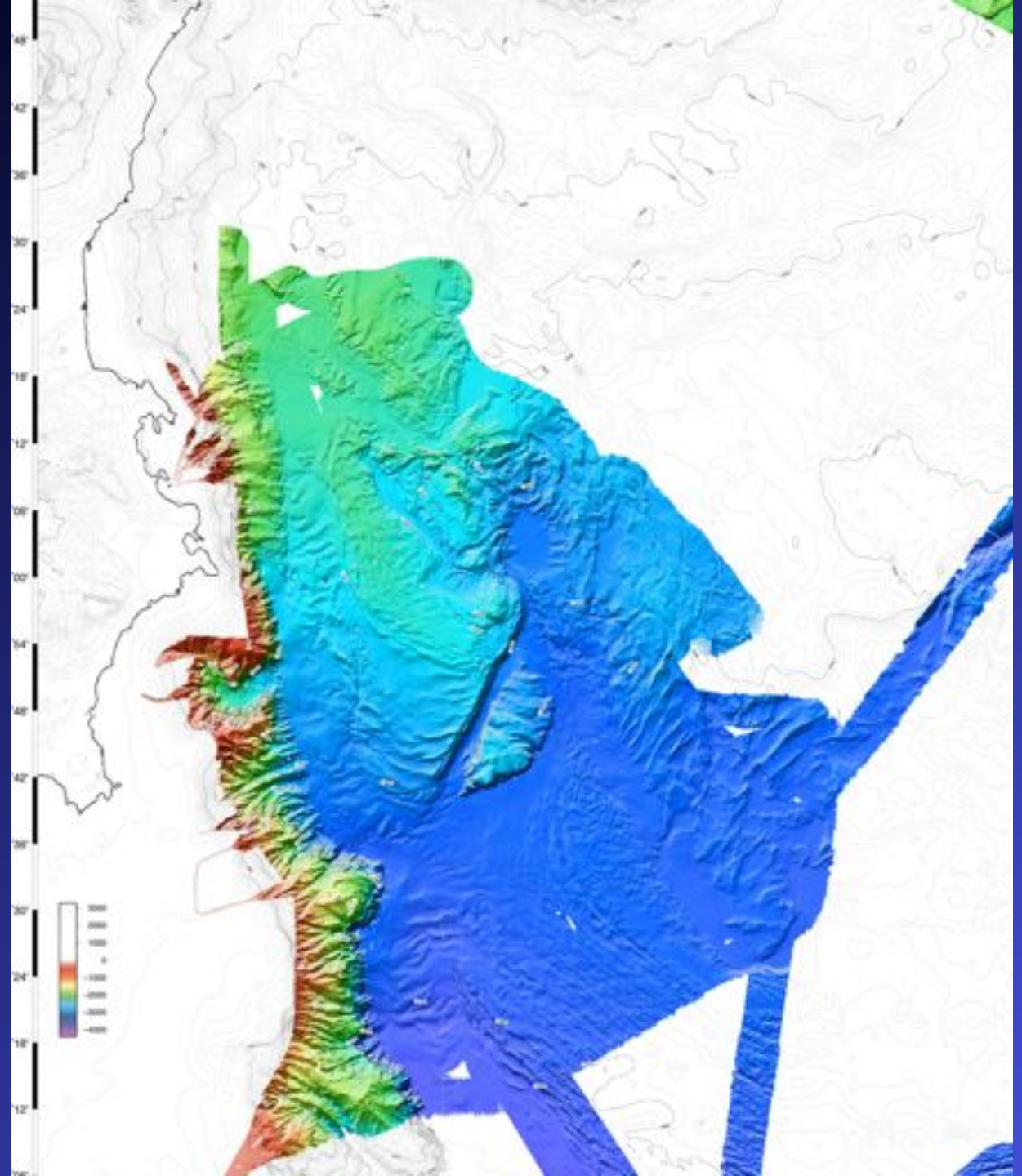
universidade de aveiro



CIRCEE survey

New data:

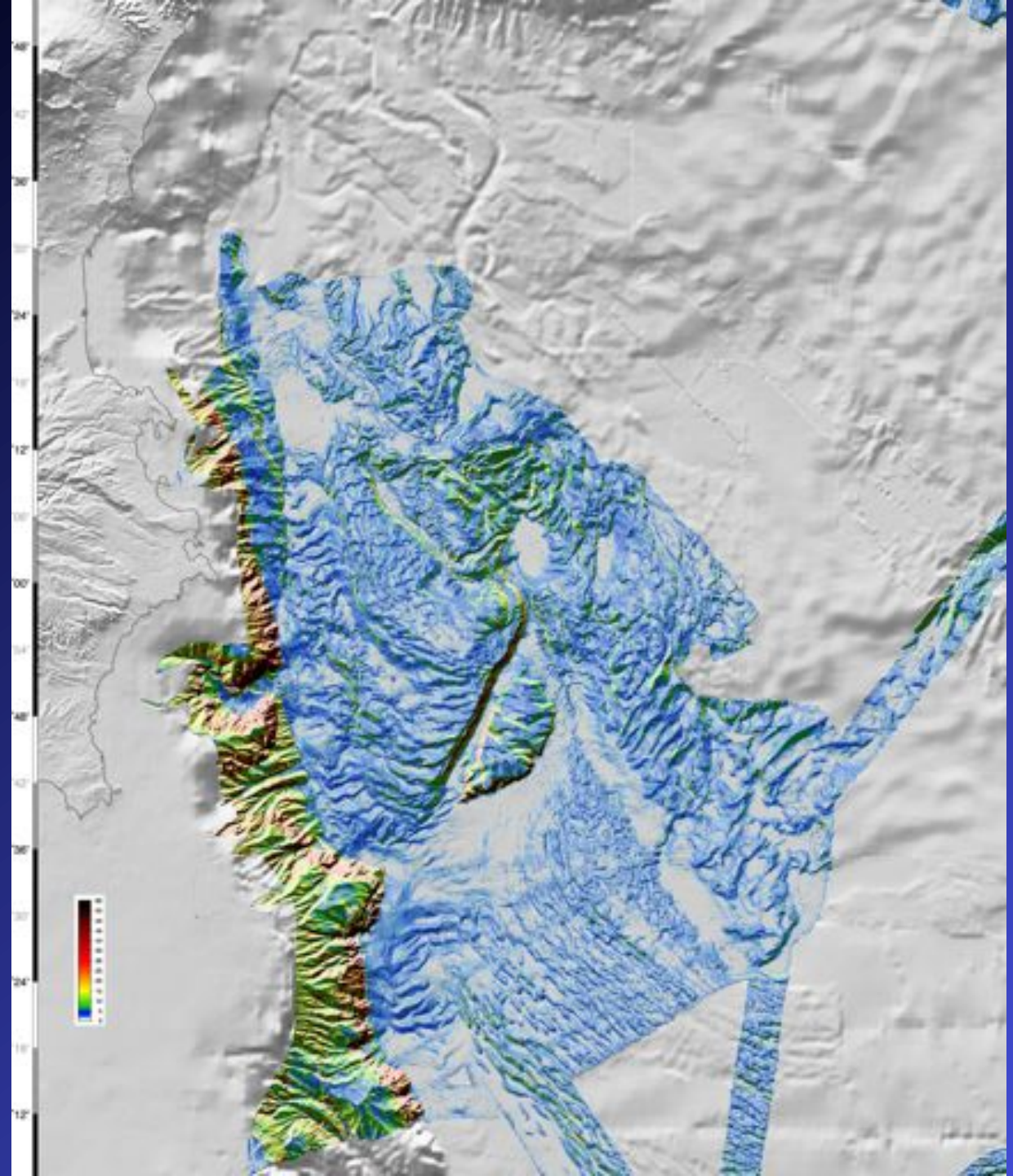
- Morpho-bathymetry
and tectonics



CIRCEE survey

New data:

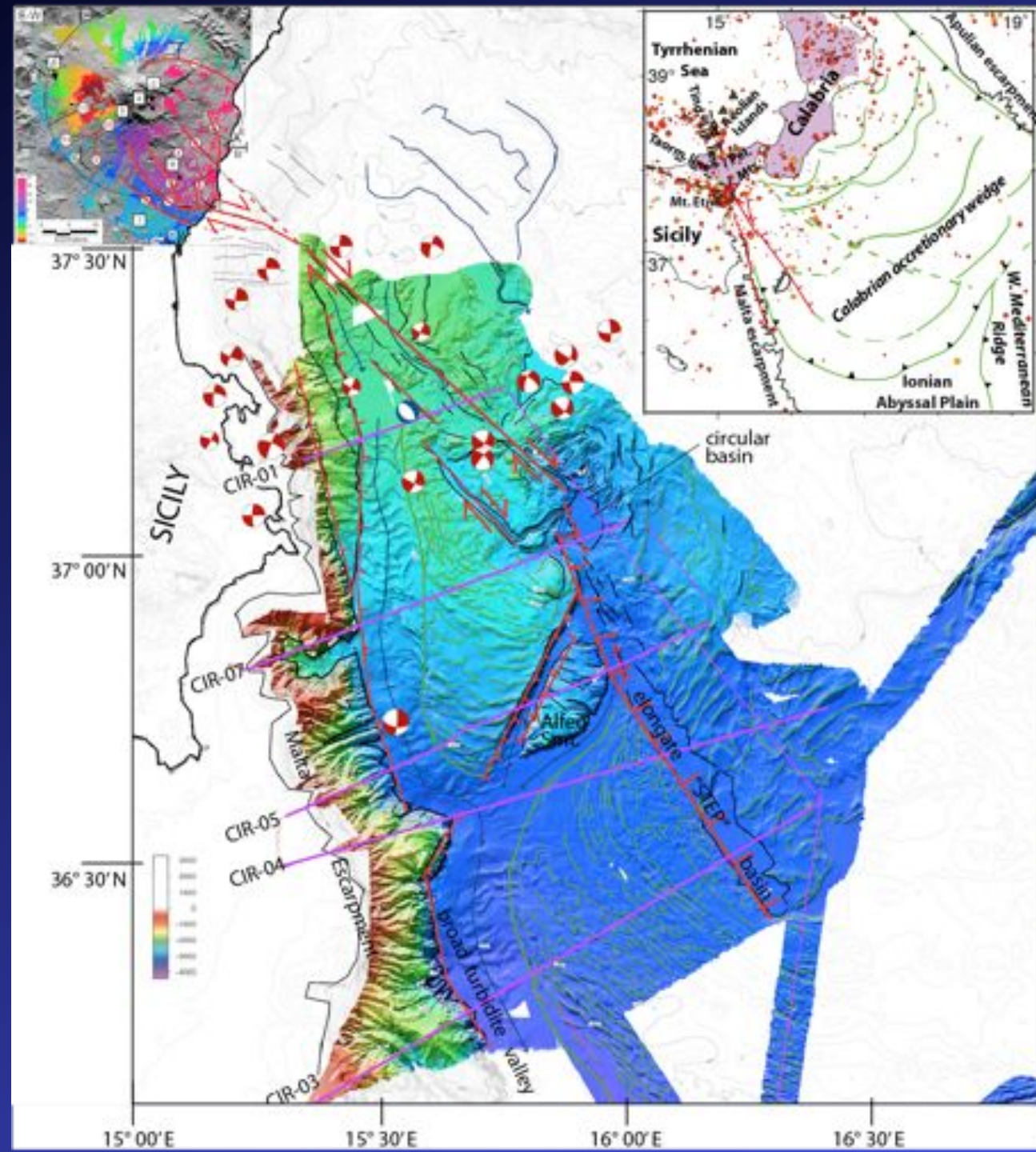
- Slope Map



CIRCEE survey

New data:

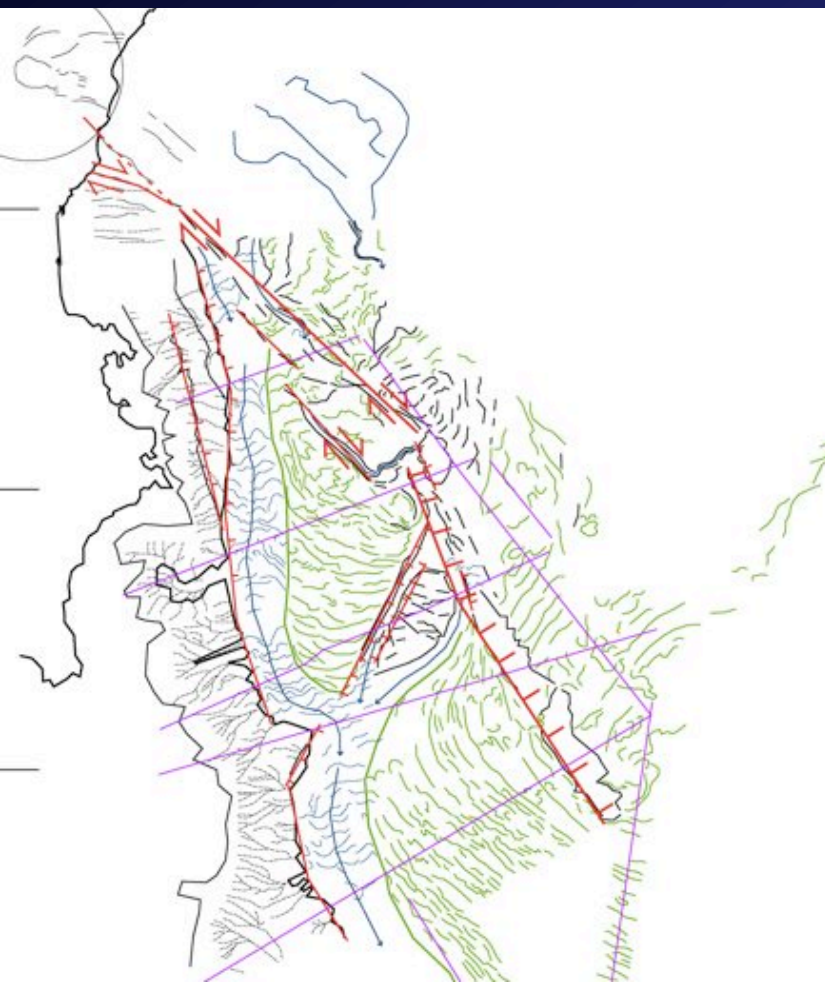
- Morpho-bathymetry
and tectonics



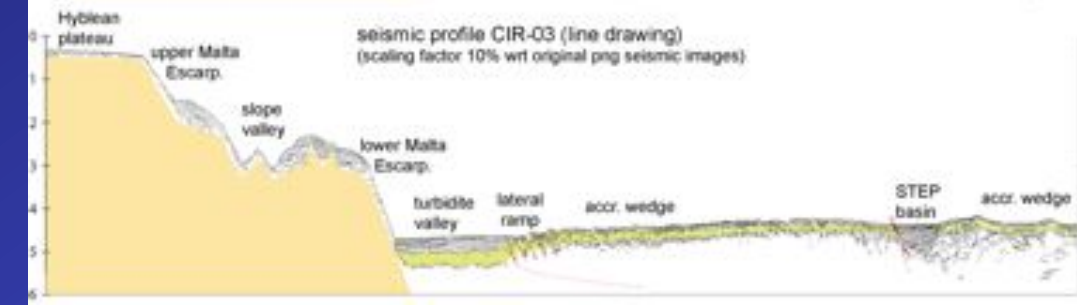
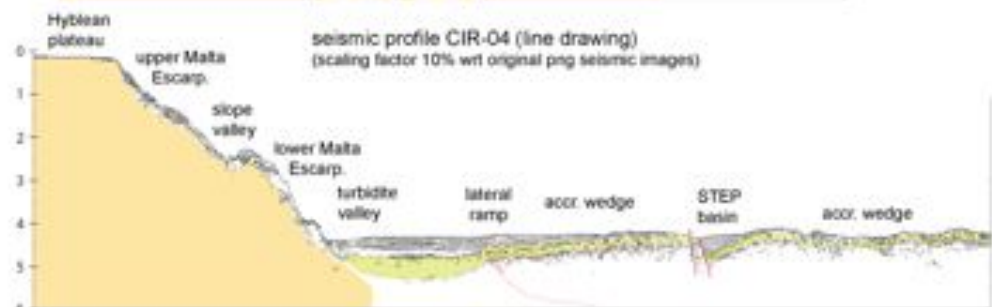
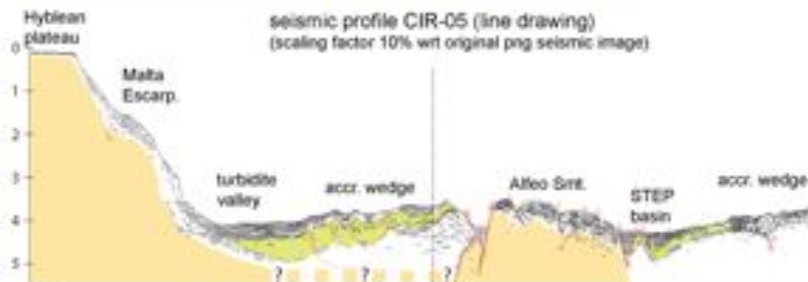
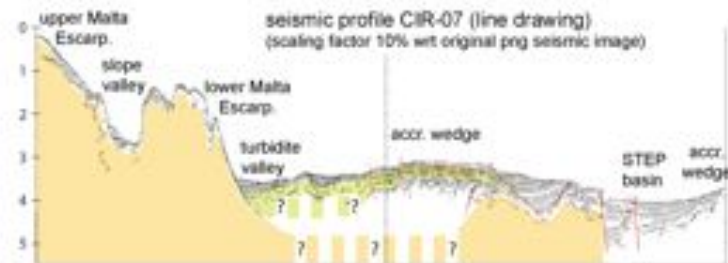
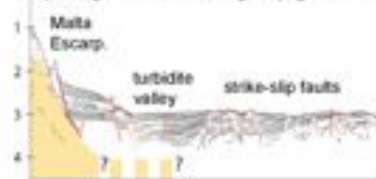
CIRCEE survey

New data:

- Line drawings of MCS lines



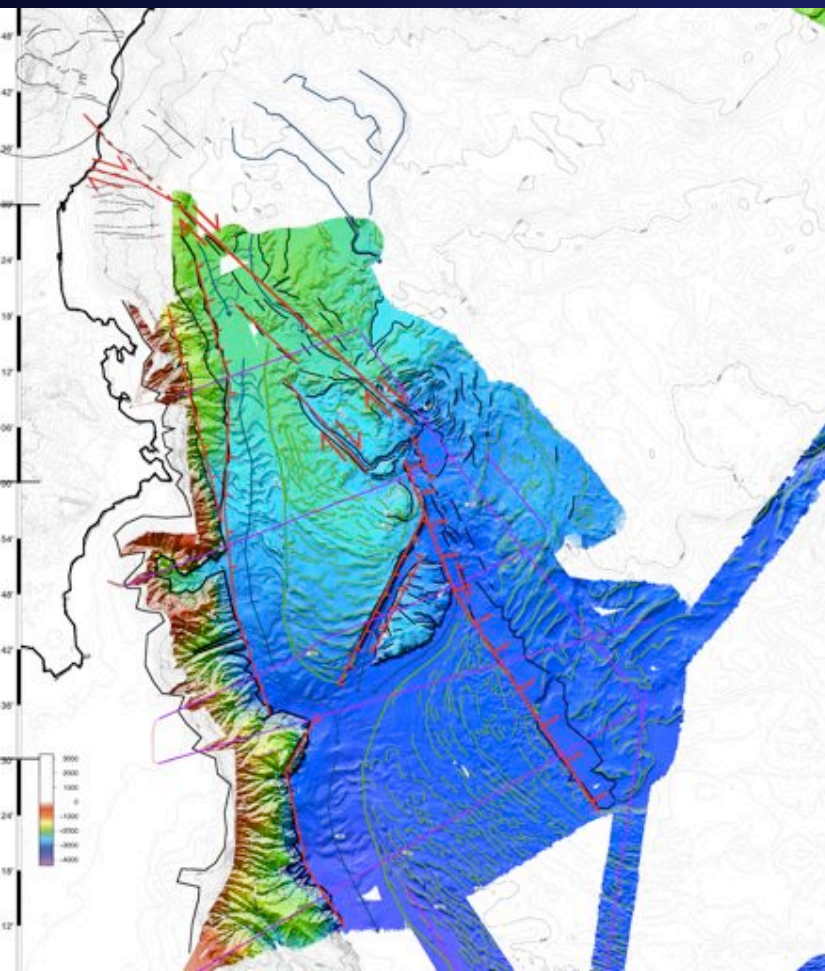
seismic profile CIR-01 (line drawing)
(scaling factor 27% wrt original png seismic image)



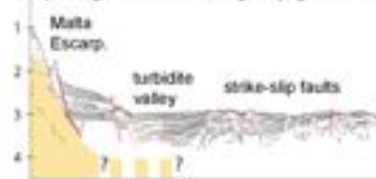
CIRCEE survey

New data:

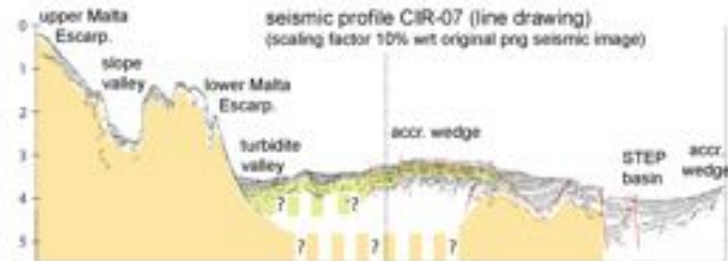
- Line drawings of MCS lines



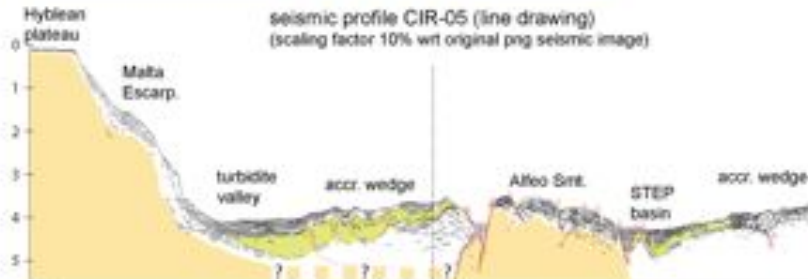
seismic profile CIR-01 (line drawing)
(scaling factor 27% wrt original png seismic image)



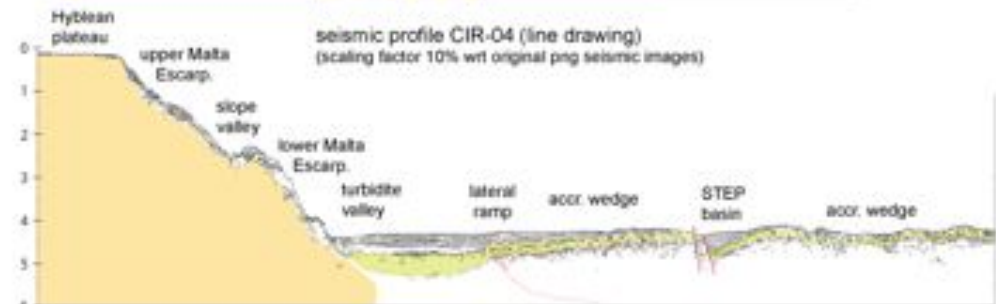
seismic profile CIR-07 (line drawing)
(scaling factor 10% wrt original png seismic image)



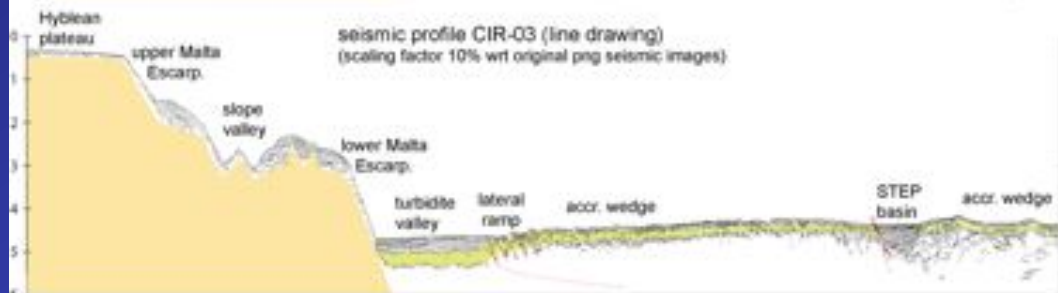
seismic profile CIR-05 (line drawing)
(scaling factor 10% wrt original png seismic image)



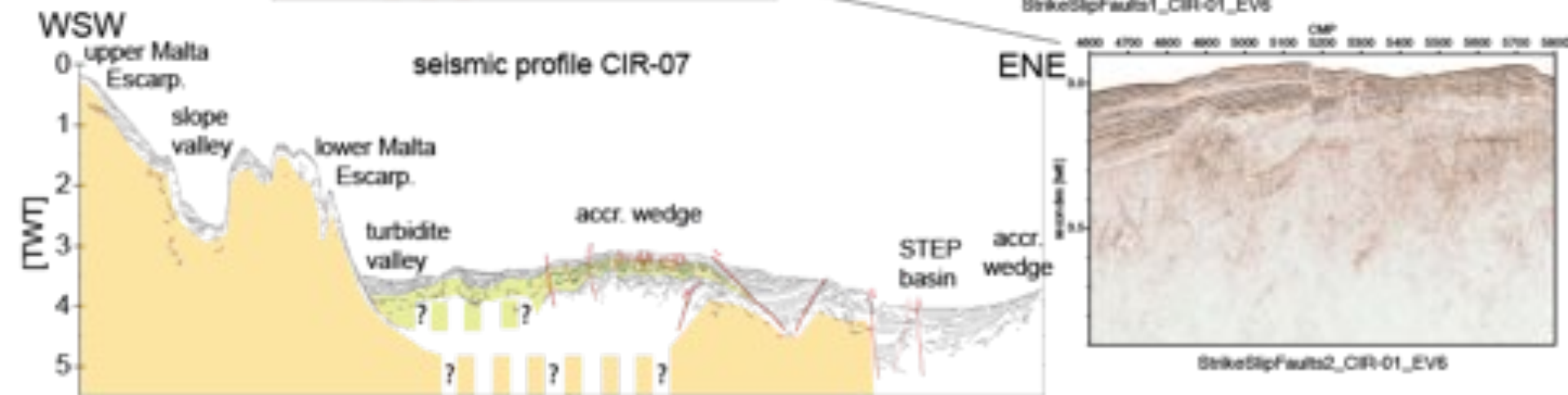
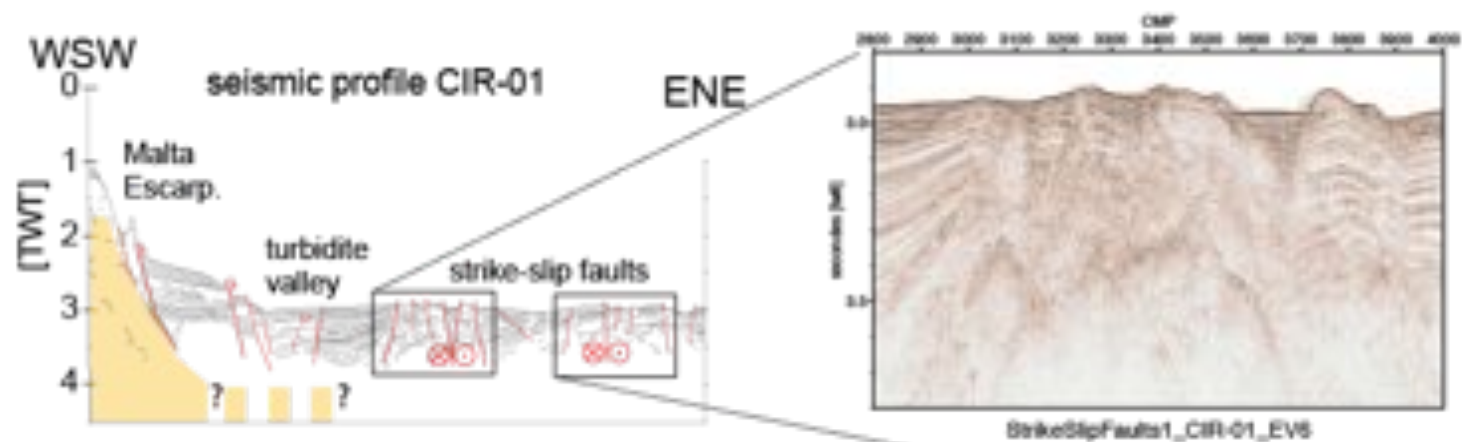
seismic profile CIR-04 (line drawing)
(scaling factor 10% wrt original png seismic images)



seismic profile CIR-03 (line drawing)
(scaling factor 10% wrt original png seismic images)

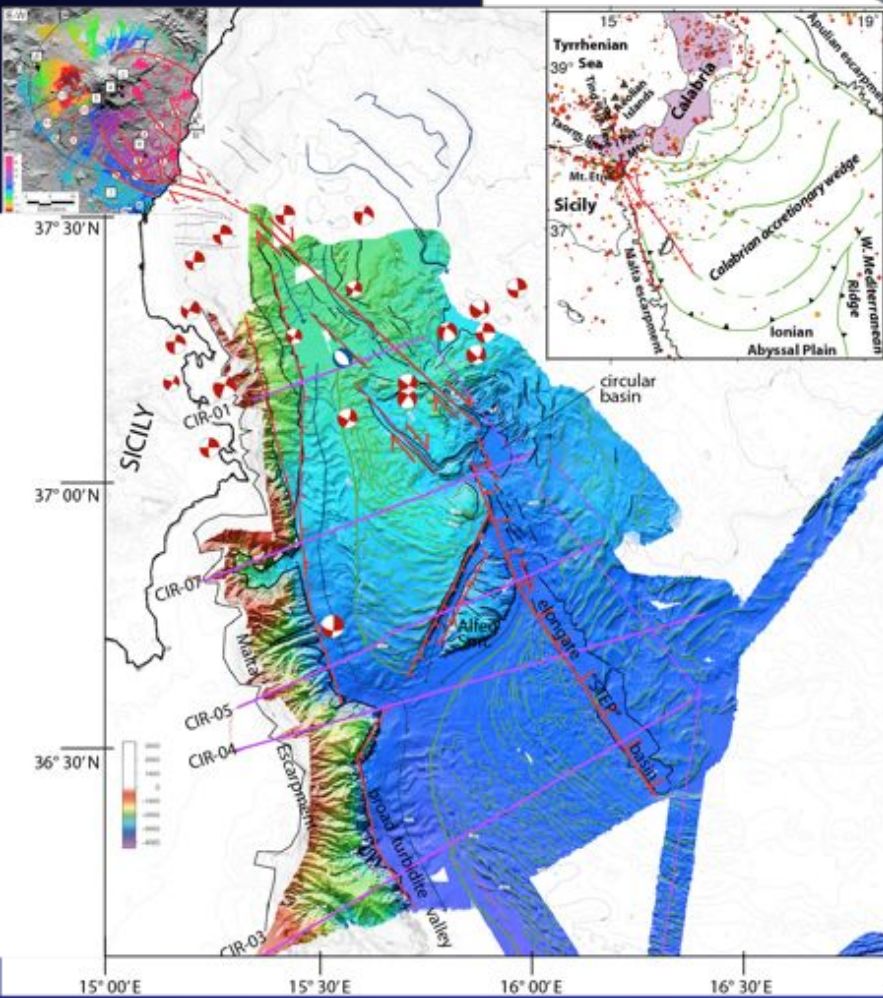
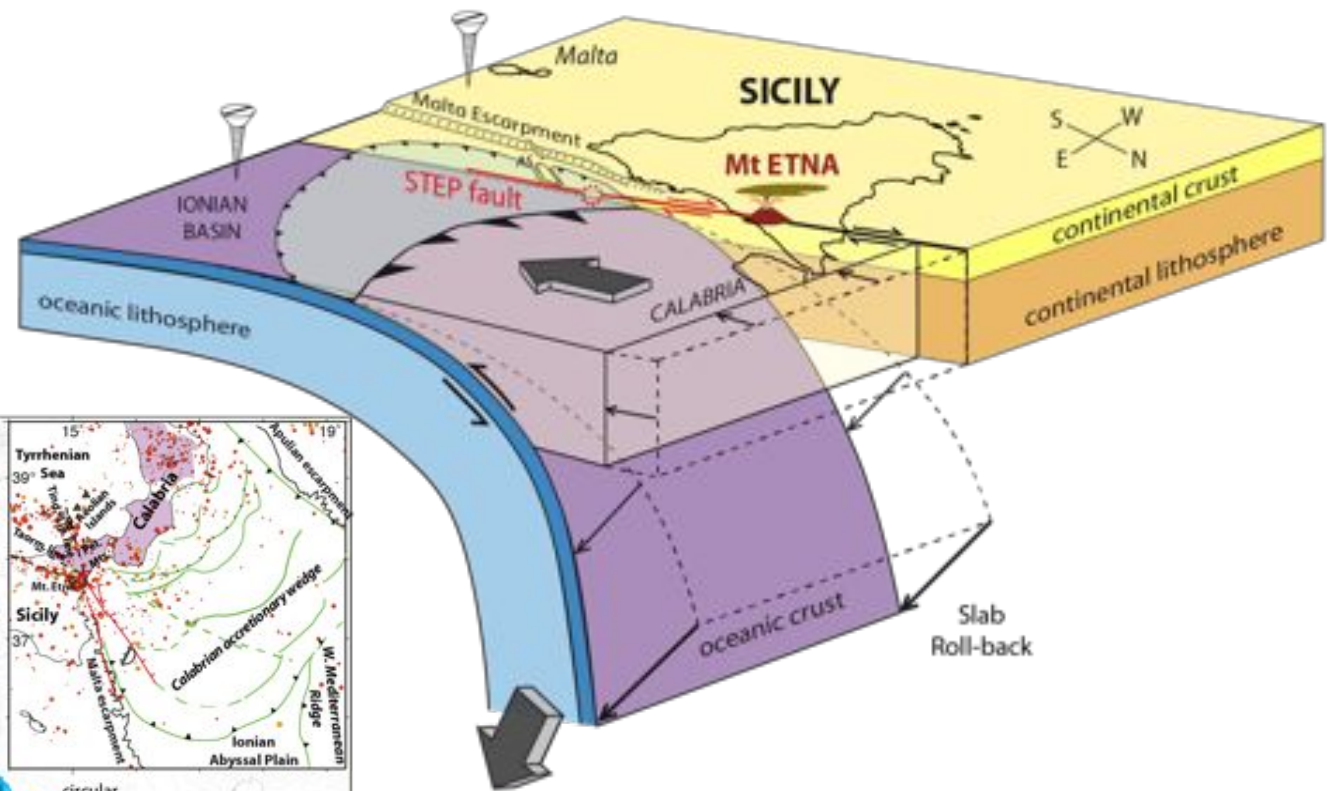


CIRCEE survey N STEP fault - Strike-slip faulting



Tectonic interpretation

STEP fault (Subduction Tear Edge Propagator)

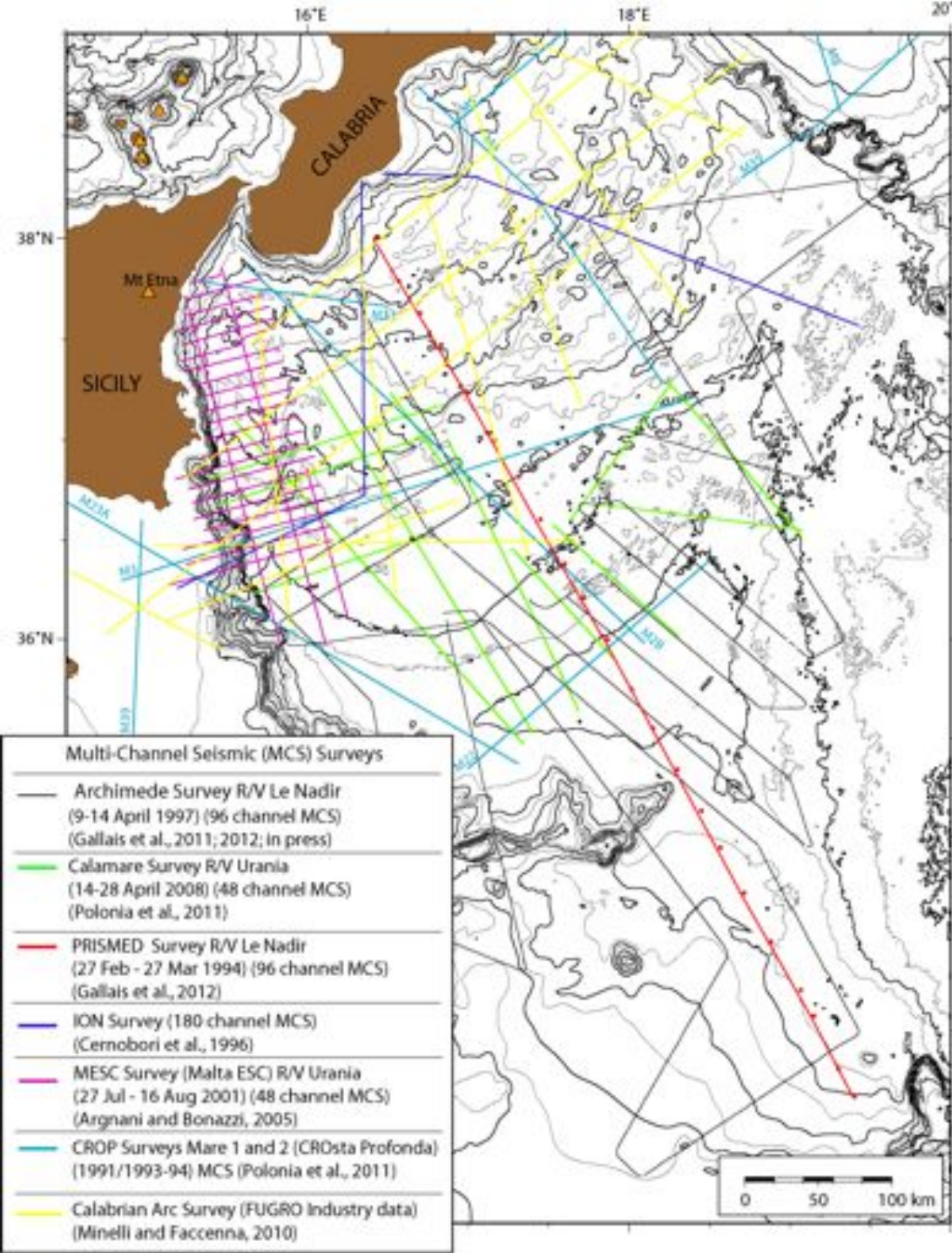


Conclusions:

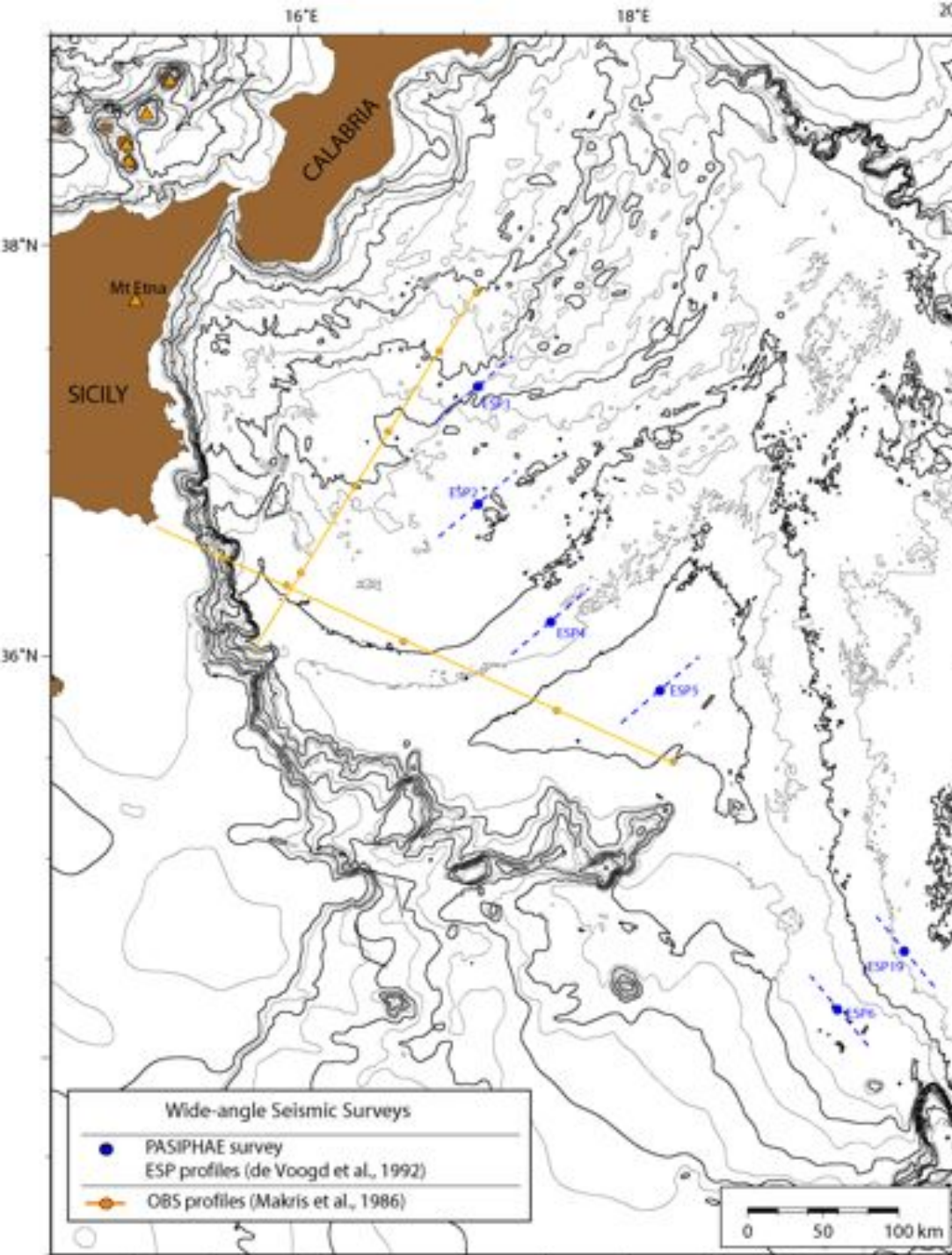
STEP fault = two segments (80 - 90 km)

S segment: pure normal/block faulting

N segment: pure strike-slip faulting (into Etna)



Existing MCS data:
PrisMed and Archimede
(RVLe Nadir, 1994, 1997)
(Gallais et al., 2011; 2012; 2013)



Existing wide-angle seismic surveys:

ESP (de Voogd et al., 1992)

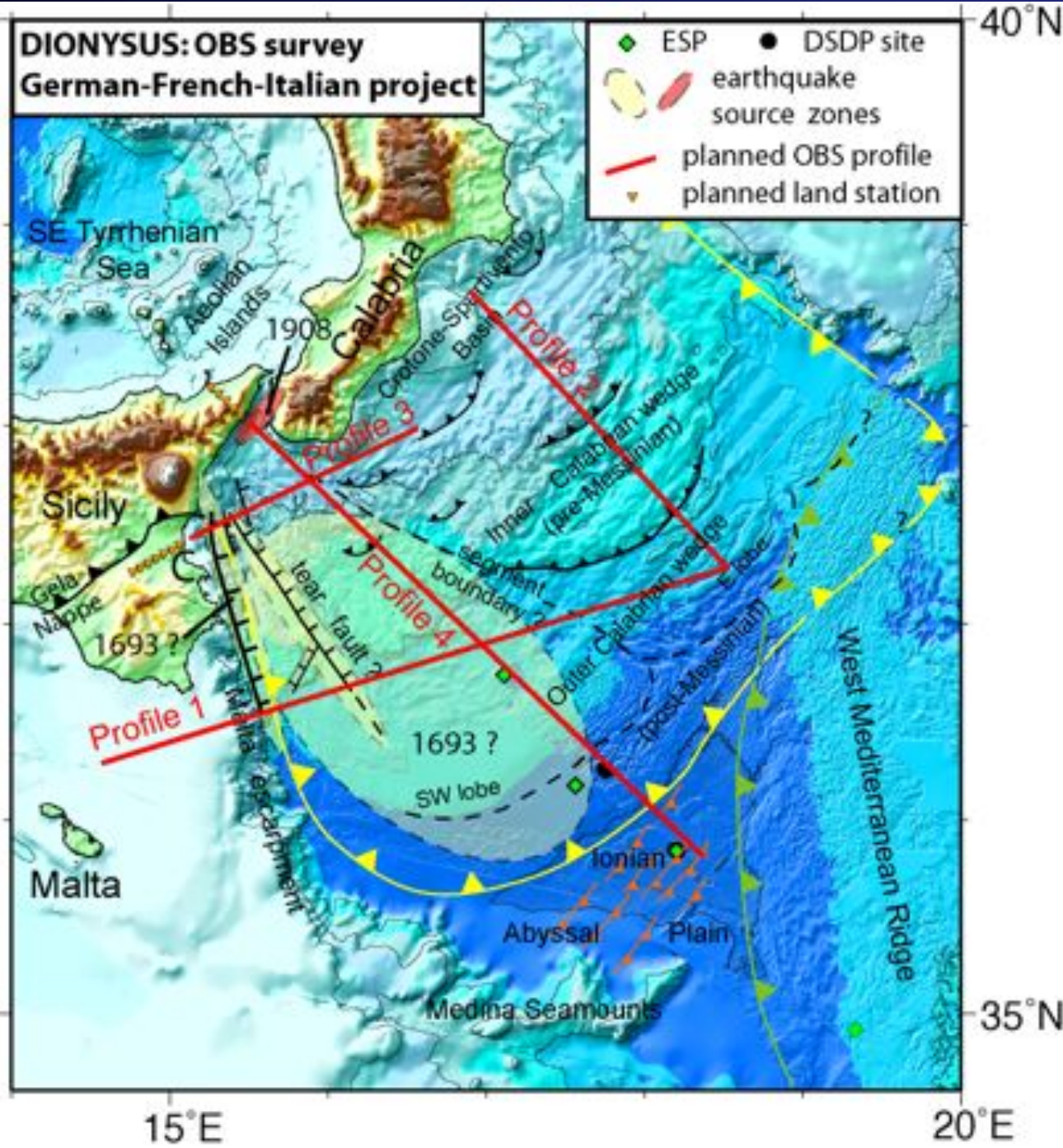
2 profiles with 5 OBS (Makris et al., 1986) spacing 40 - 50 km

Cruise proposal

DIONYSUS

Objectives :

- image the deep structure of the Tethyan margins
- determine the nature and thickness of the crust (oceanic vs. thinned contin.)
- constrain the 3-D geometry of the Calabrian subduction zone



PIs - H. Kopp, D. Klaeschen

Cruise proposal

DIONYSUS

Methods :

- Wide-angle seismic survey (shot along existing MCS lines depth processed in Geomar CROP lines)

10 Oct. - 1 Nov. 2014

30 OBS Geomar

30 OBS Brest

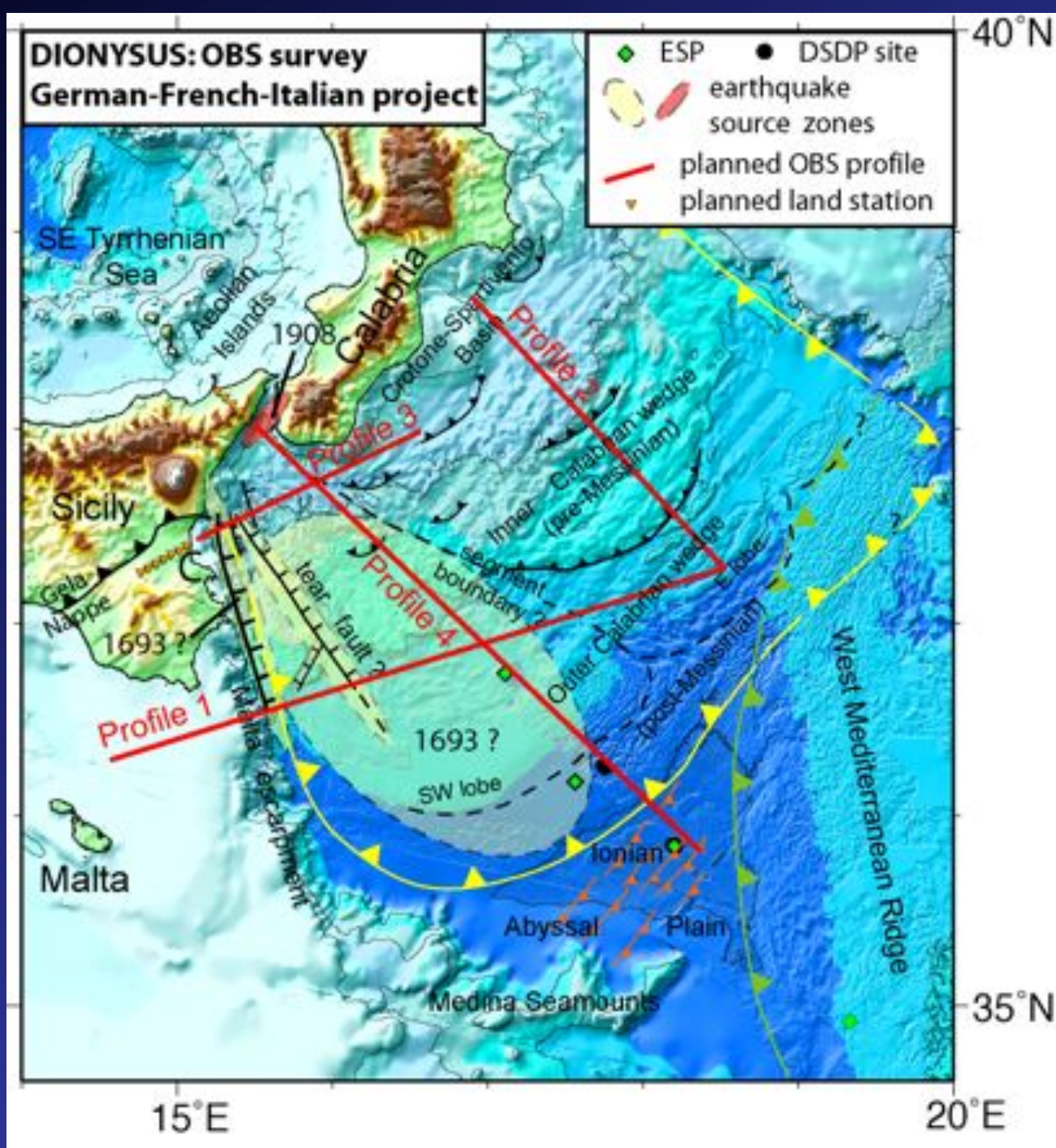
180 deployments

4 profiles 580 nm (1040 km)

spacing <6km (3,2 nm)

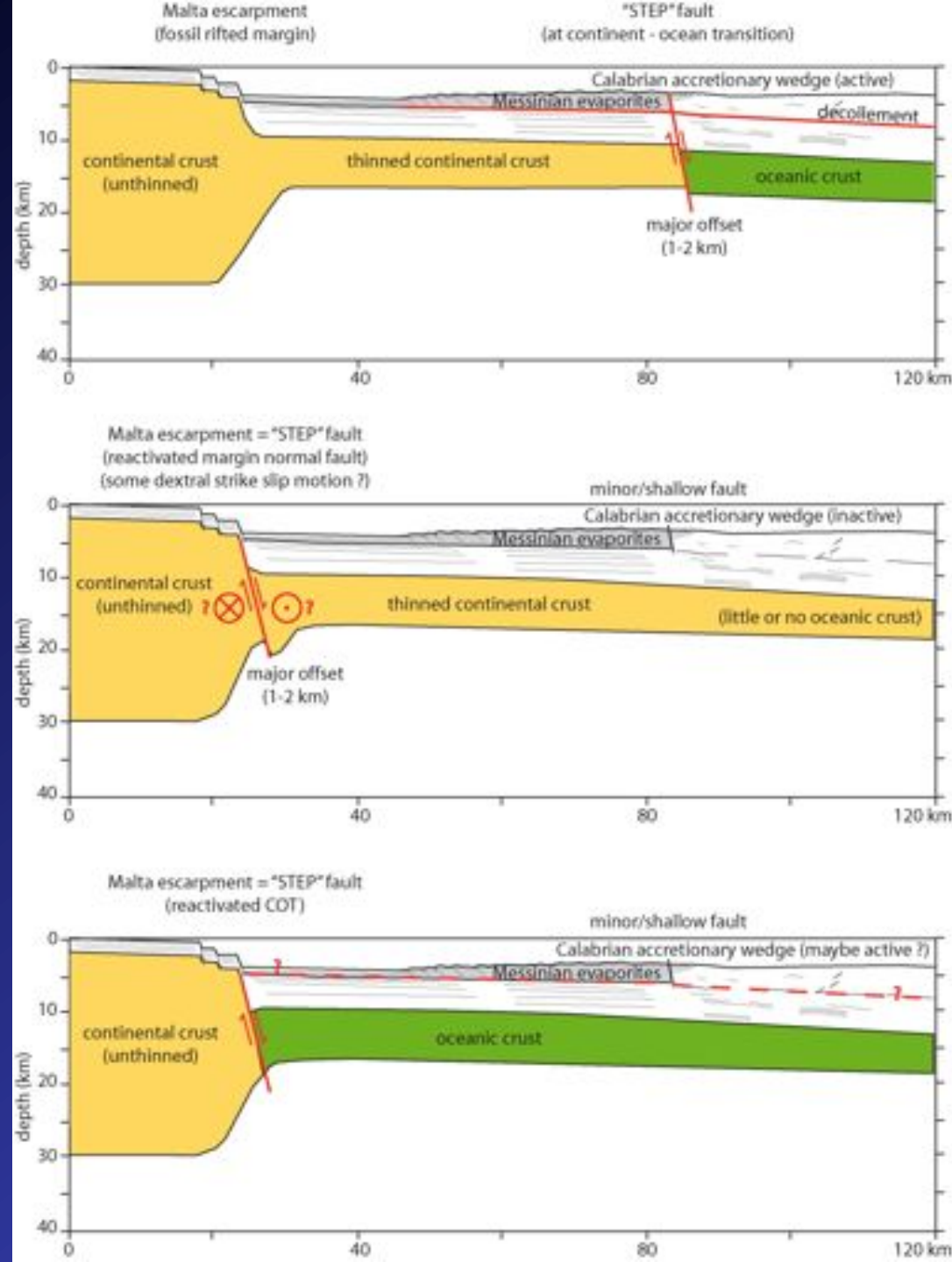


PIs - H. Kopp, D. Klaeschen

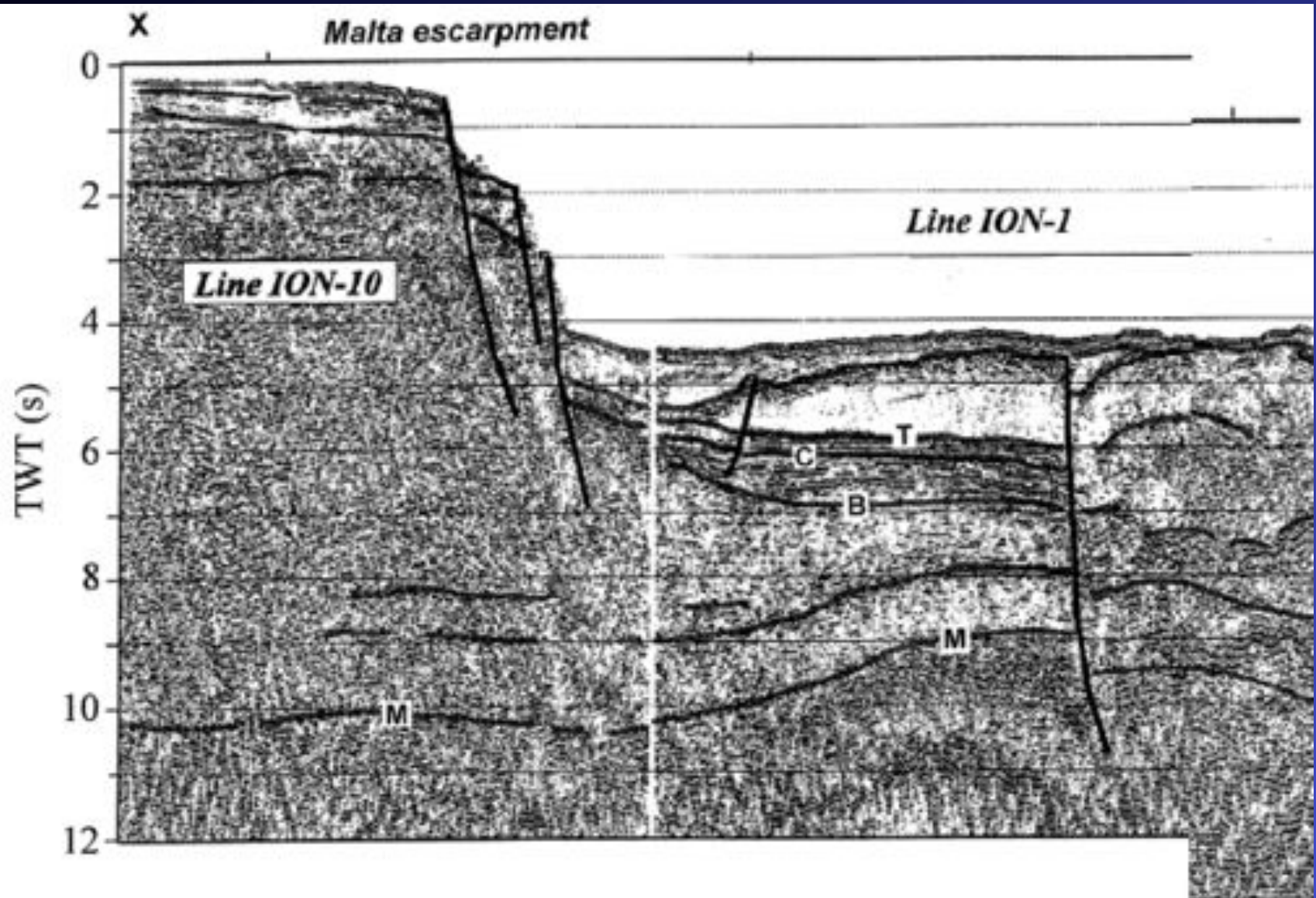


Deep structure and tectonics
of the E Sicily margin

(three hypotheses to test)



Profile ION-10 and ION-1 (Nicolich et al., 2000): crossing the Malta escarpment and tear fault ("STEP"), deep seismic profile images offset in basement & Moho

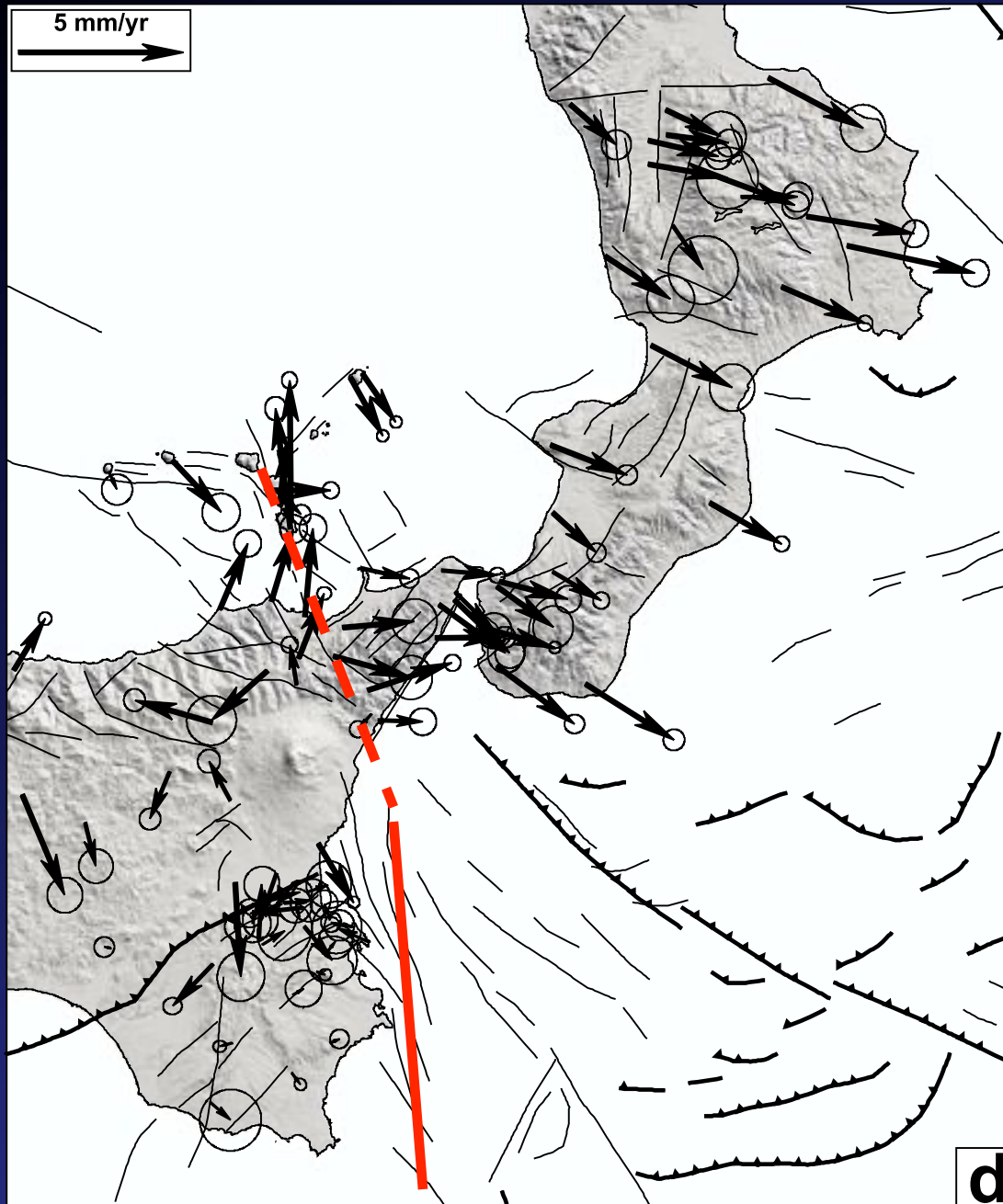


Italy region : GPS vectors (Palano et al., 2012, JGR)



E to SE motion of a
“Calabrian” block at
3-5 mm/a (Nubia
fixed refer. frame)

Italy region : GPS vectors (Palano et al., 2012, JGR)

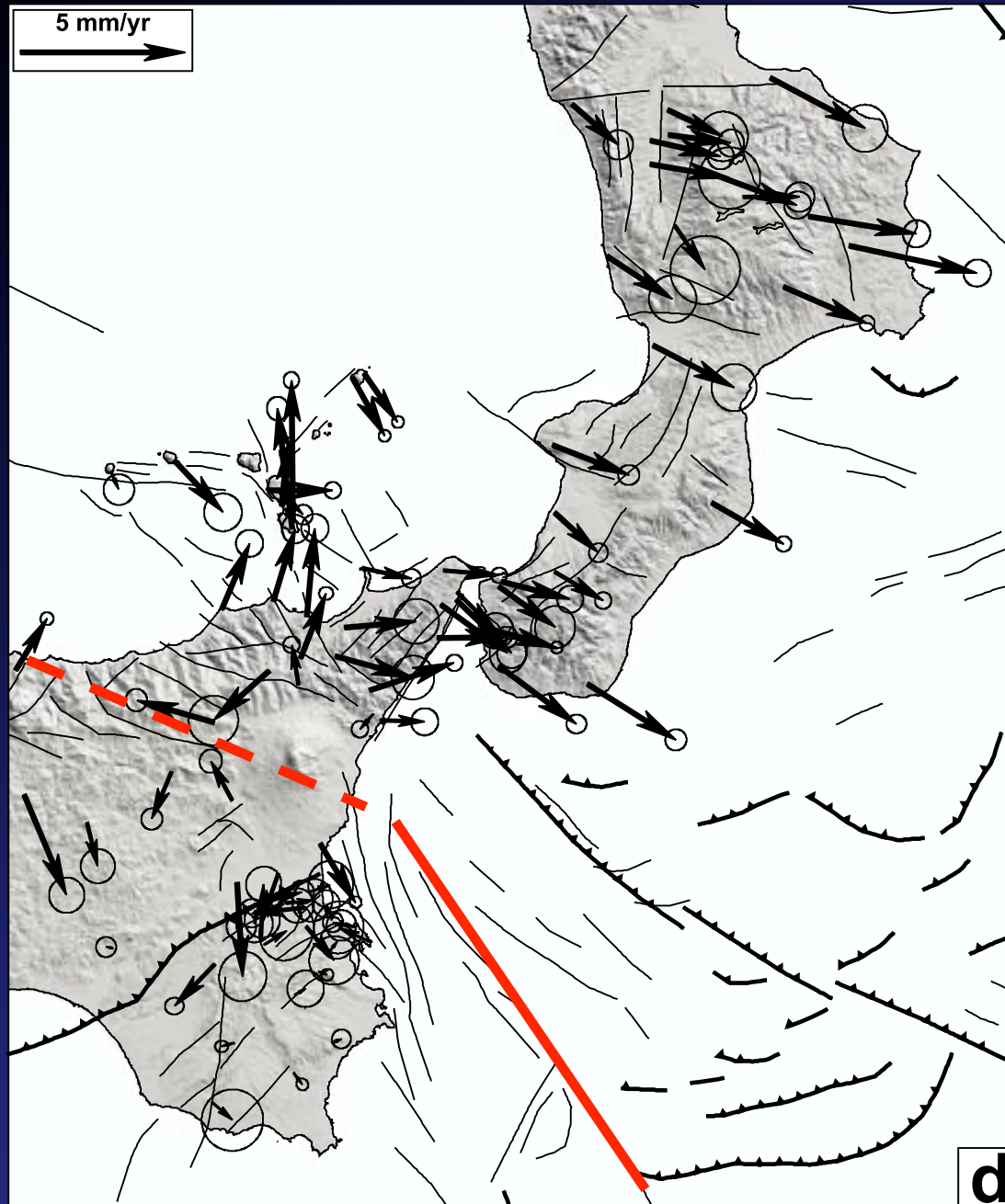


E to SE motion of a
“Calabrian” block at
3-5 mm/a (Nubia
fixed refer. frame)

Strike-slip boundary
separating blocks:
Tindari-Lipari line

STEP fault = Malta Escarpm.

Italy region : GPS vectors (Palano et al., 2012, JGR)



E to SE motion of a
“Calabrian” block at
3-5 mm/a (Nubia
fixed refer. frame)

Strike-slip boundary
separating blocks:

Taormina line (N Sicily)

STEP fault 50+ km offshore
of E Sicily

Thanks for your attention 😊

