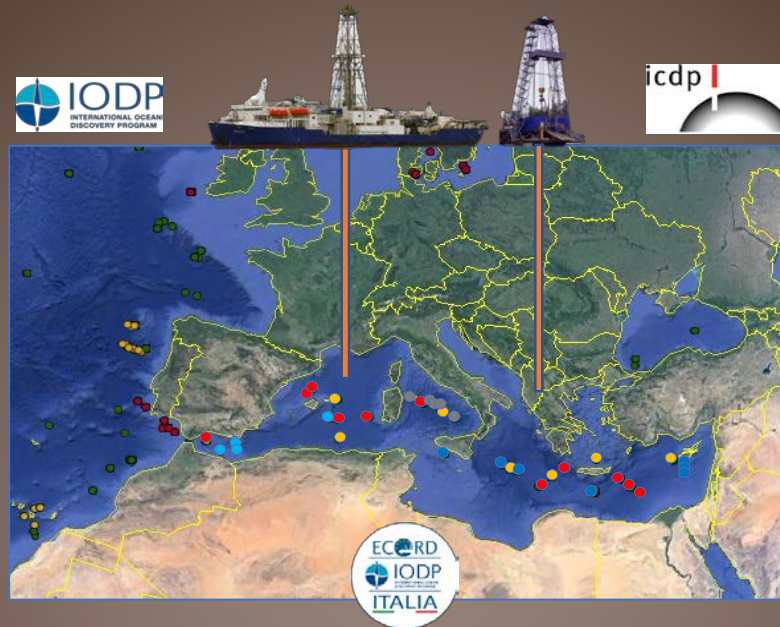


Lo stato delle proposte di perforazione nell'area mediterranea

Scientific Drilling in the Mediterranean Sea



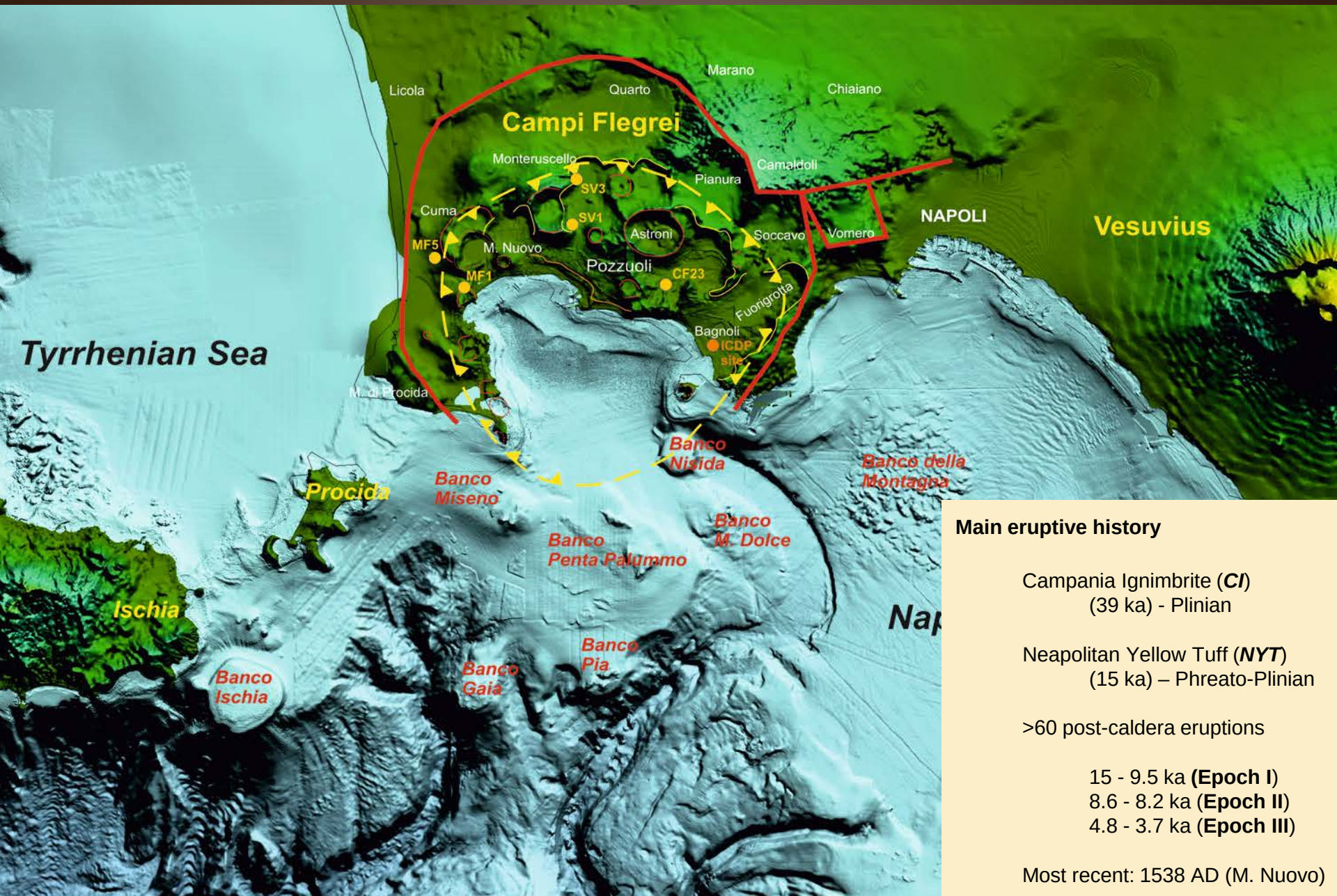
Perforazione della Caldera dei Campi Flegrei *Una proposta anfibia IODP-ICDP:* ***La componente marina (IODP)***

M. Sacchi, G. De Natale, V. Spiess, L. Steinmann
& Campi Flegrei IODP proposal writing group

V. Acocella, A. Bonneville, M. Corradino, S. De Silva, L. Fedele, L. Ferranti, N. Geshi, D. Insinga, M. Jurado, C. Kilburn, F. Matano, A. Milia, F. Molisso, R. Moretti, V. Morra, S. Passaro, F. Pepe, P. Petrosino, S. Porfido, C. Scarpati, H. Schmincke, R. Somma, M. Sumita, S. Tamburrino, R. Tonielli, M. Torrente, C. Troise, M. Vallefucio, G. Ventura



Campi Flegrei Caldera



Main eruptive history

Campania Ignimbrite (**CI**)
(39 ka) - Plinian

Neapolitan Yellow Tuff (**NYT**)
(15 ka) – Phreato-Plinian

>60 post-caldera eruptions

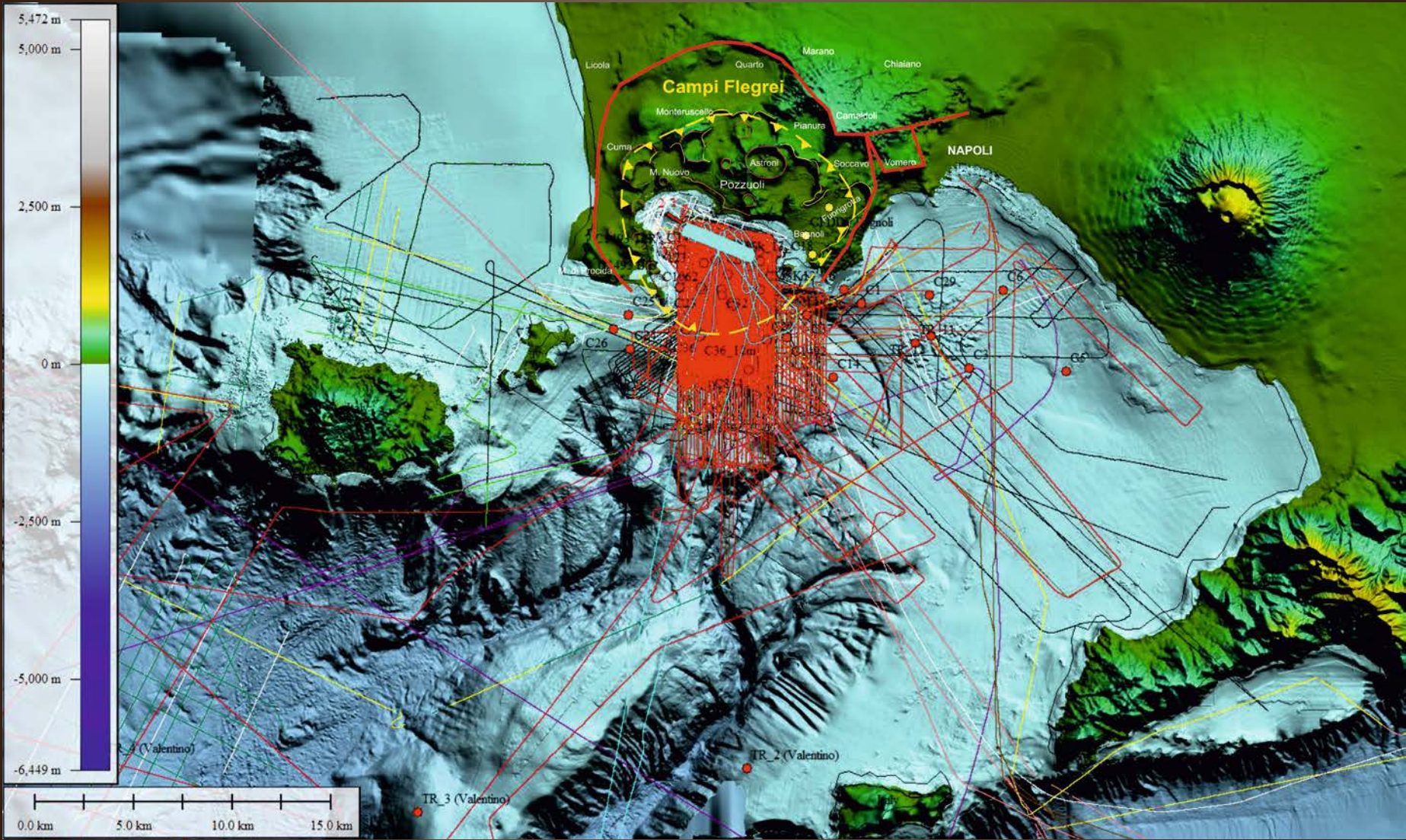
15 - 9.5 ka (**Epoch I**)

8.6 - 8.2 ka (**Epoch II**)

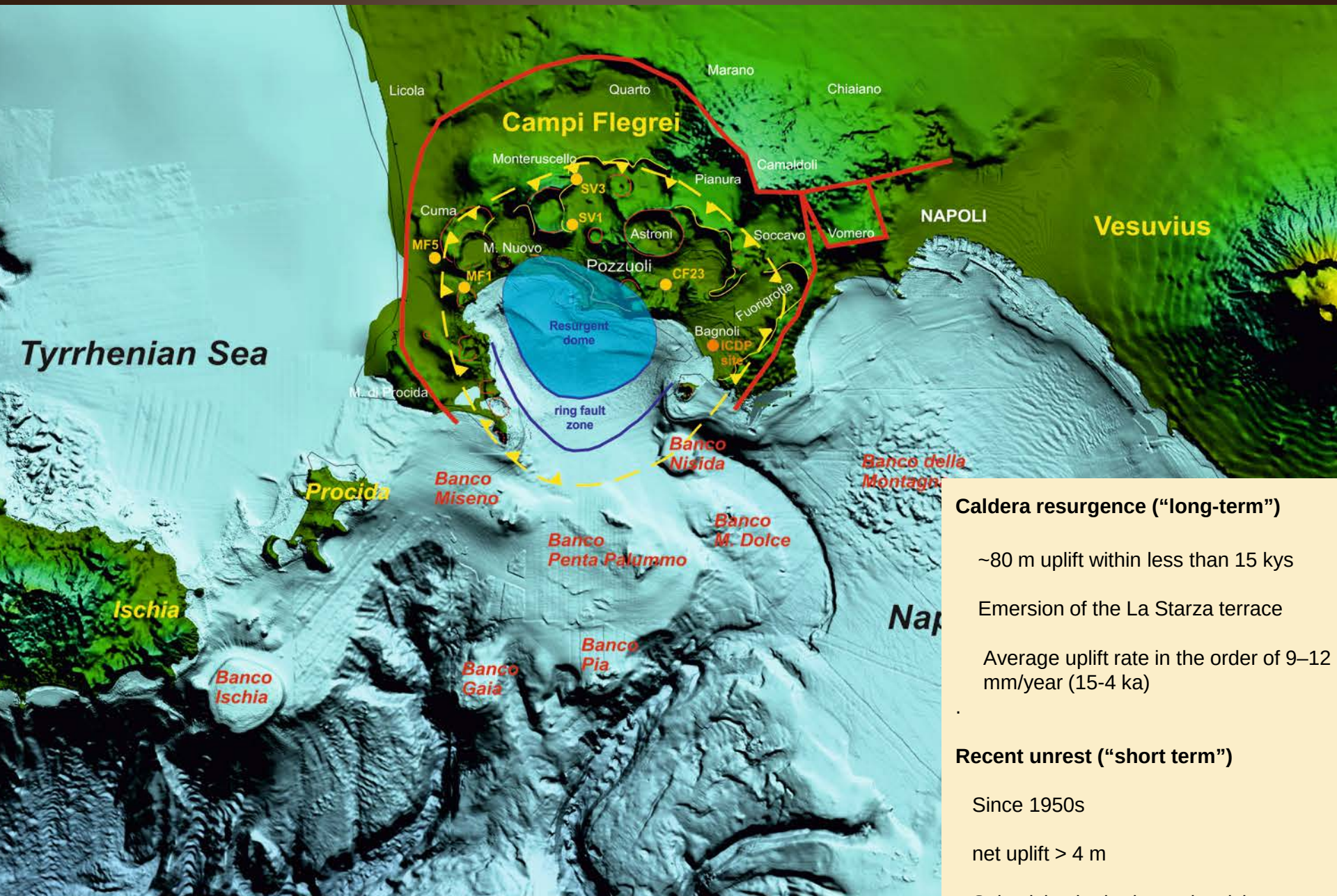
4.8 - 3.7 ka (**Epoch III**)

Most recent: 1538 AD (M. Nuovo)

Site survey data package (2008-2017)



Campi Flegrei Caldera



Caldera resurgence (“long-term”)

~80 m uplift within less than 15 kys

Emersion of the La Starza terrace

Average uplift rate in the order of 9–12 mm/year (15–4 ka)

Recent unrest (“short term”)

Since 1950s

net uplift > 4 m

ECORD MagellanPlus Workshop Series Program

Structure and Evolution of Magmatic and Hydrothermal Volcanic Systems in offshore collapse/resurgent calderas: Development of an IODP Drilling Proposal at Campi Flegrei linking to active ICDP Drilling Initiatives

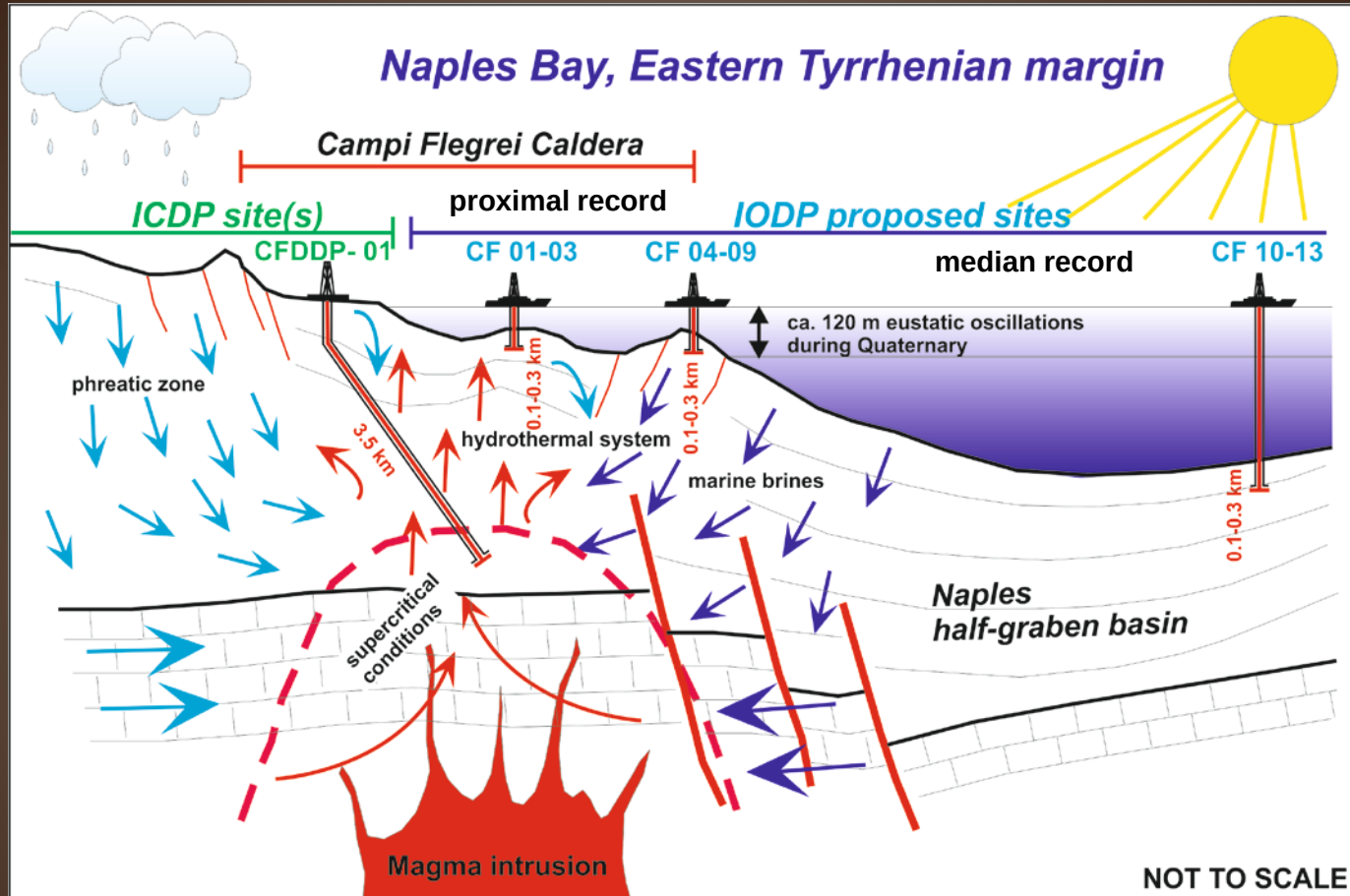
MagellanPlus Workshop

V. Spiess , G. De Natale, M. Sacchi, L. Steinmann

Napoli, Italy (25-28 February, 2017)



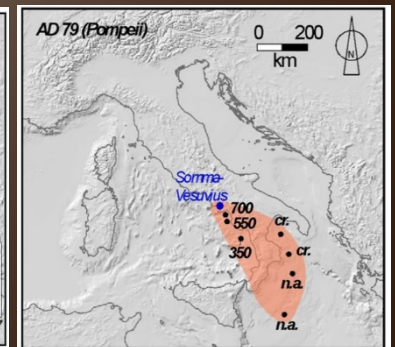
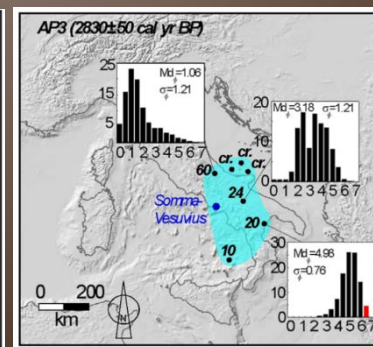
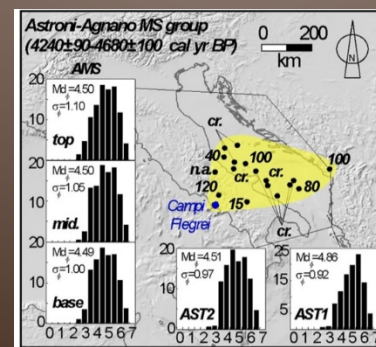
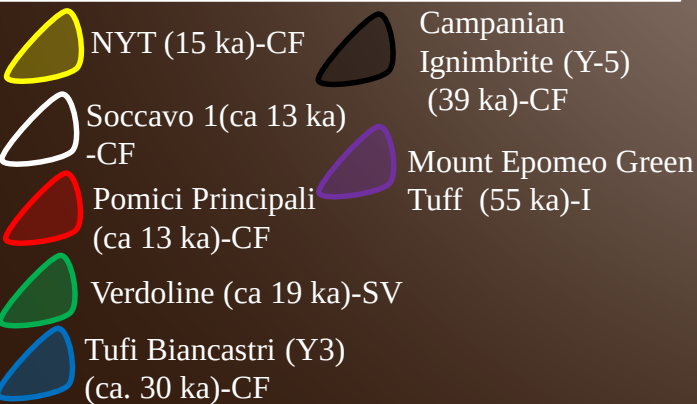
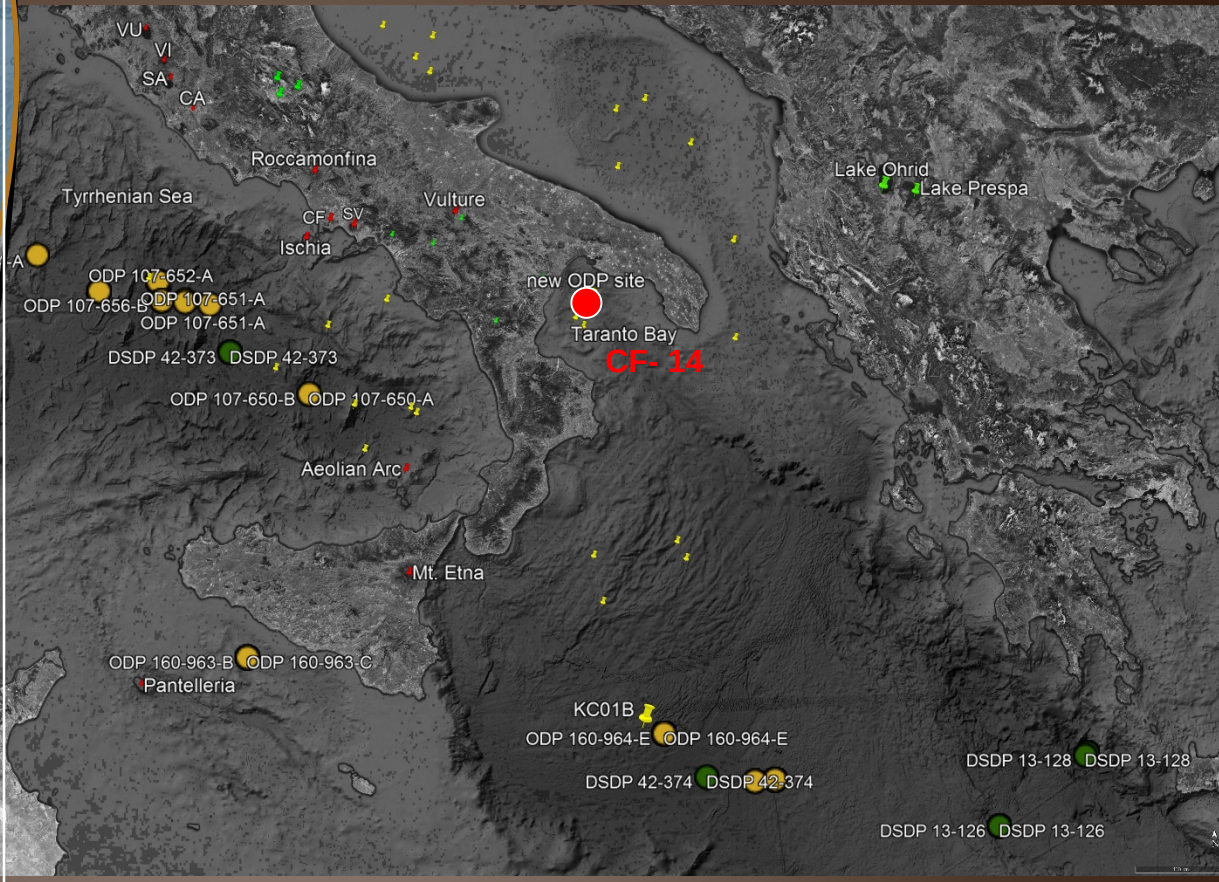
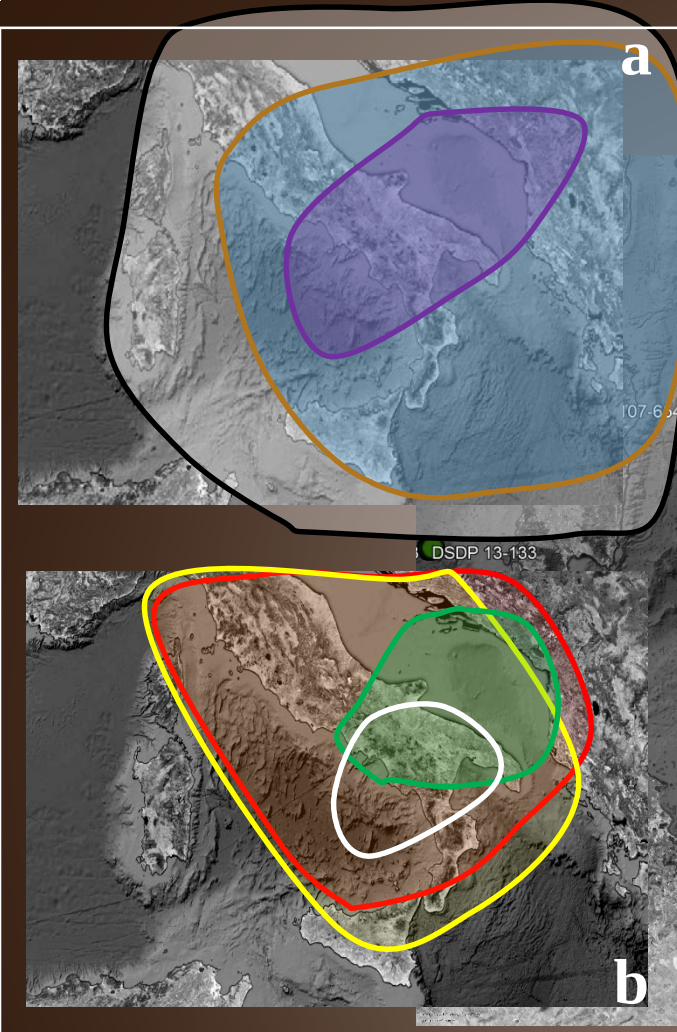
Campi Flegrei MagellanPlus Workshop (Napoli, Italy, 25-28 February 2017)



Joint submission to IODP&ICDP of an Amphibious Drilling Droposal (ADP) by the end of 2018

- **IODP component:** should focus on integrated stratigraphy of the caldera fill and resurgence, petrology and architecture of shallow structural levels (0-500 m depth)
- **ICDP component** should focus on rock-fluid properties, physical-chemical processes, the and the geothermal system at greater depth. (0-3000 m depth)

Drilling target CF-14: distal tephrostratigraphic record



Campi Flegrei (NYT) caldera: high-resolution multi-channel reflection seismics

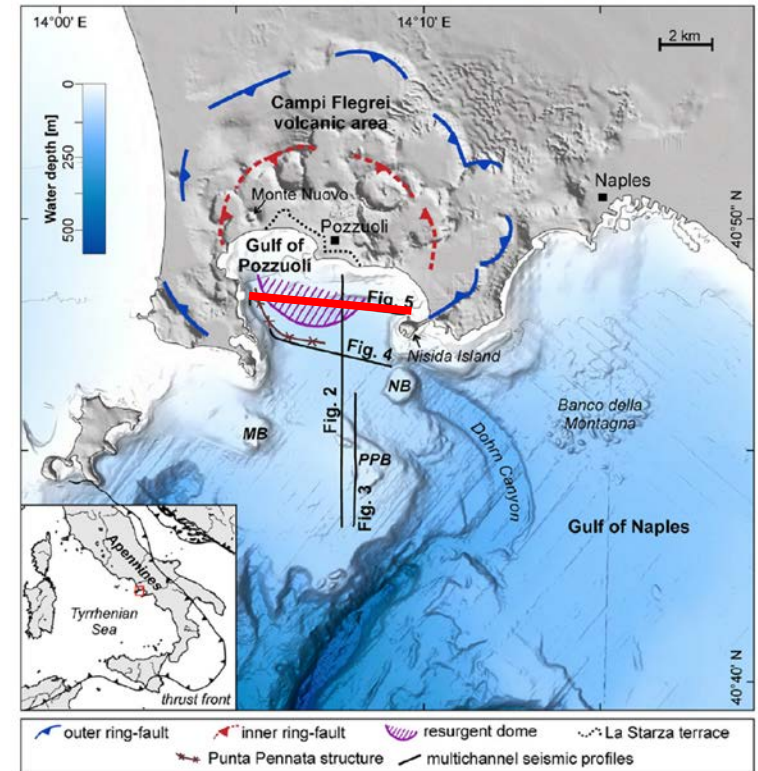
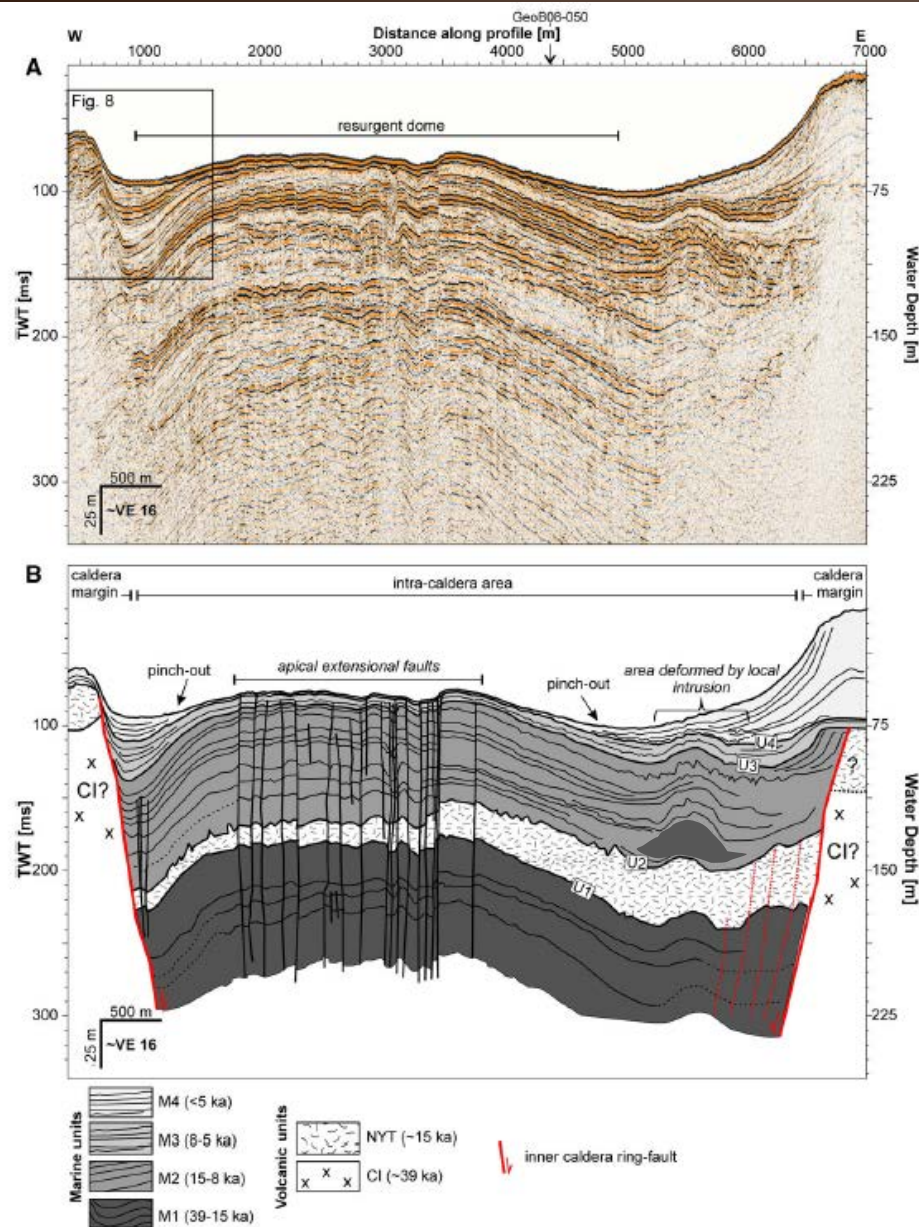
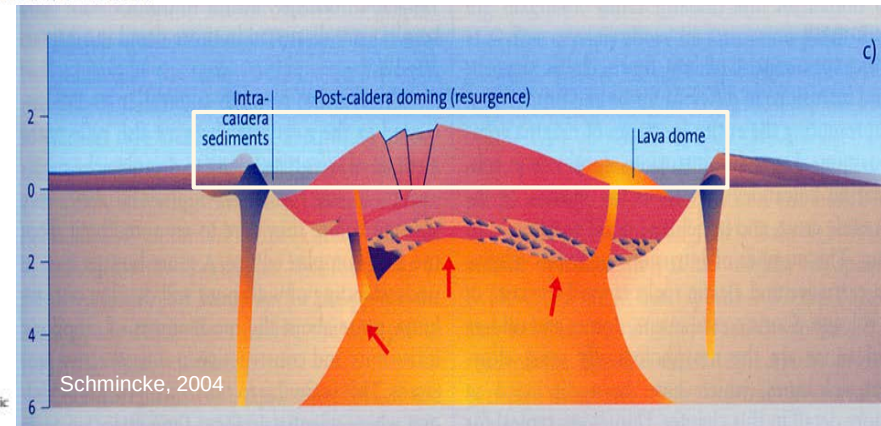


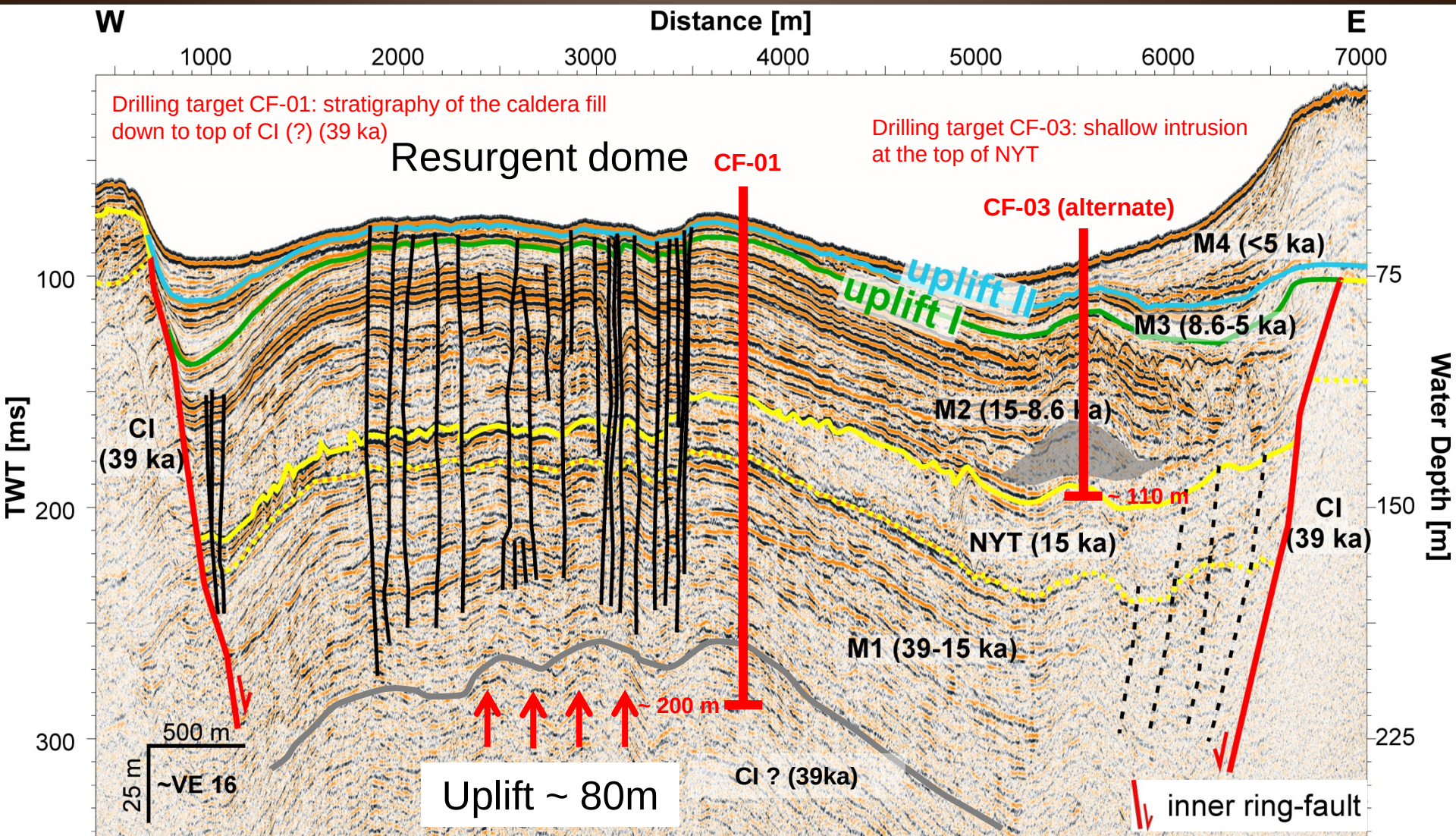
Fig. 1. Topography and bathymetry (D'Argenio et al., 2004a) of the Campi Flegrei volcanic area and the Gulf of Naples with location of the presented multichannel seismic profiles. The locations of the onshore caldera rim and offshore resurgent dome were adapted from Accolla (2008) and Sacchi et al. (2014), respectively. MB = Miseno Bank, PPB = Punta Palumbo Bank, NB = Nisida Bank.



Schmincke, 2004

Fig. 5. E-W trending multichannel seismic profile GeoB08-050, showing the resurgent dome and associated fault swarm, main caldera ring-fault as well as different marine and volcanic units located in the offshore sector of the CFC (for location see Fig. 1). (A) shows the uninterpreted section and (B) shows the interpreted section.

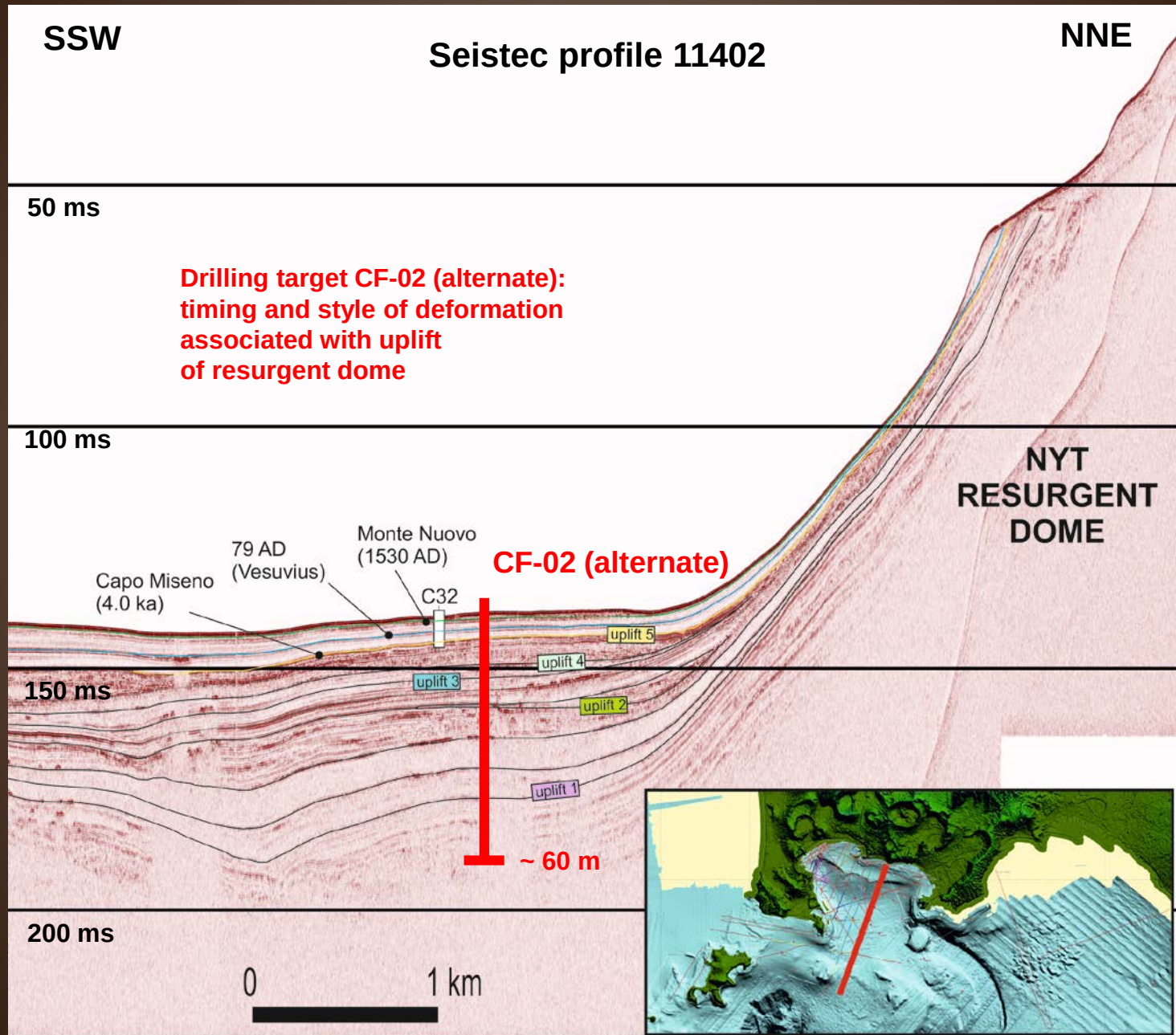
Campi Flegrei (NYT) caldera: high-resolution multi-channel reflection seismics

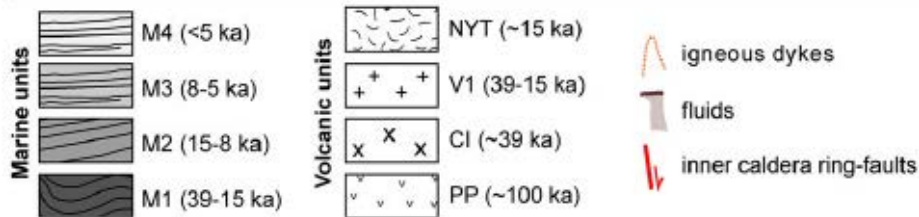
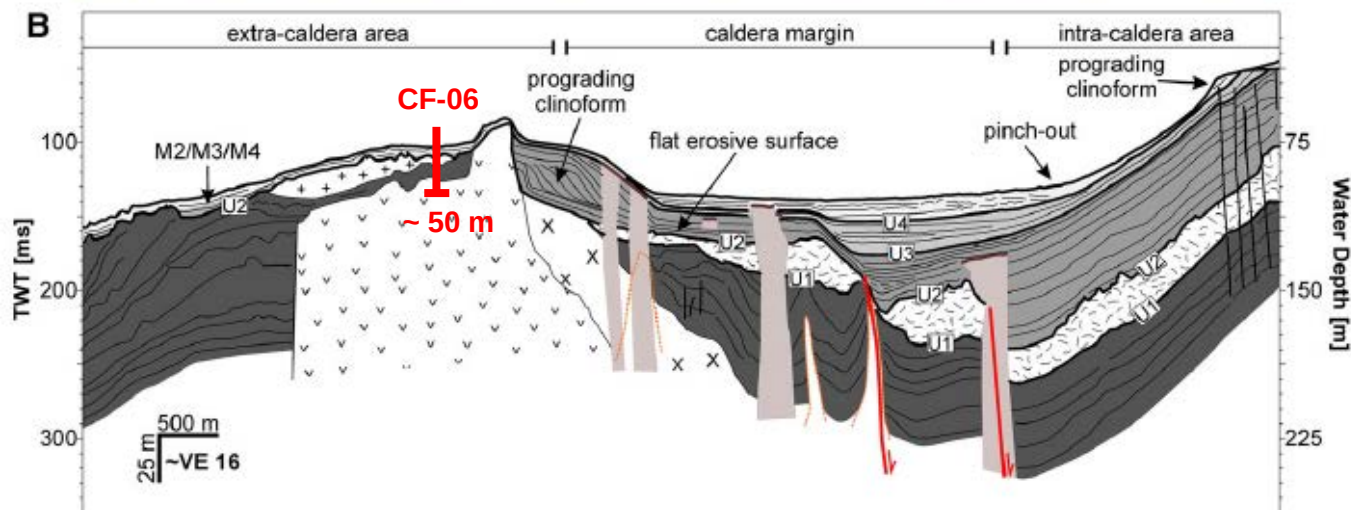
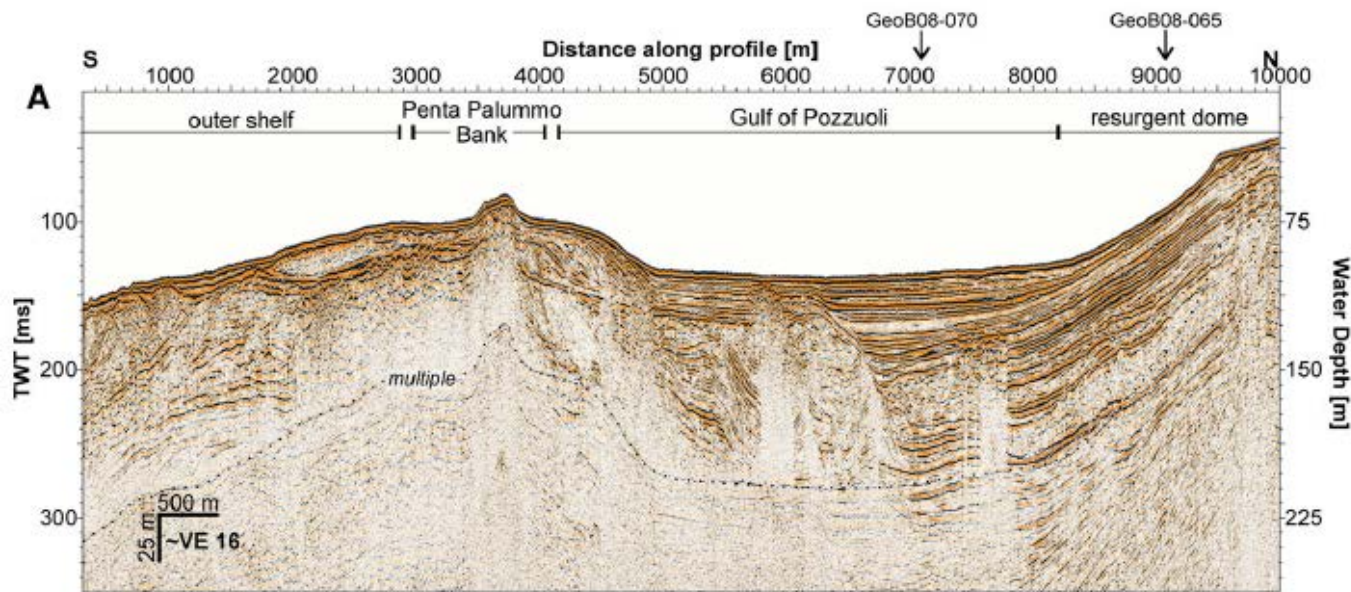


Average uplift rate: 9–12 mm/year (15–4 ka)

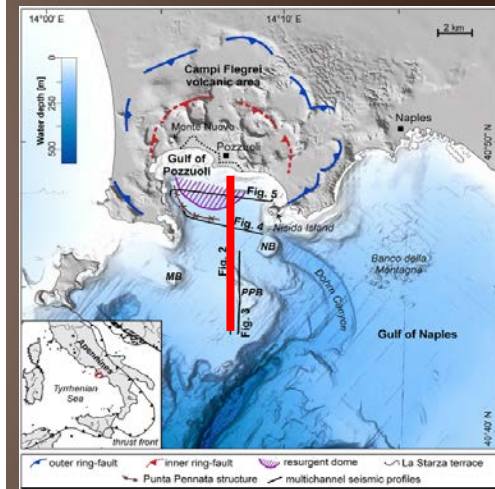
Sacchi et al., 2009, 2014 ; Steinmann, Spiess & Sacchi, 2016

Very high-resolution single-channel reflection seismics



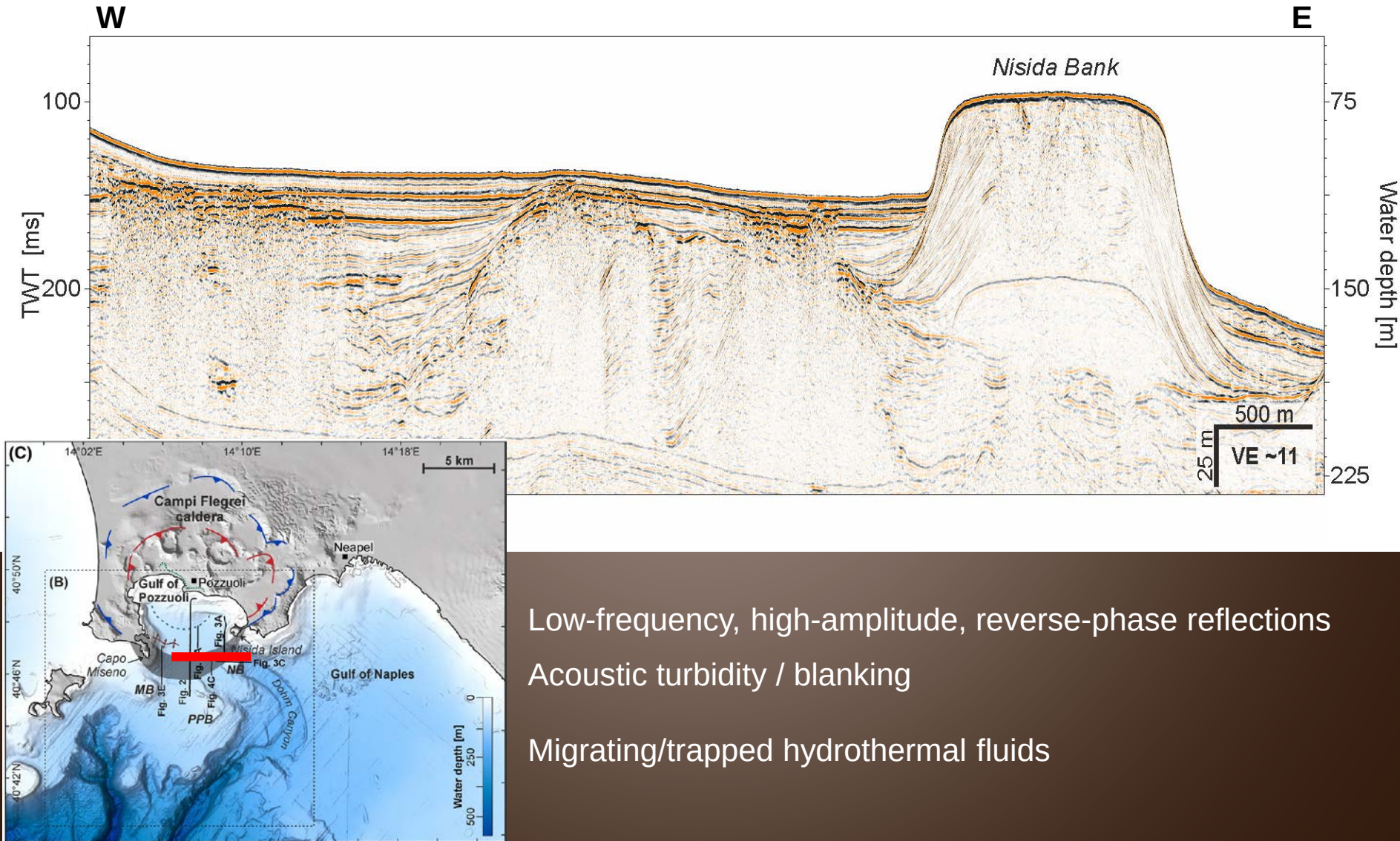


high-resolution multi-channel reflection seismics



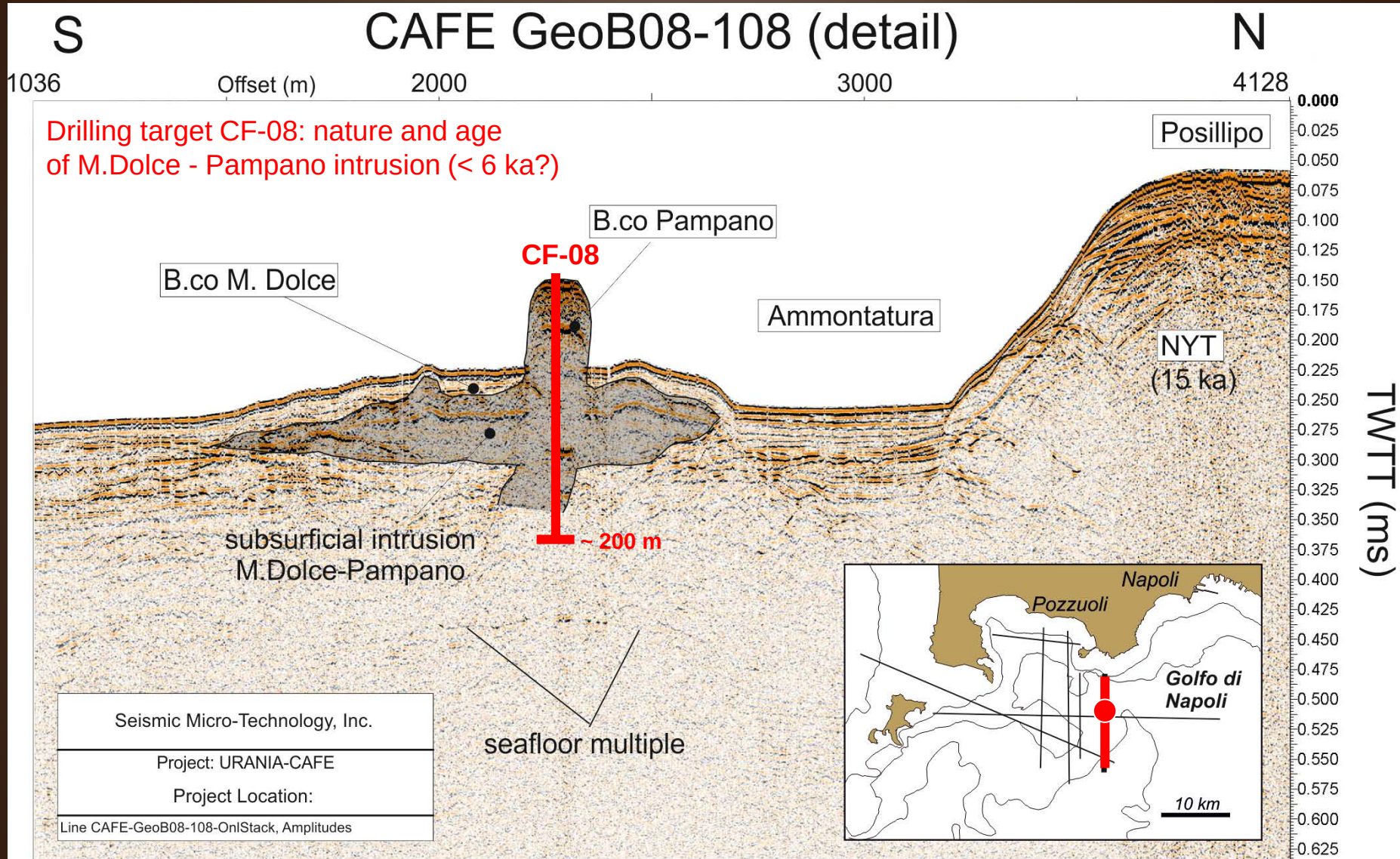
Drilling target CF-06:
age and petrology of
volcanic basement
older than CI (39 ka)

Monogenic volcanoes often associated with diffused hydrothermal venting along ring fault zone



Low-frequency, high-amplitude, reverse-phase reflections
Acoustic turbidity / blanking
Migrating/trapped hydrothermal fluids

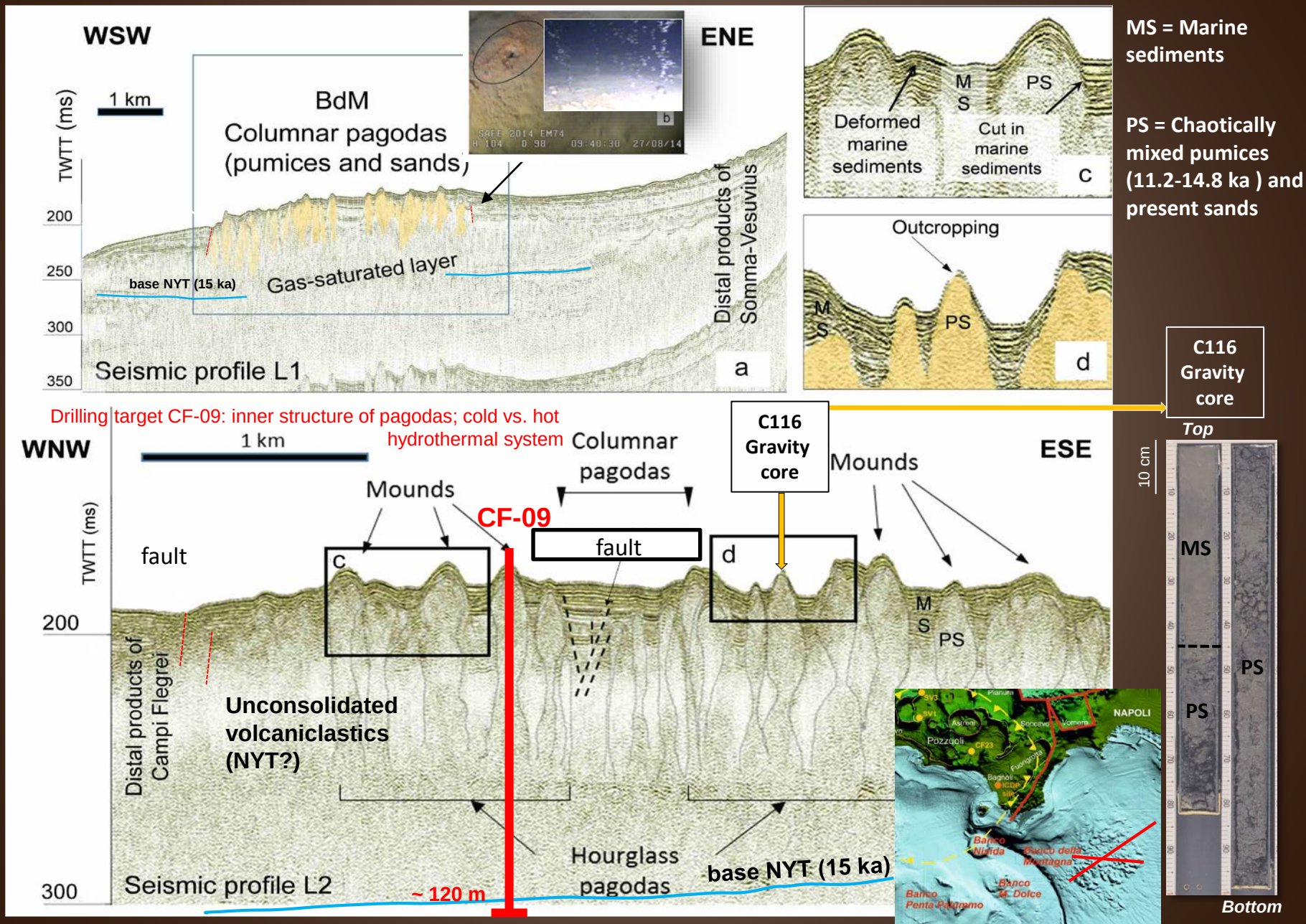
high-resolution multichannel reflection seismics



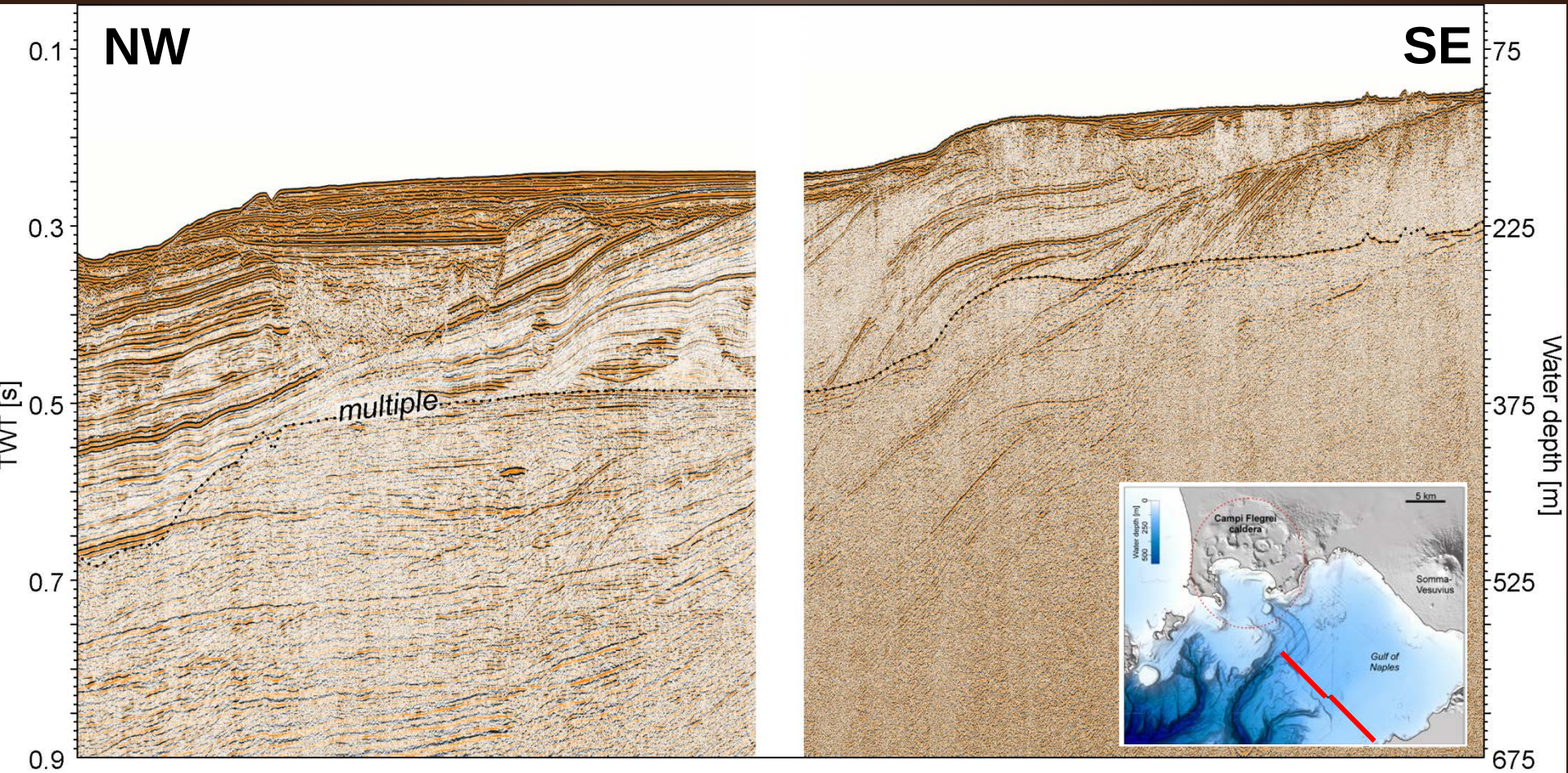
Soft sediment deformation and diapirism at hydrothermal vents

mixing between gas, marine and volcanoclastic deposits

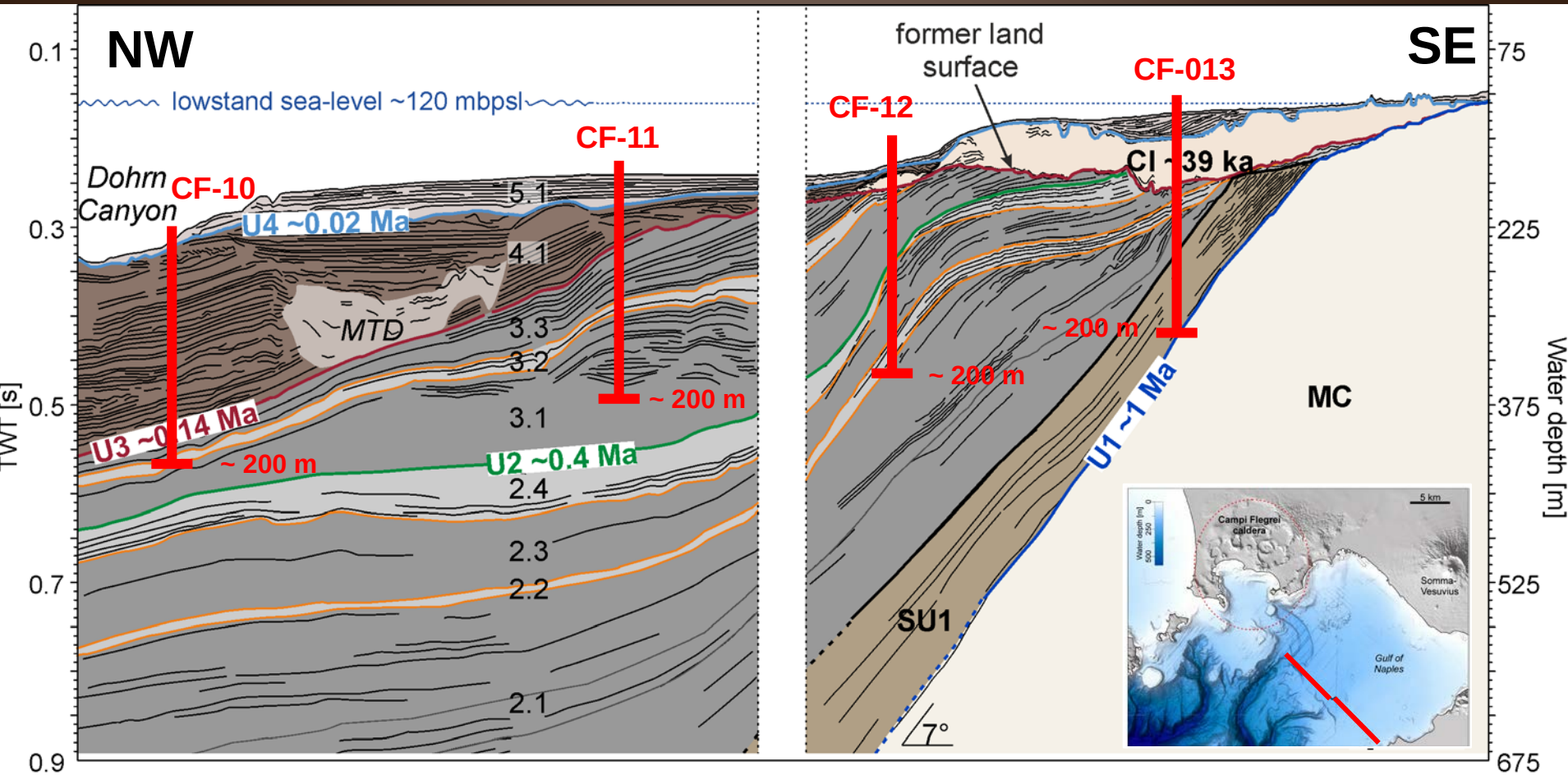
mantle-derived fluids mixed with gases from decarbonation reactions of crustal rocks



Napoli half-graben basin fill



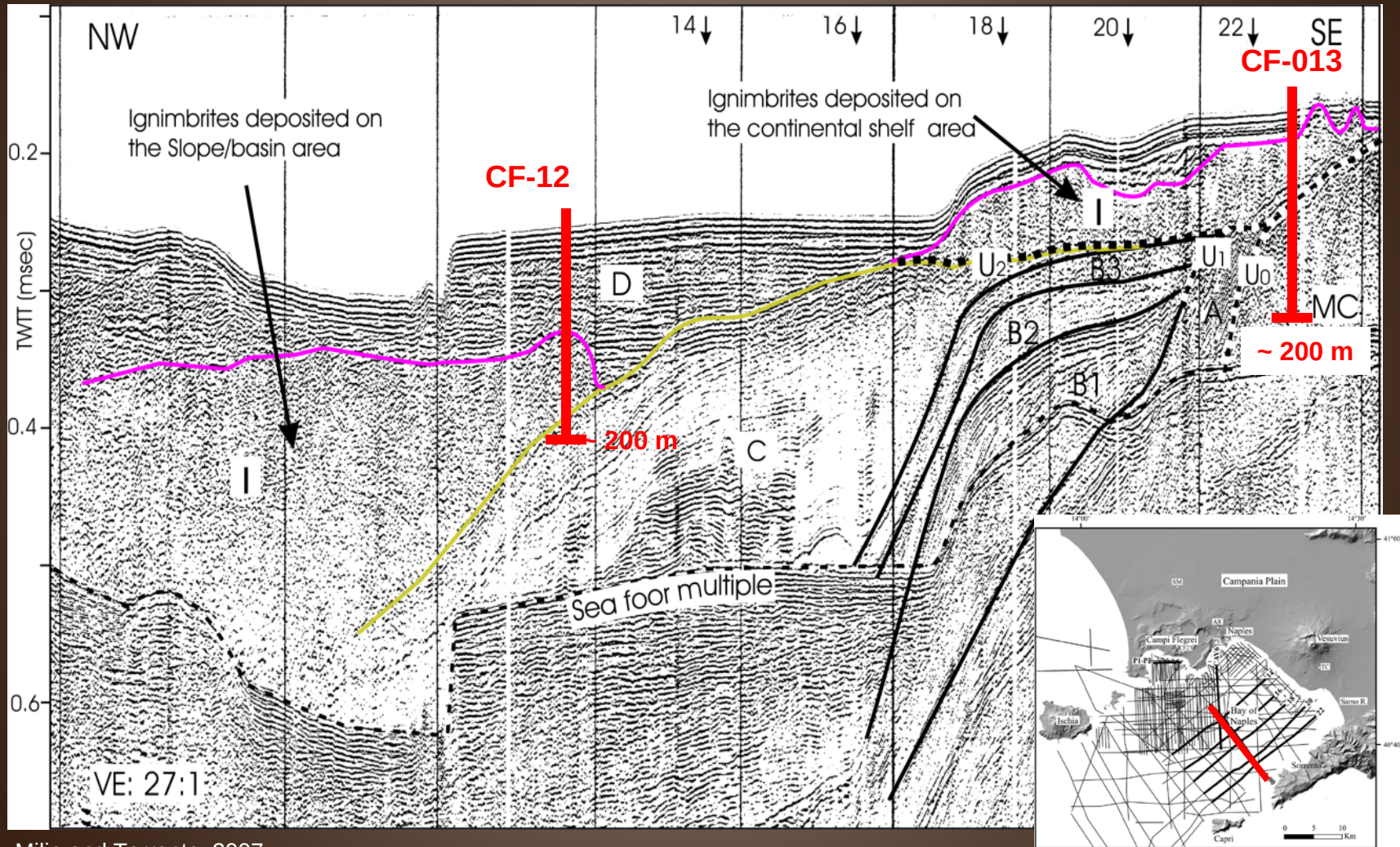
Napoli half-graben basin fill



Drilling targets (transect) CF-10-13: a composite section of the upper Quaternary mixed siliciclastic volcanoclastic succession of the Naples Bay.

Napoli half-graben basin fill

Campania Ignimbrite (CI) and pre-CI ignimbrites



Campi Flegrei Amphibious Drilling Proposal (IODP-ICDP)

ICDP proposed site ● IODP proposed sites ●

Submission due by October 2018



Tyrrhenian Sea

CF- 04 ●

Procida

Ischia

Banco della Montagna

CF- 09 ●

Napoli Bay

CF- 10 ●

CF- 11 ●

CF- 12 ●

CF- 13 ●