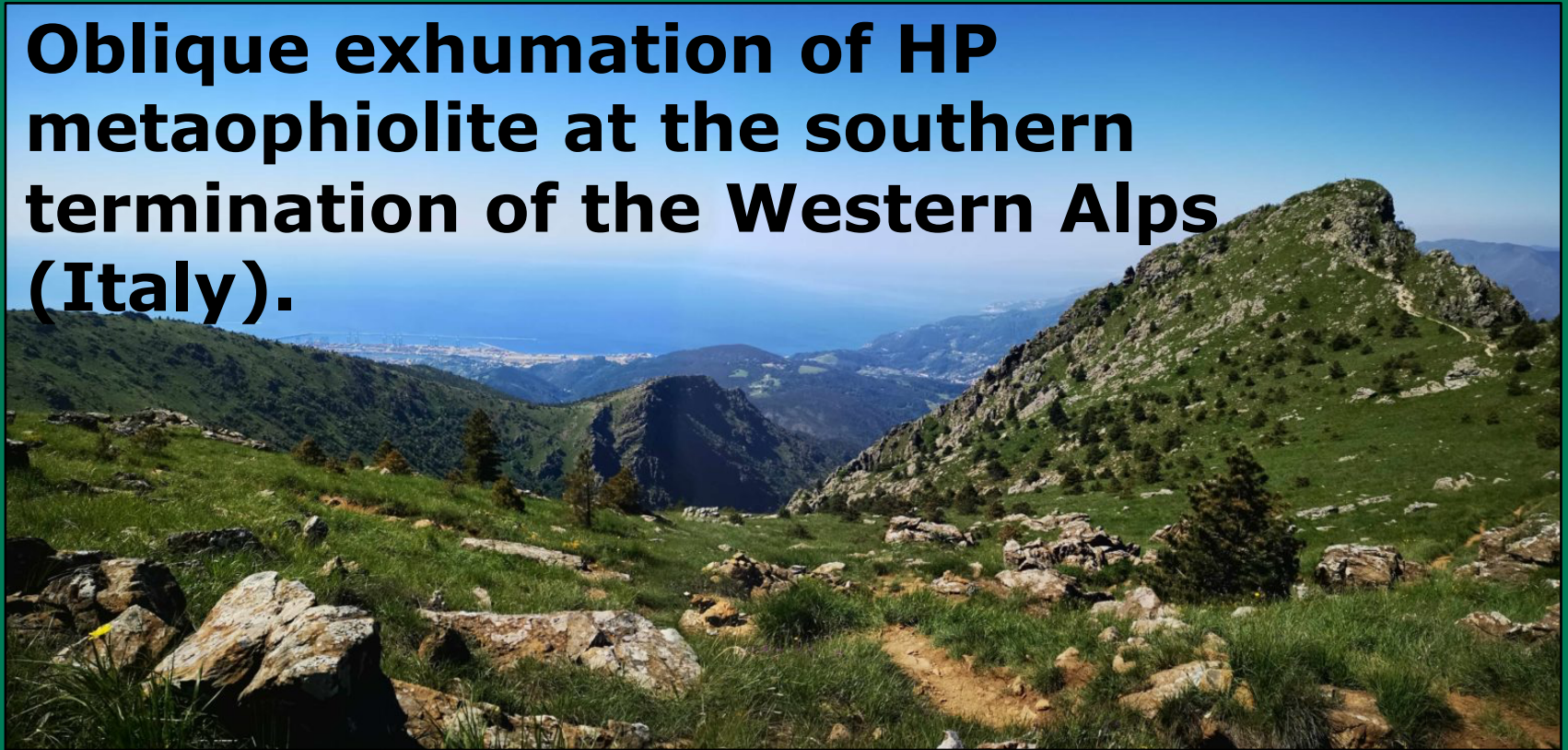


Oblique exhumation of HP metaophiolite at the southern termination of the Western Alps (Italy).

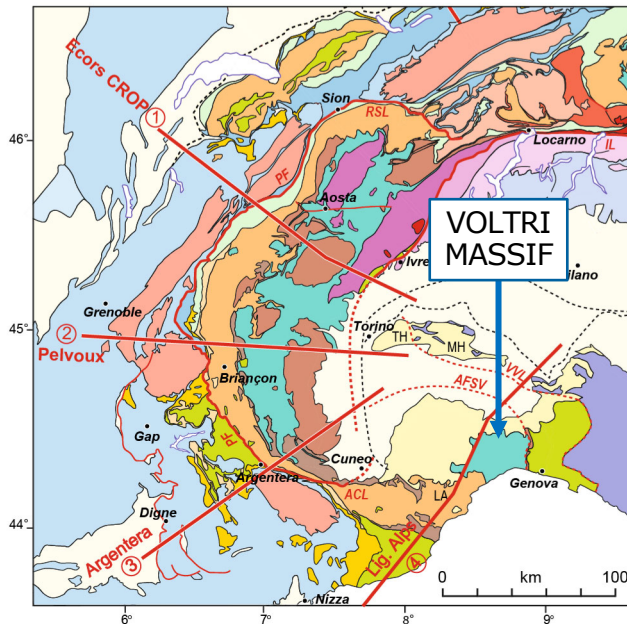


Laura Federico, Laura Crispini, Michele Locatelli, Paola Cianfarra

Data and interpretations shown in this presentation derive from long-term discussions with co-workers (a.o. G. Capponi, G. Molli, M. Scambelluri) and from the work of old and new students: we want to acknowledge, among others, contributions by C. Malatesta, M. Scarsi and C. Spagnolo.

Introduction to the problem

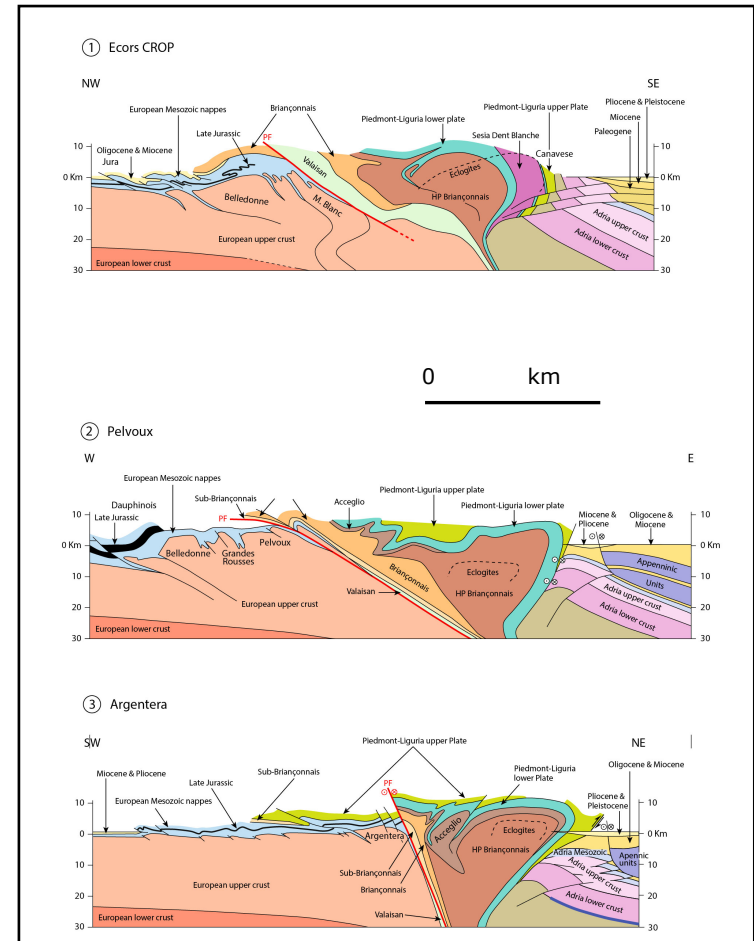
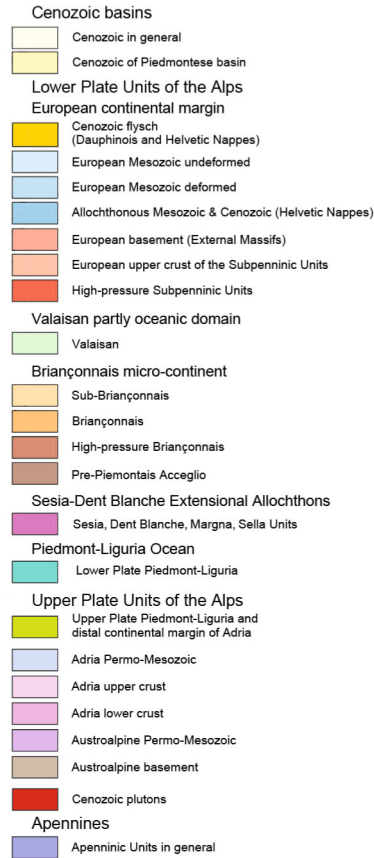
Tectonic map of the Western Alps



(mod. after Schmid et al., 2017)

Faults in red: RSL Rhone-Simplon Line, IL Insubric Line, PF Penninic Front, ACL Argentera-Cuneo Line, AFSV front of the metamorphic core of the Alps and Sestri-Voltaggio line, VVL Villalvernia-Varzi line.

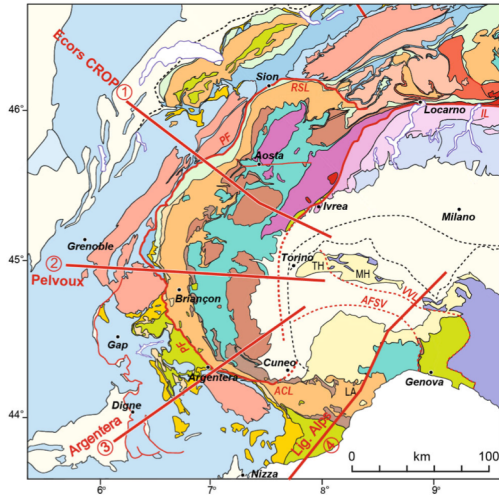
Abbreviations in black are: LA Ligurian Alps, TH Torino hills, MH Monferrato hills, GB Giudicarie transpressive belt



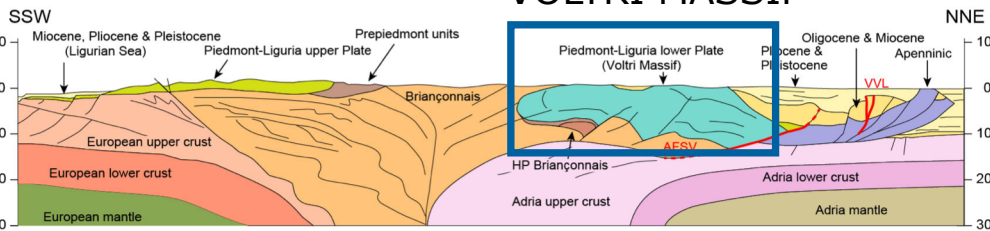
Geological setting

OROGEN-SCALE

Tectonic map of the Western Alps

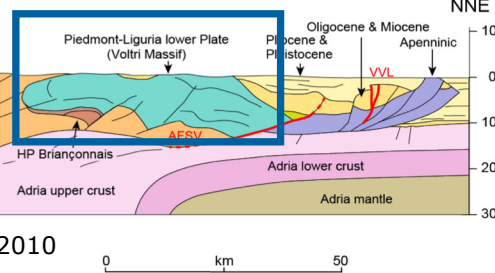


④ Ligurian Alps

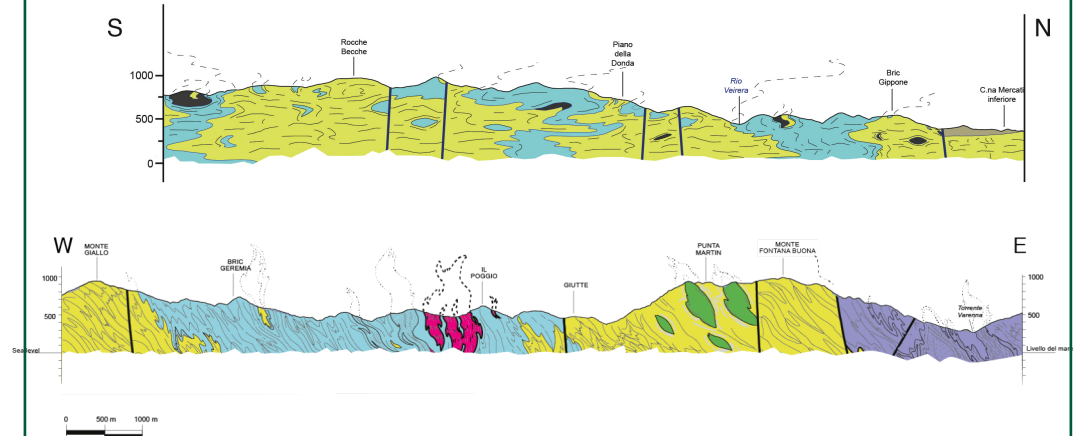


Redrawn and modified after Molli et al. 2010

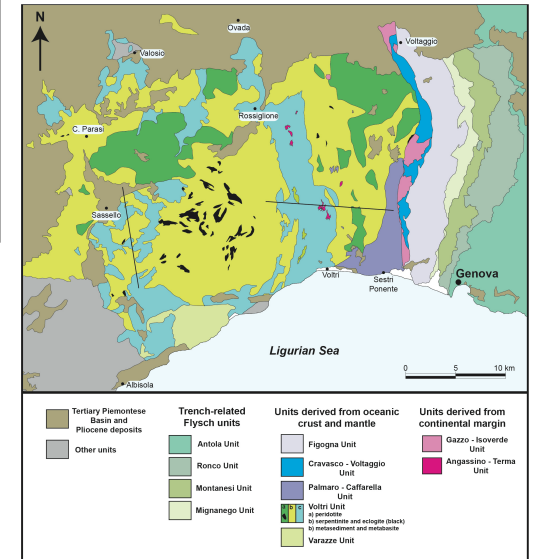
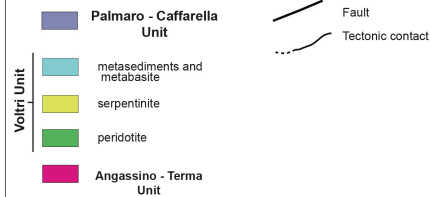
VOLTRI MASSIF



MASSIF-SCALE



LEGEND



Modified after Capponi et al., 2016

Introduction

Geological
setting

Structural
data

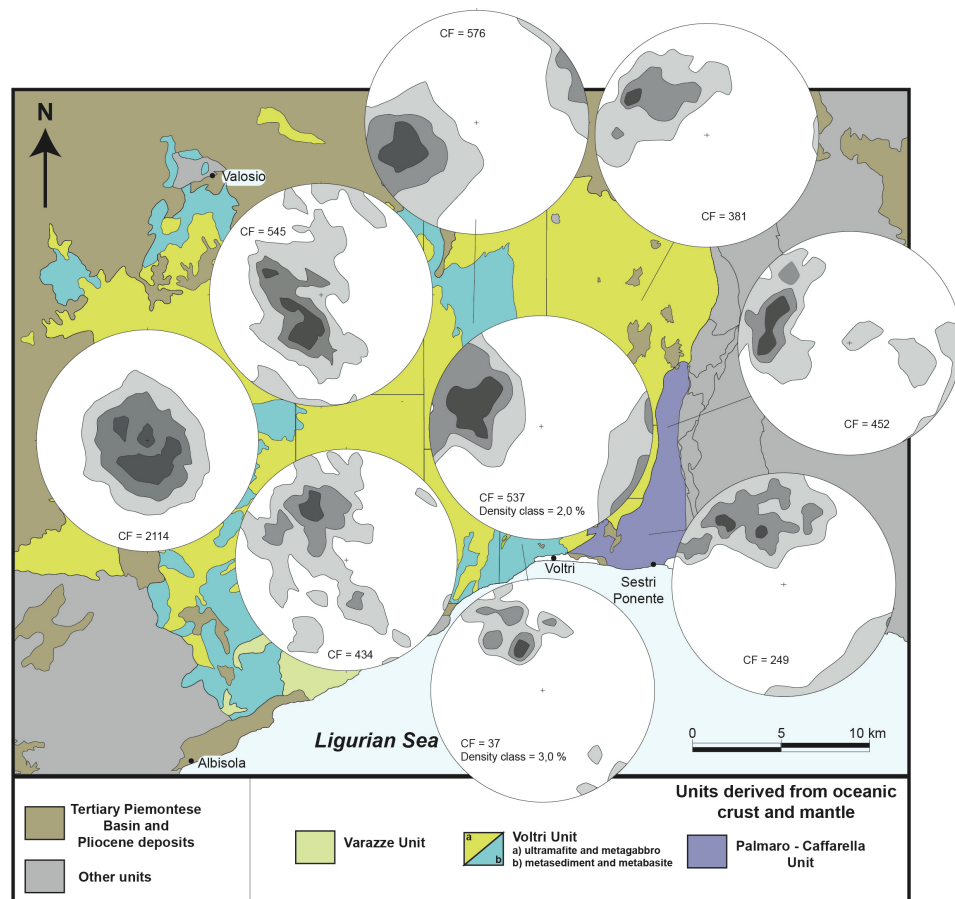
Geochronol.
data

Geodynamic
model

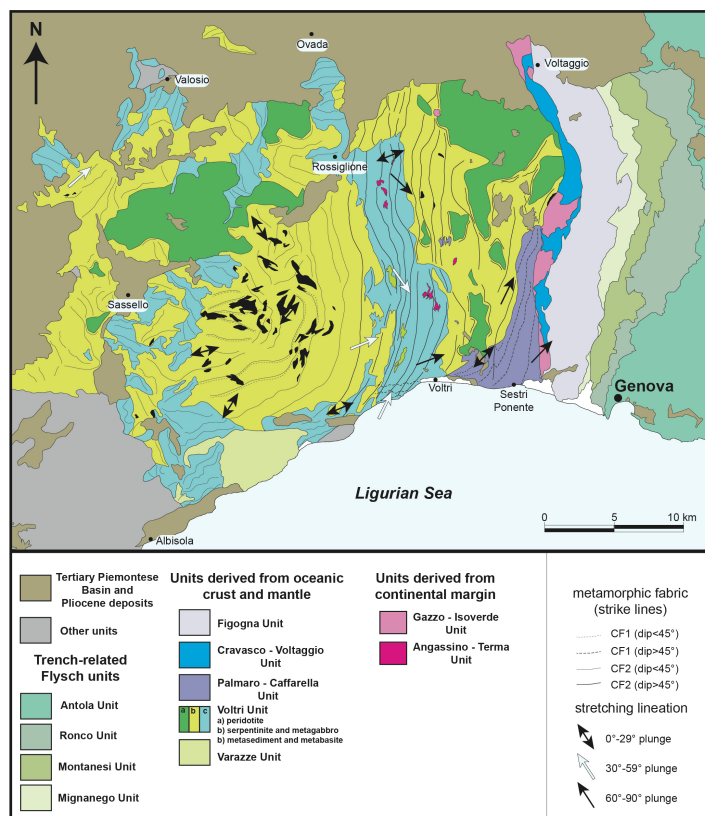
Conclusions

Structural data

Regional schistosity (Composite Fabric, CF)



Strike lines of regional schistosity (CF) and stretching lineations



Structural data

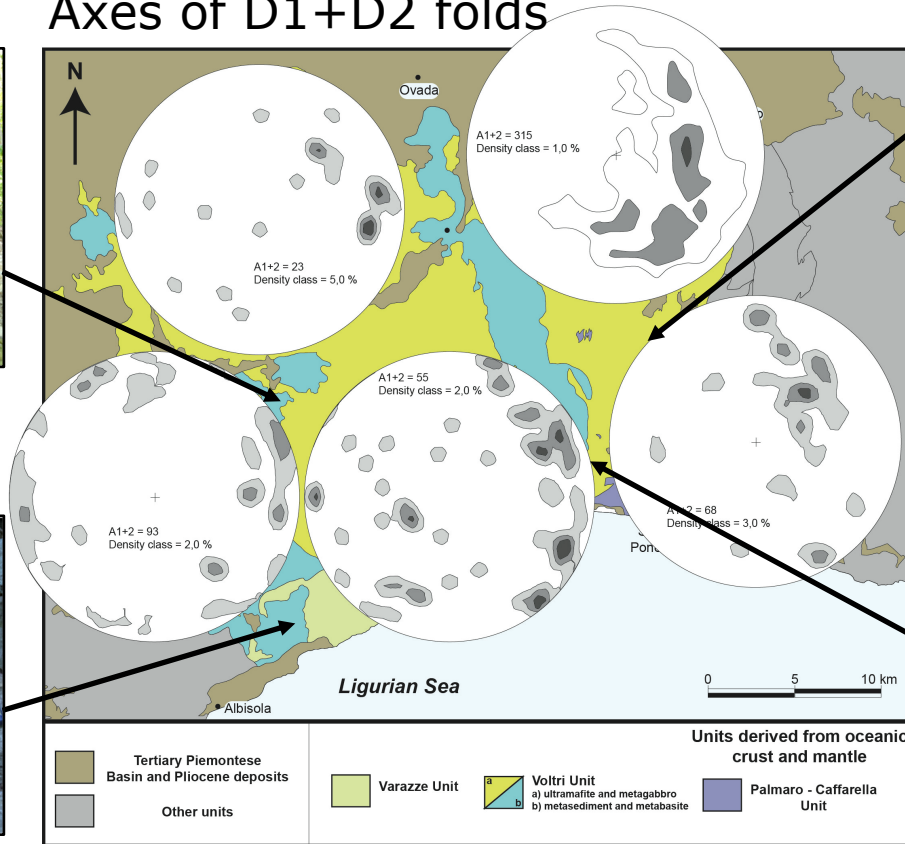
Axes of D1+D2 folds



D1+2 isoclinal fold,
Voltri metasediments,
Rio Reborgo



D1+2 isoclinal fold,
Voltri metasediments,
Torrente Teiro

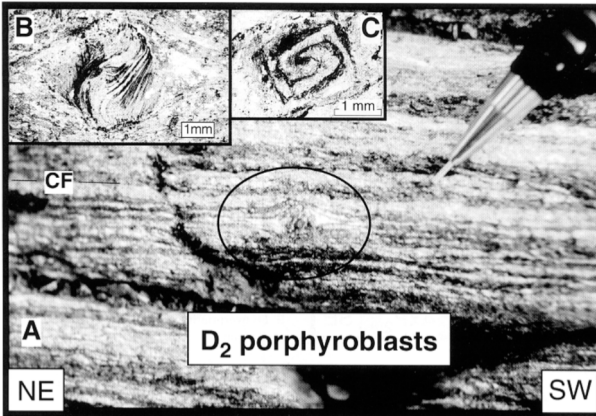


D1 + D2 Type 3
interference pattern;
metasediments of the
Palmaro-Caffarella Unit,
Val Varenna. (Capponi et
al., 2008)



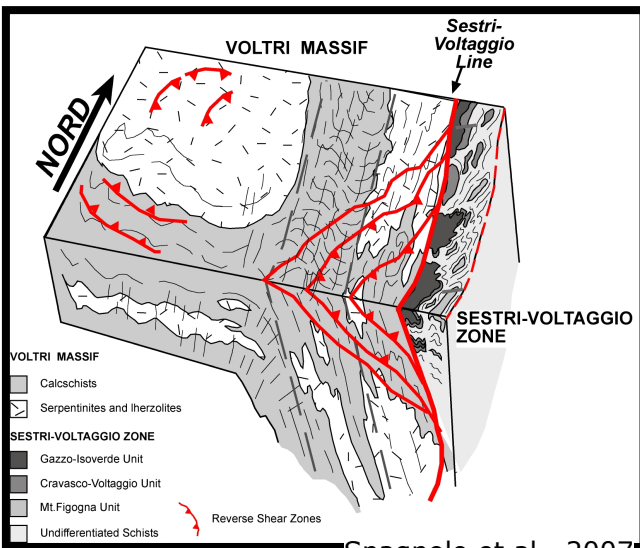
Sheath fold: metasediments of
the Voltri Unit, Monte Pennone
(Capponi et al., 2008).

Structural data

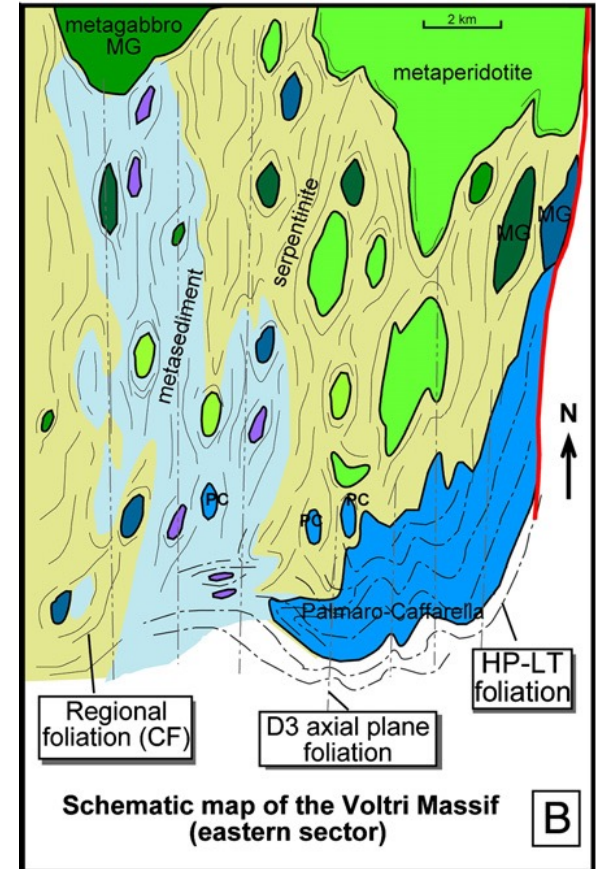


D2 mantled porphyroblasts in eastern Voltri metasediments (field «A» and micro «B» and «C» photographs. Capponi & Crispini, 2002)

$\gamma = 10$ has been estimated in the eastern sector of the Massif (Crispini, 1996).

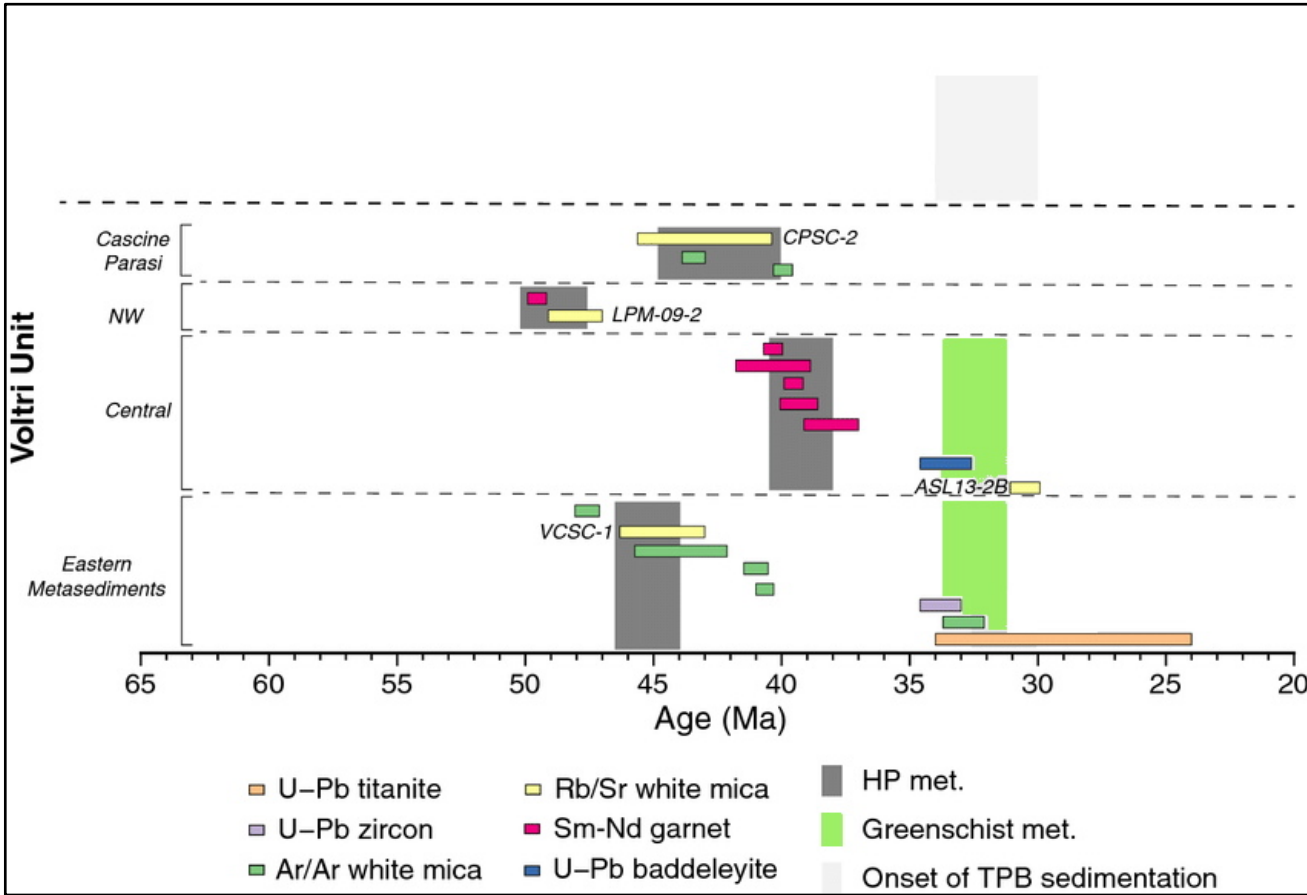


Spagnolo et al., 2007



Mod. after Malatesta et al., 2012

Geochronological data



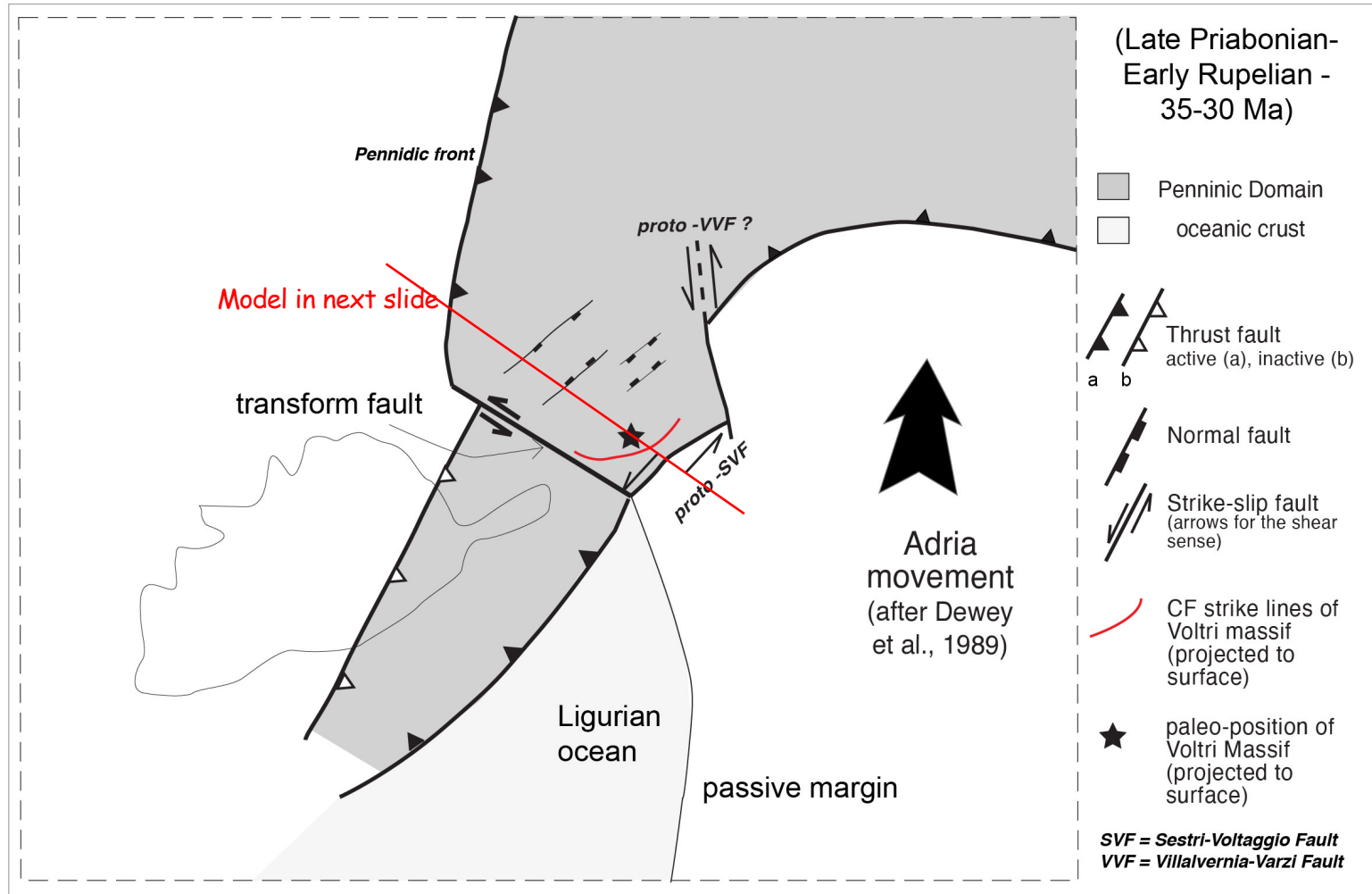
Geochronology of the Voltri Unit. Compilation of available geochronological data.
Horizontal bars correspond to 2σ errors.

Data sources: U–Pb titanite and zircon (Vignaroli et al. 2010); U–Pb baddeleyite (Rubatto and Scambelluri 2003); ^{40}Ar – ^{39}Ar mica (Barbieri et al. 2003; Federico et al. 2005); Sm–Nd garnet, (Starr et al. 2020), and Rb–Sr white mica, Smye et al., 2021.

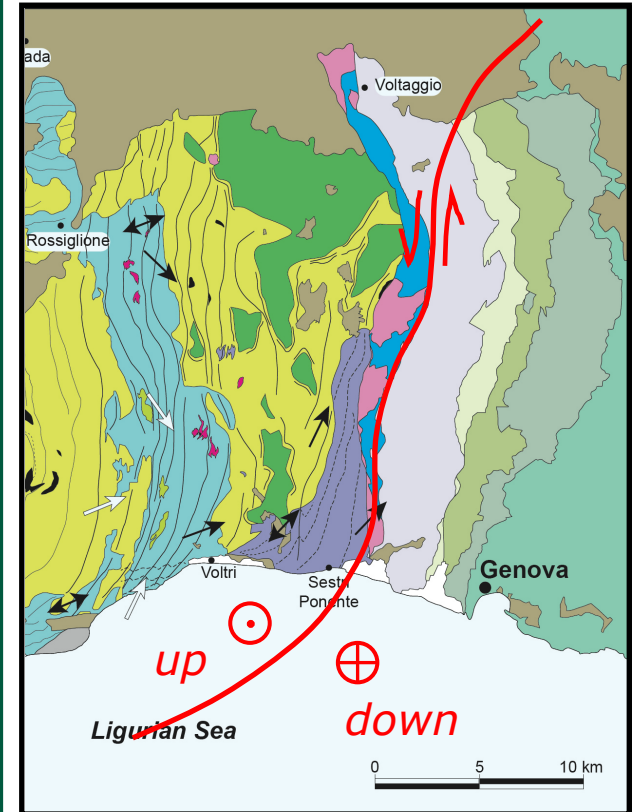
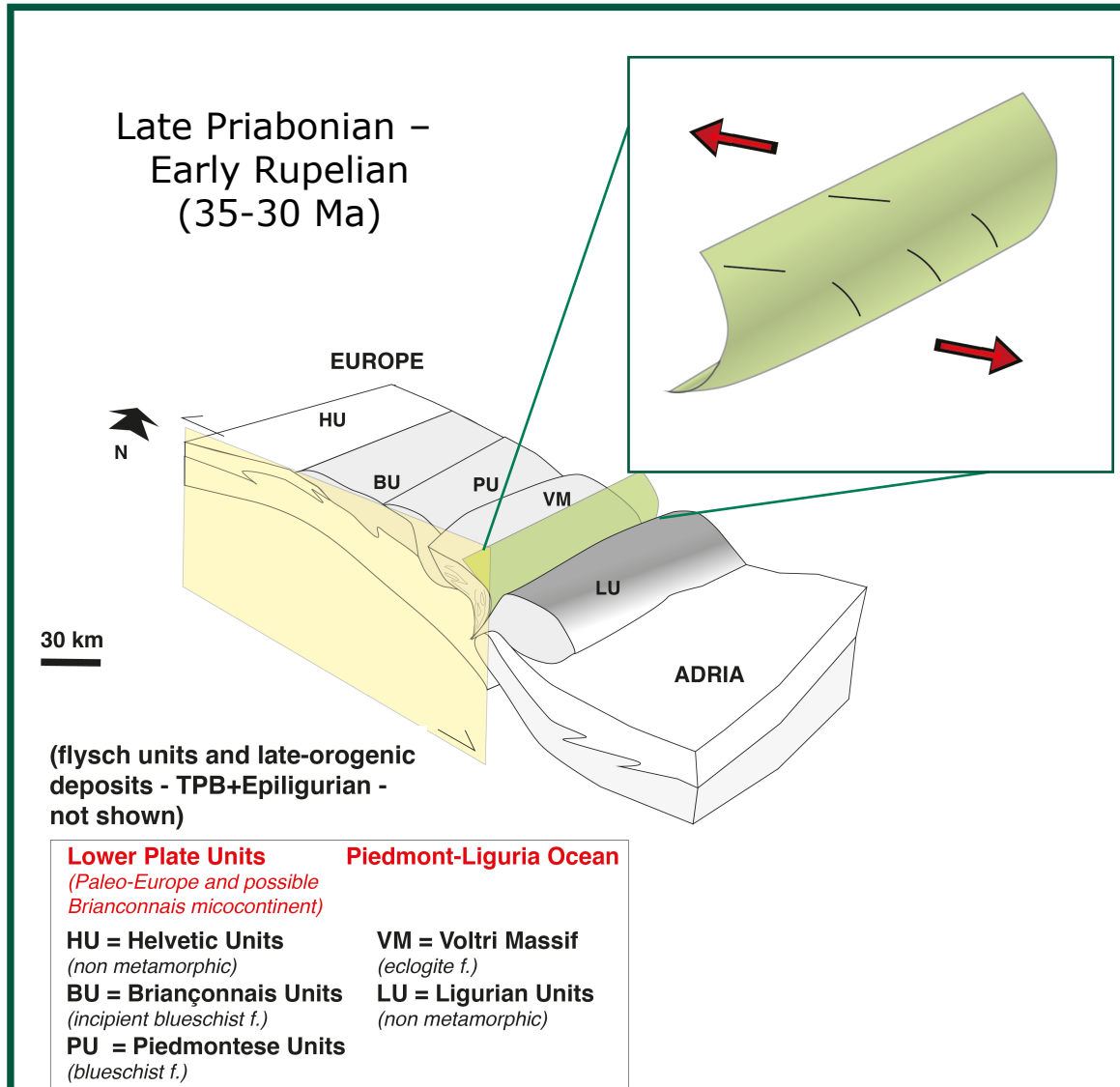
Age of onset of
TPB sedimentation from
Turco et al (1994) and
Gelati and Gnaccolini
(1998).

Mod. after Smye et al., 2021

Geodynamic model



Geodynamic model



Conclusions

- **The final exhumation of the Voltri massif occurred in a context of strongly oblique convergence**
- **It was accommodated by a sinistral shear zone and laterally confined by a sinistral transform fault**
- **The interference between these two structures caused a disruption of the HP units and a strongly non cylindrical structural setting**

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