

CHANTIER RGF – PYRÉNÉES

Processus de circulations de fluides et de minéralisations dans les Pyrénées

Philippe BOULVAIS (Univ. Rennes 1), Jérémie MELLETON (BRGM)

04 juin 2019 - Pau

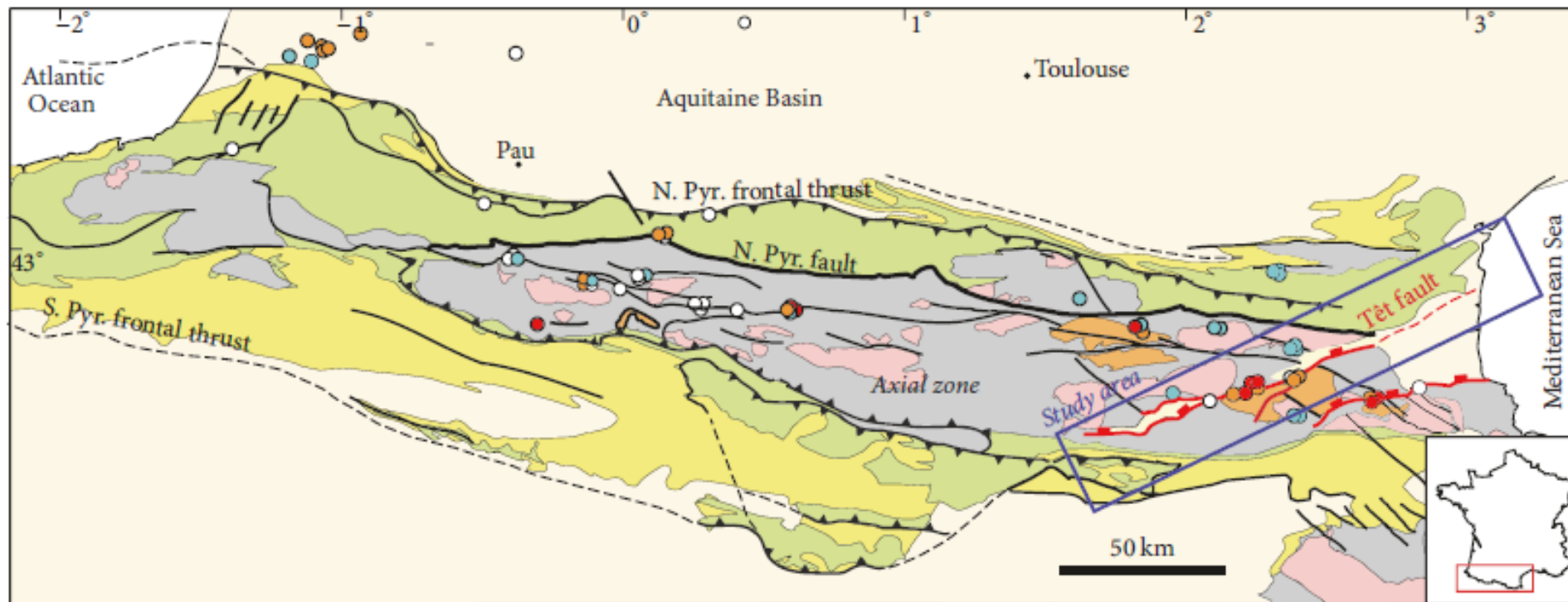
FLUIDES

- ACTUELS

- PYRÉNÉENS

- VARISQUES

FLUIDES ACTUELS



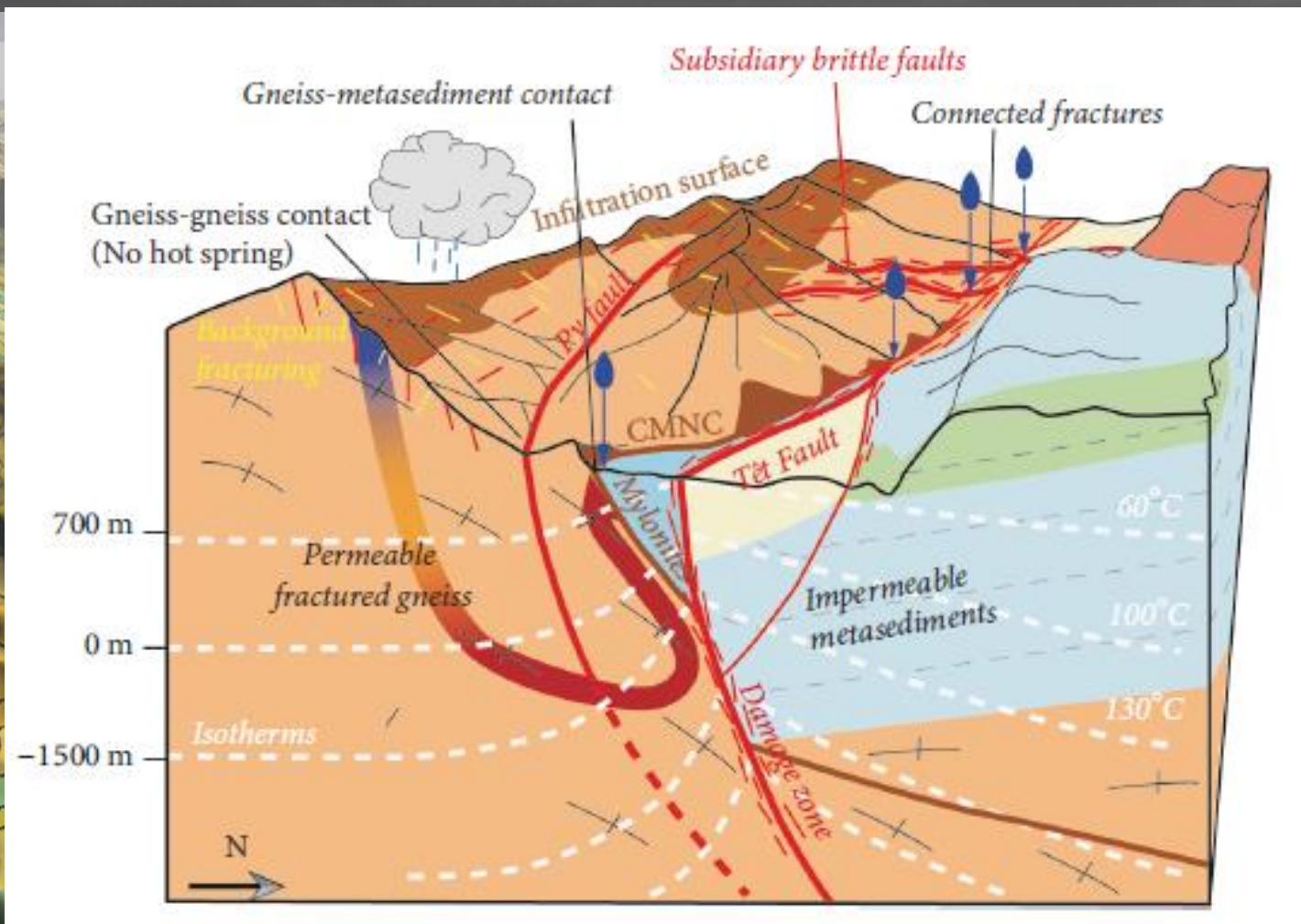
Tertiary in forelands
 Pyrenean tertiary
 Mesozoic

(1) (3)
 (2)
 Paleozoic basement
 (1) Granite
 (2) Gneiss
 (3) Paleoproterozoic sediments

Hot springs and temperatures (°C)
 25 75

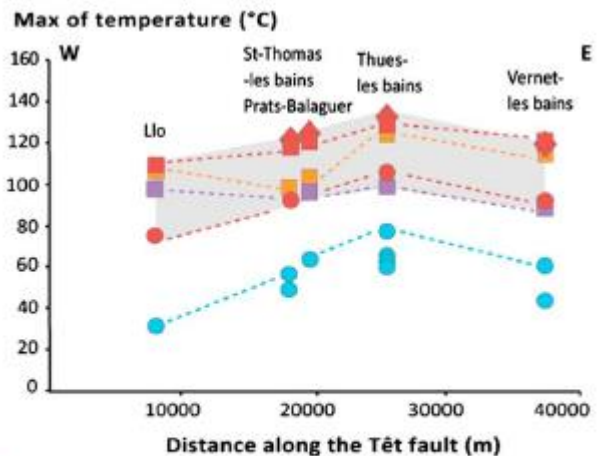
Taillefer et al.,
Geofluids, 2017

FLUIDES ACTUELS



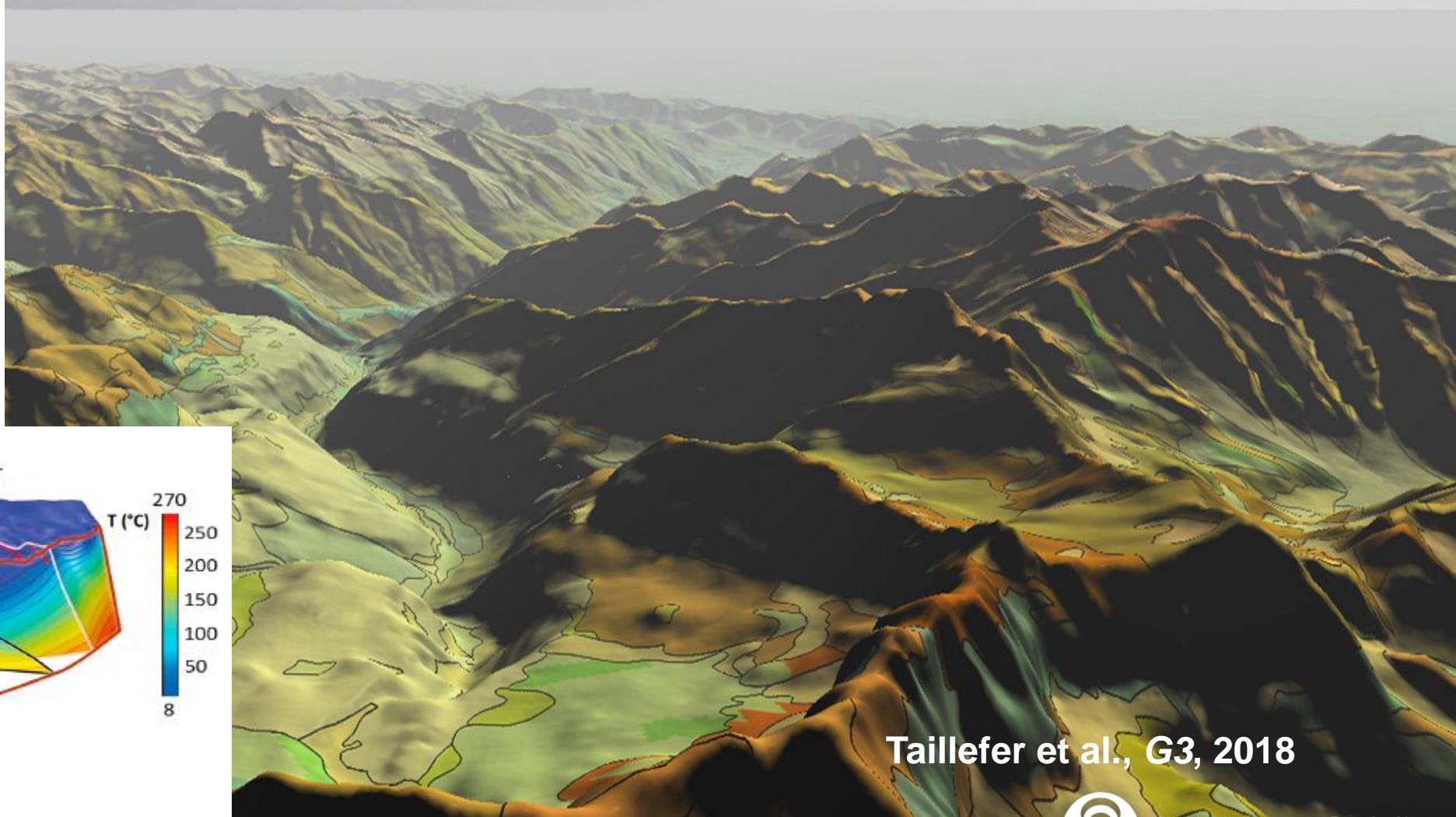
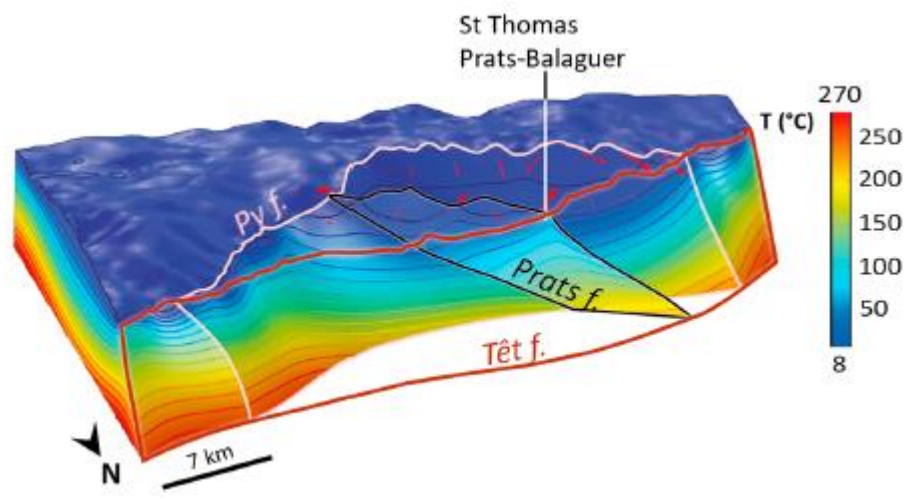
Taillefer et al.,
Geofluids, 2017

FLUIDES ACTUELS



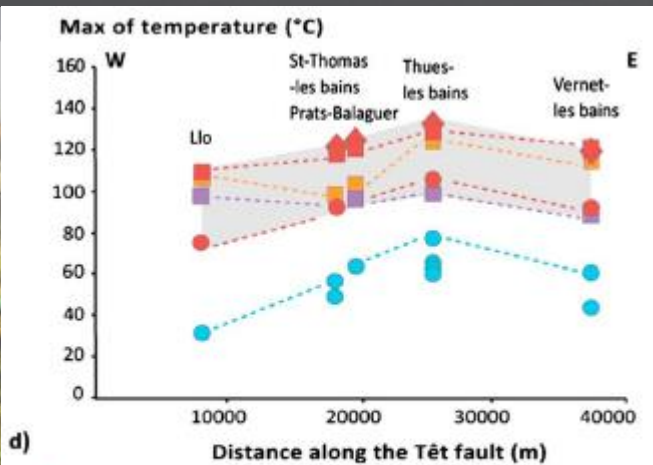
d)

- ◆ Qz with no steam loss
- Qz with steam loss
- Chalcedony
- Na/Li
- Na/K
- Hot springs in the field

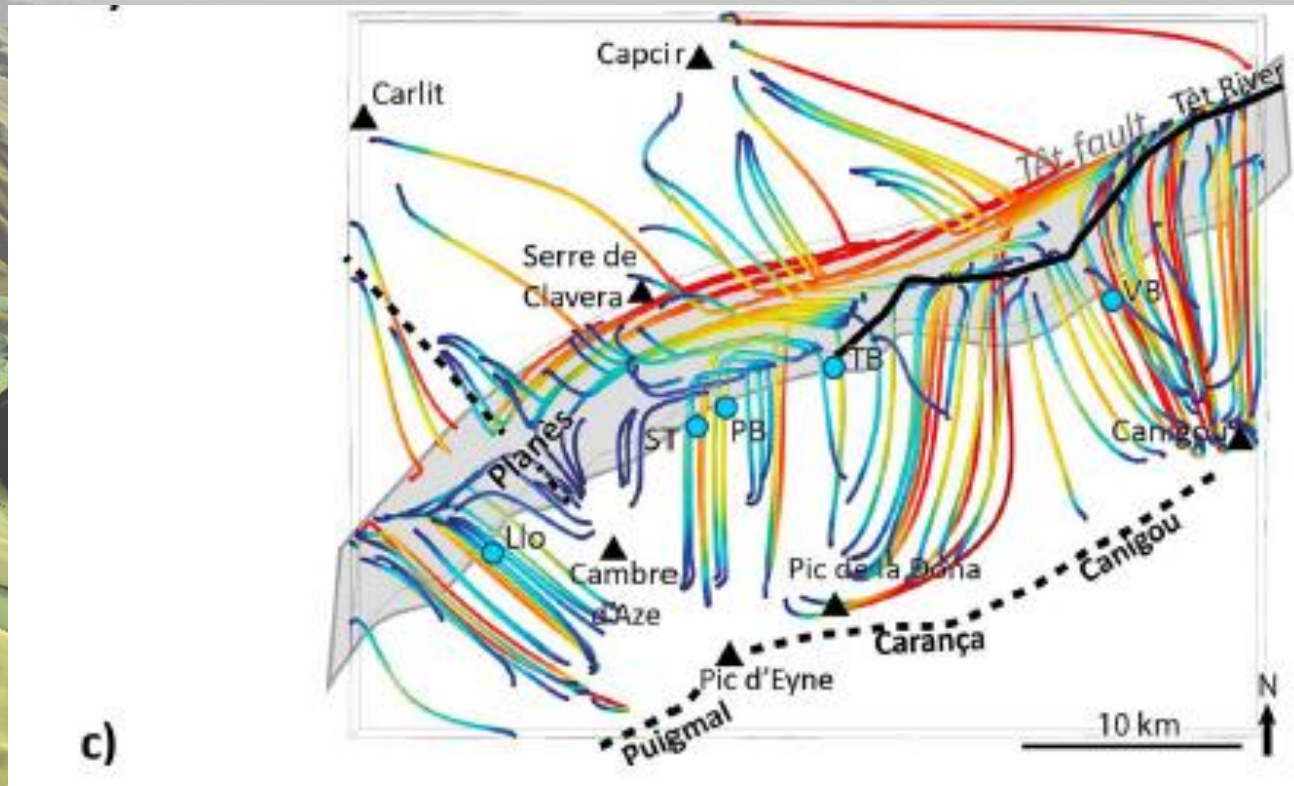
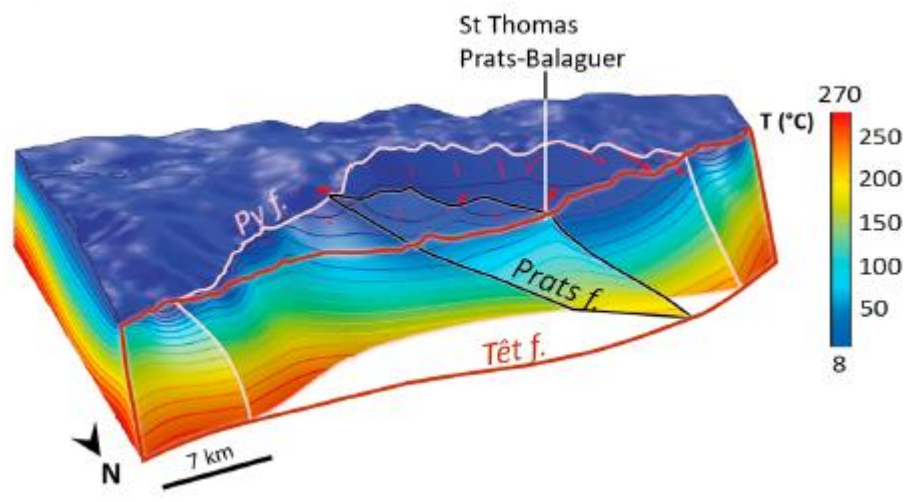


Taillefer et al., G3, 2018

FLUIDES ACTUELS



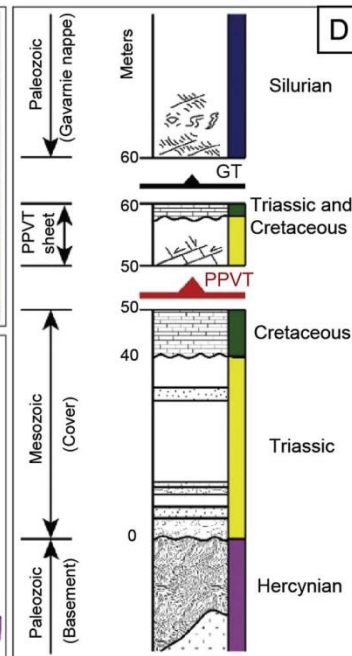
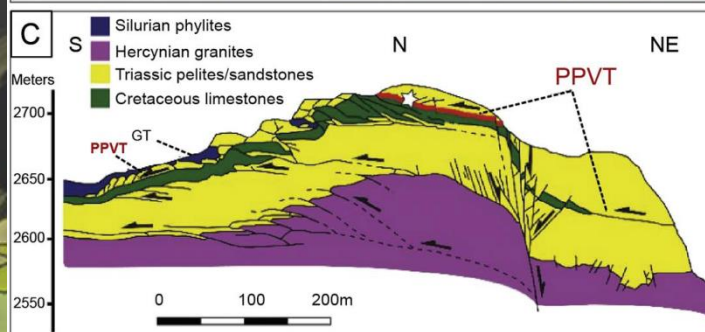
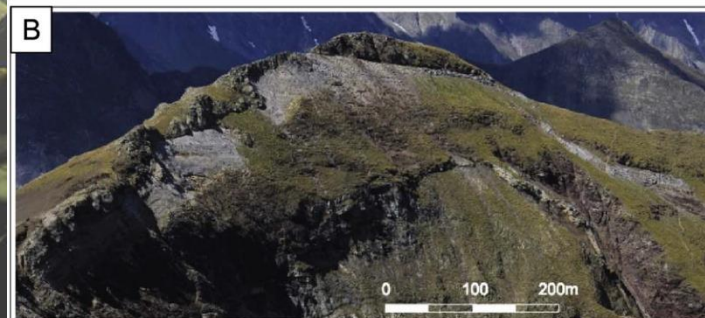
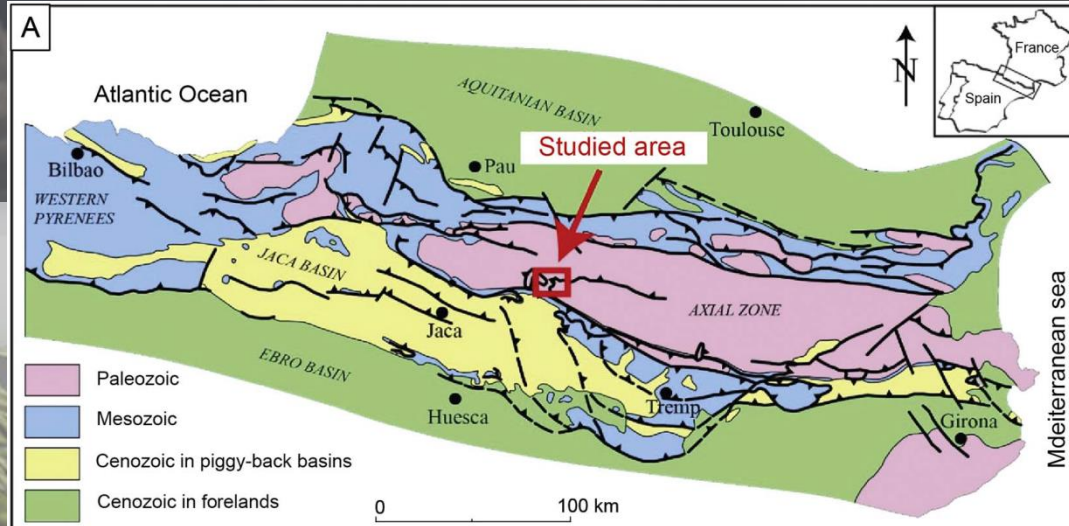
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- Chalcedony
- Na/Li
- Na/K
- Hot springs in the field



Taillefer et al., G3, 2018

FLUIDES PYRÉNÉENS

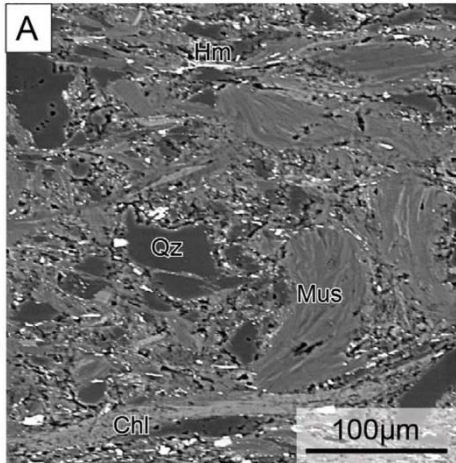
→ phase pyrénéenne
(raccourcissement)



Abd Elmola et al., App. Clay Science, 2017

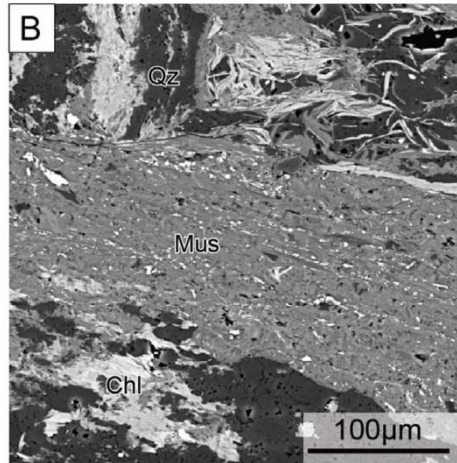
FLUIDES PYRÉNÉENS

PPV12-07 (damage zone)

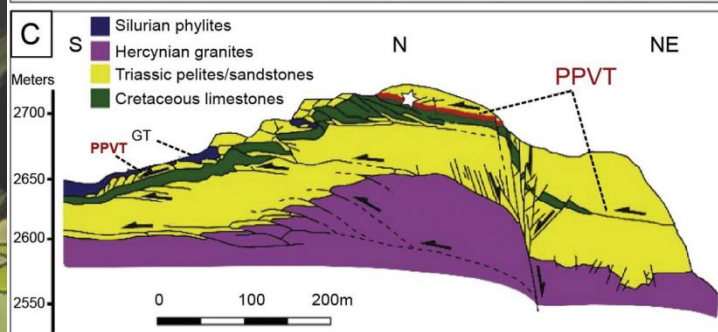
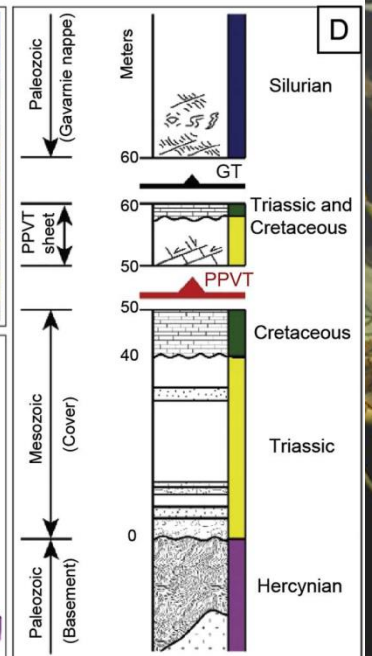
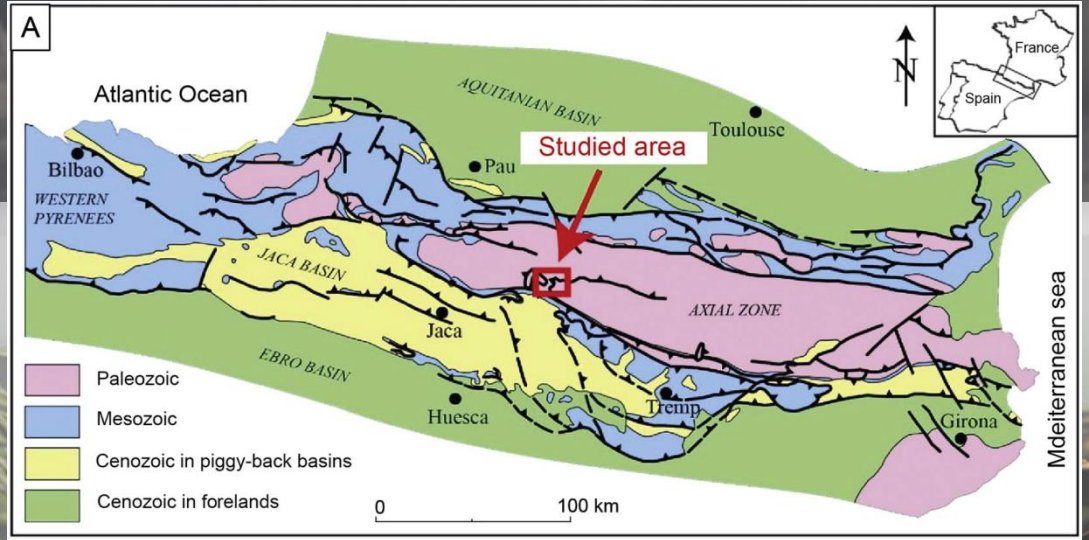
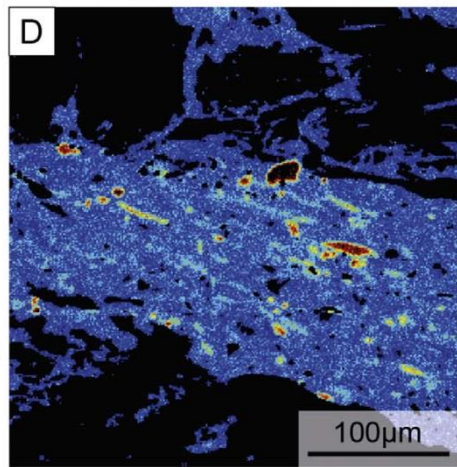
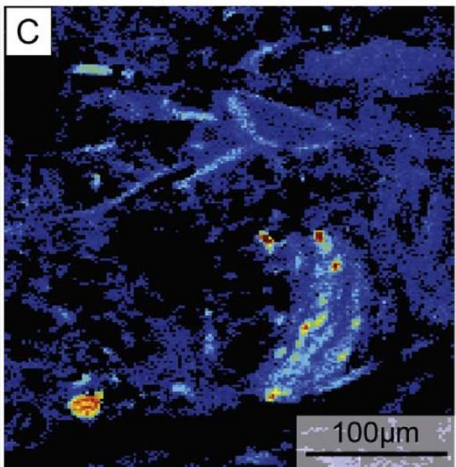


SEM-BSE images

PPV12-05 (core zone)



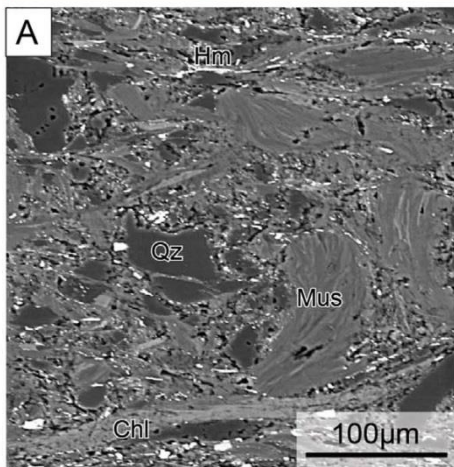
Na₂O oxide wt % in mica



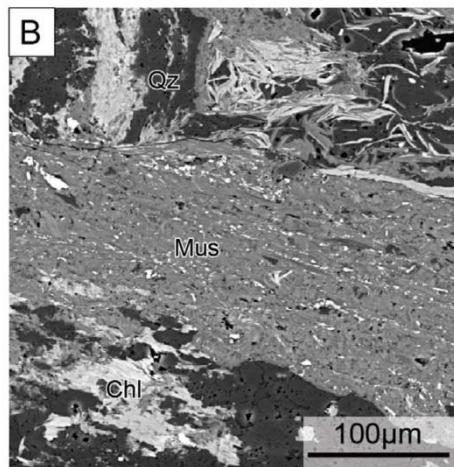
Abd Elmola et al., App. Clay Science, 2017

FLUIDES PYRÉNÉENS

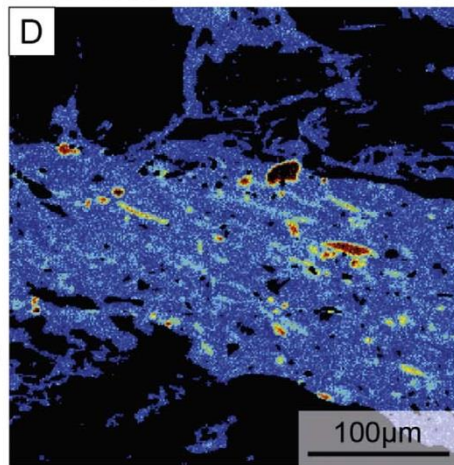
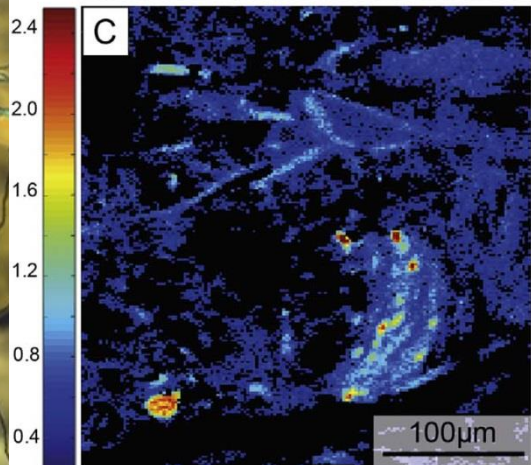
PPV12-07 (damage zone)



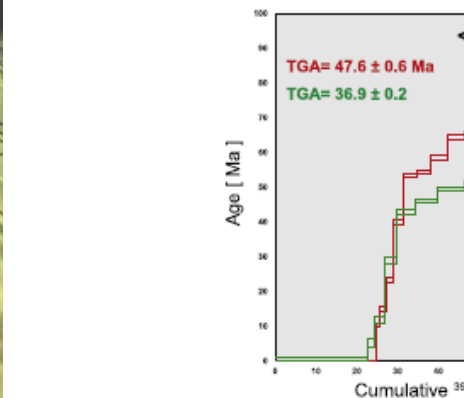
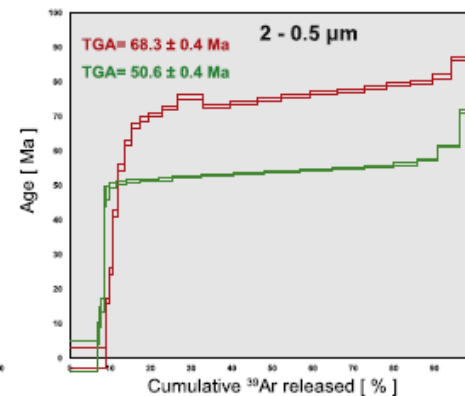
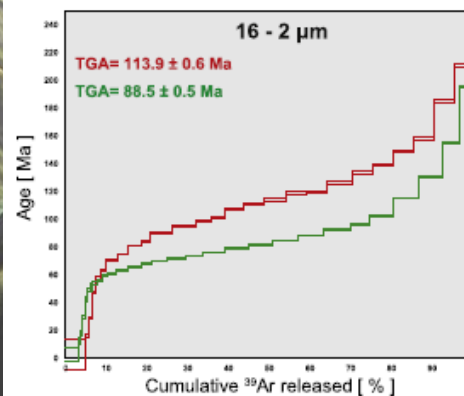
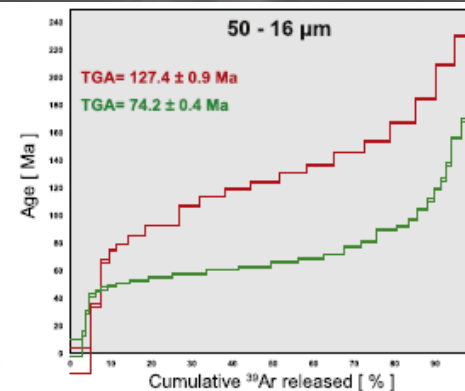
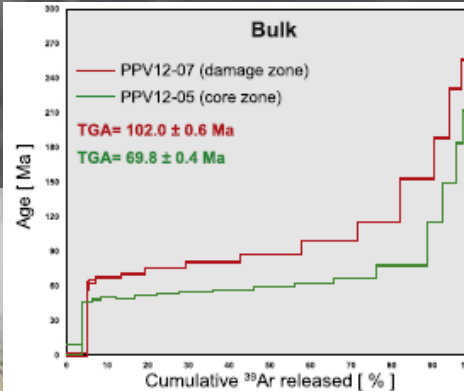
PPV12-05 (core zone)



SEM-BSE images



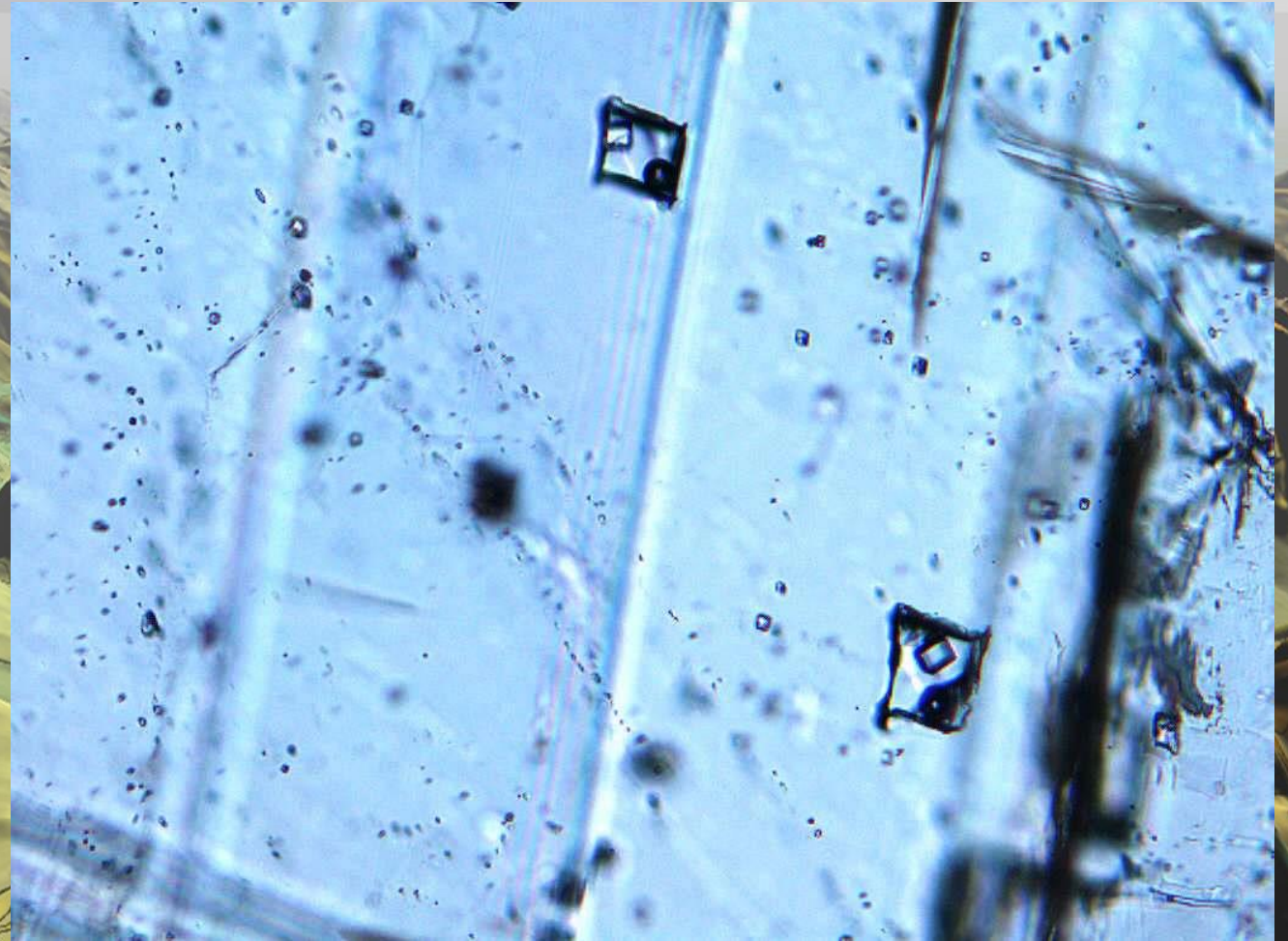
Na₂O oxide wt % in mica



Abd Elmola et al., Tectonophysics, 2018

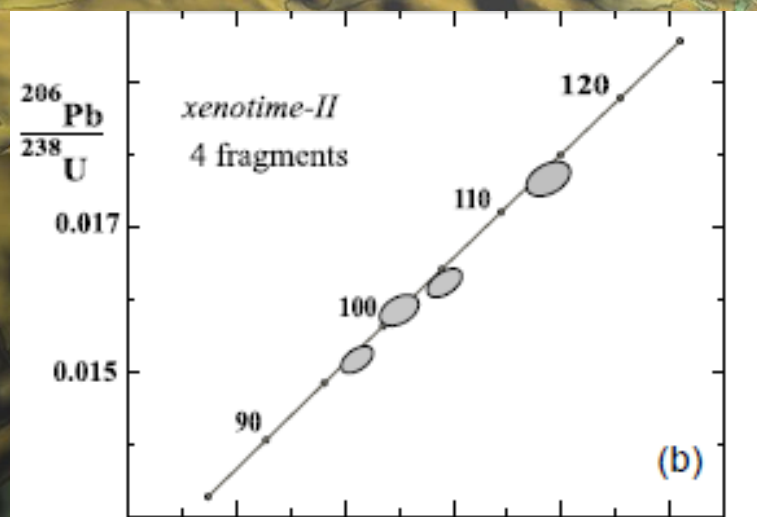
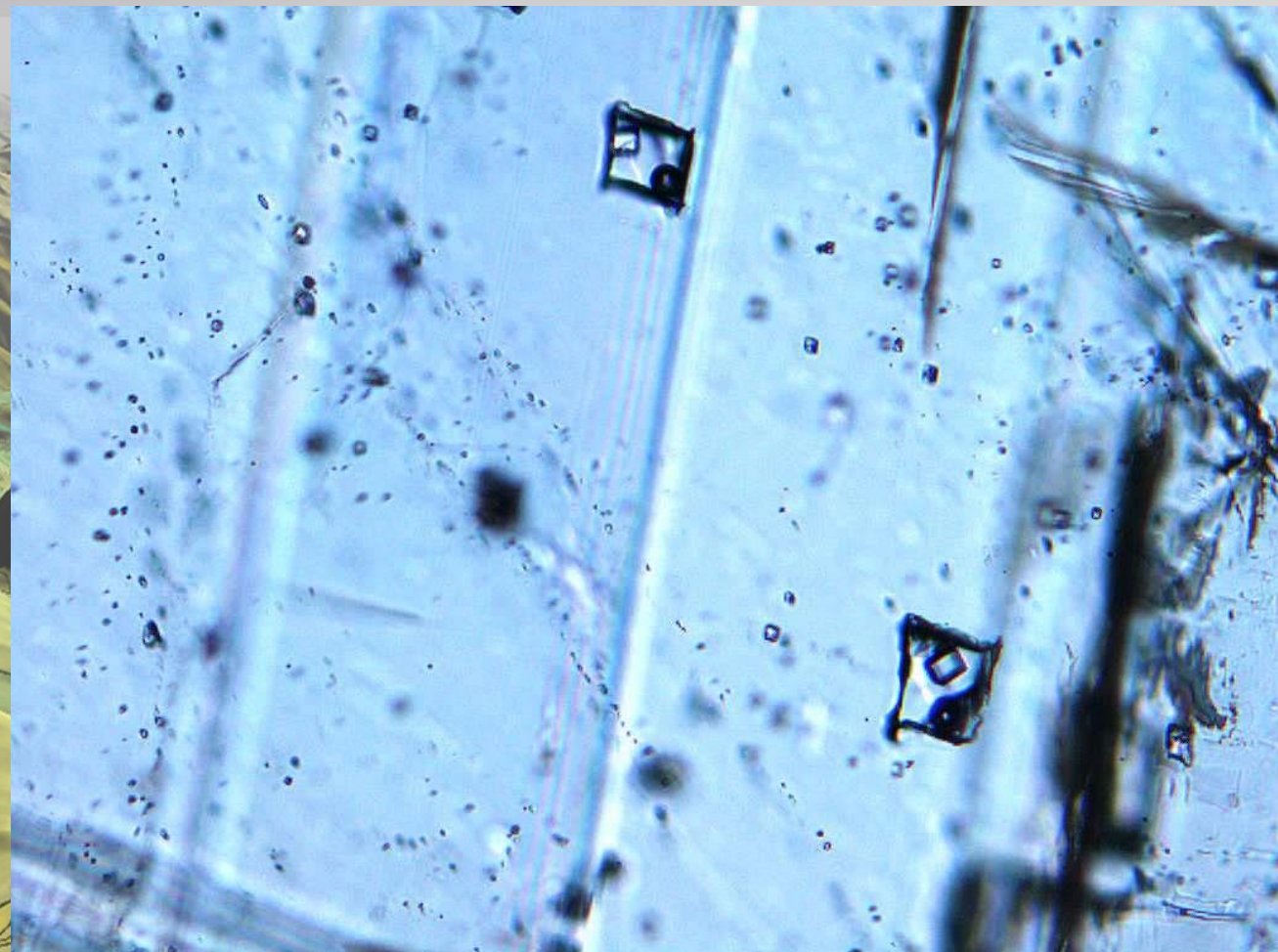
FLUIDES PYRÉNÉENS

→ phase eo-pyrénéenne
(étirement)



DEA Gaëtan Hubert, 2004, Rennes-Nancy

FLUIDES PYRÉNÉENS



Schärer et al., Terra Nova, 1999

FLUIDES PYRÉNÉENS

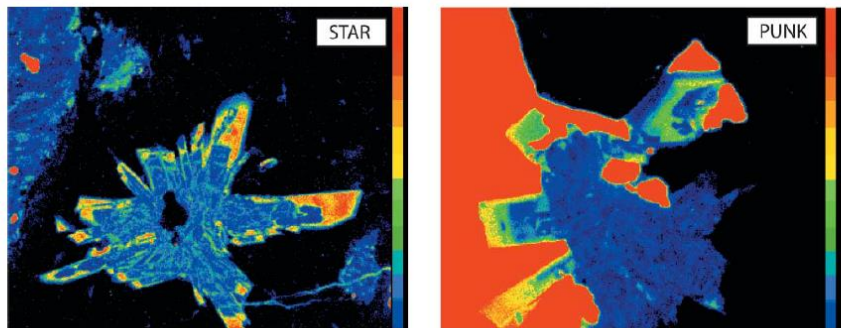
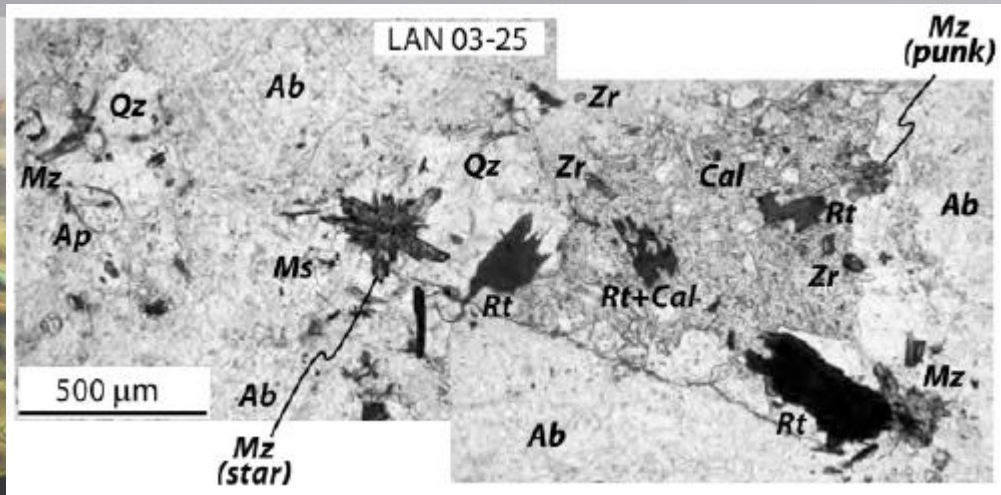
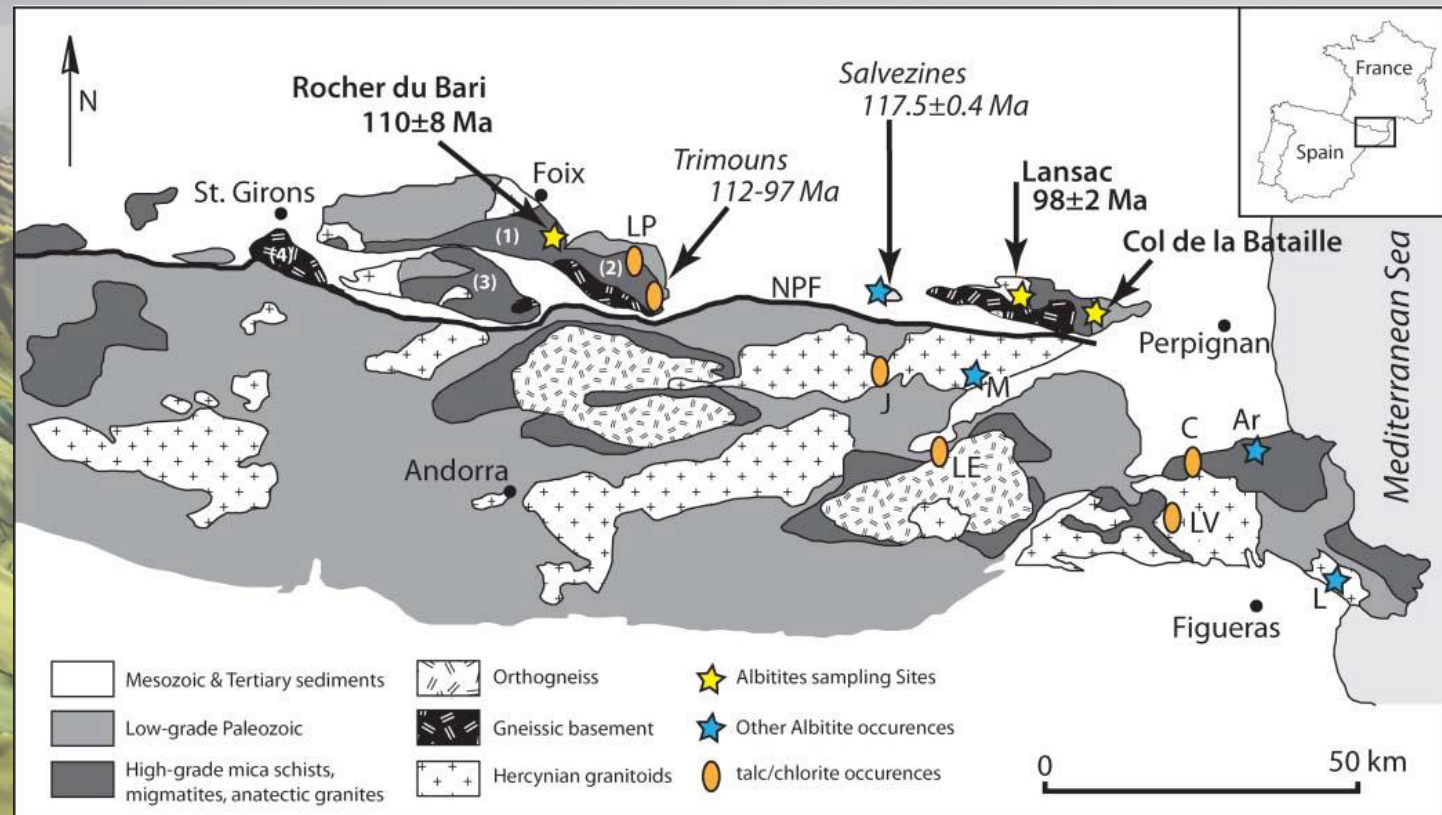


Fig. 7. Calcium chemical mapping of the monazite grains 'star' and 'punk' obtained by electron microprobe. 'Star' lies within a quartz matrix, 'punk' at the contact between calcite (left) and albite.



Poujol et al., J. Geol. Soc., 2010

FLUIDES PYRÉNÉENS

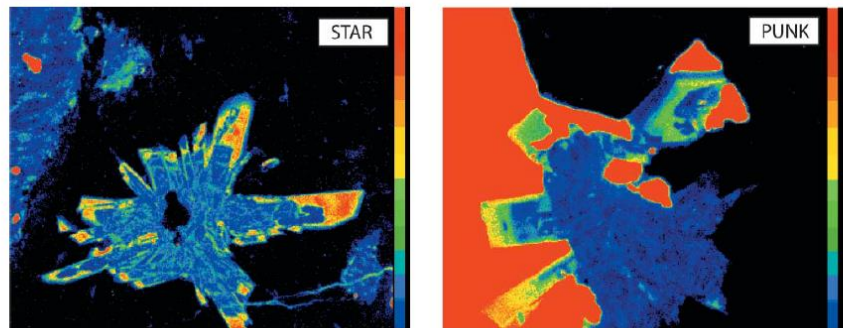
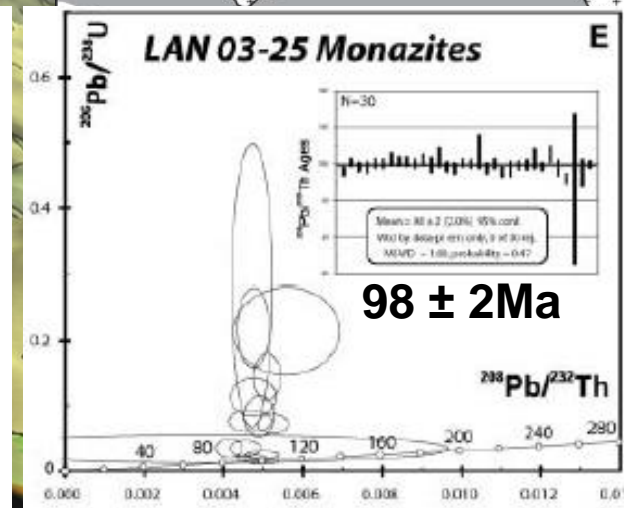
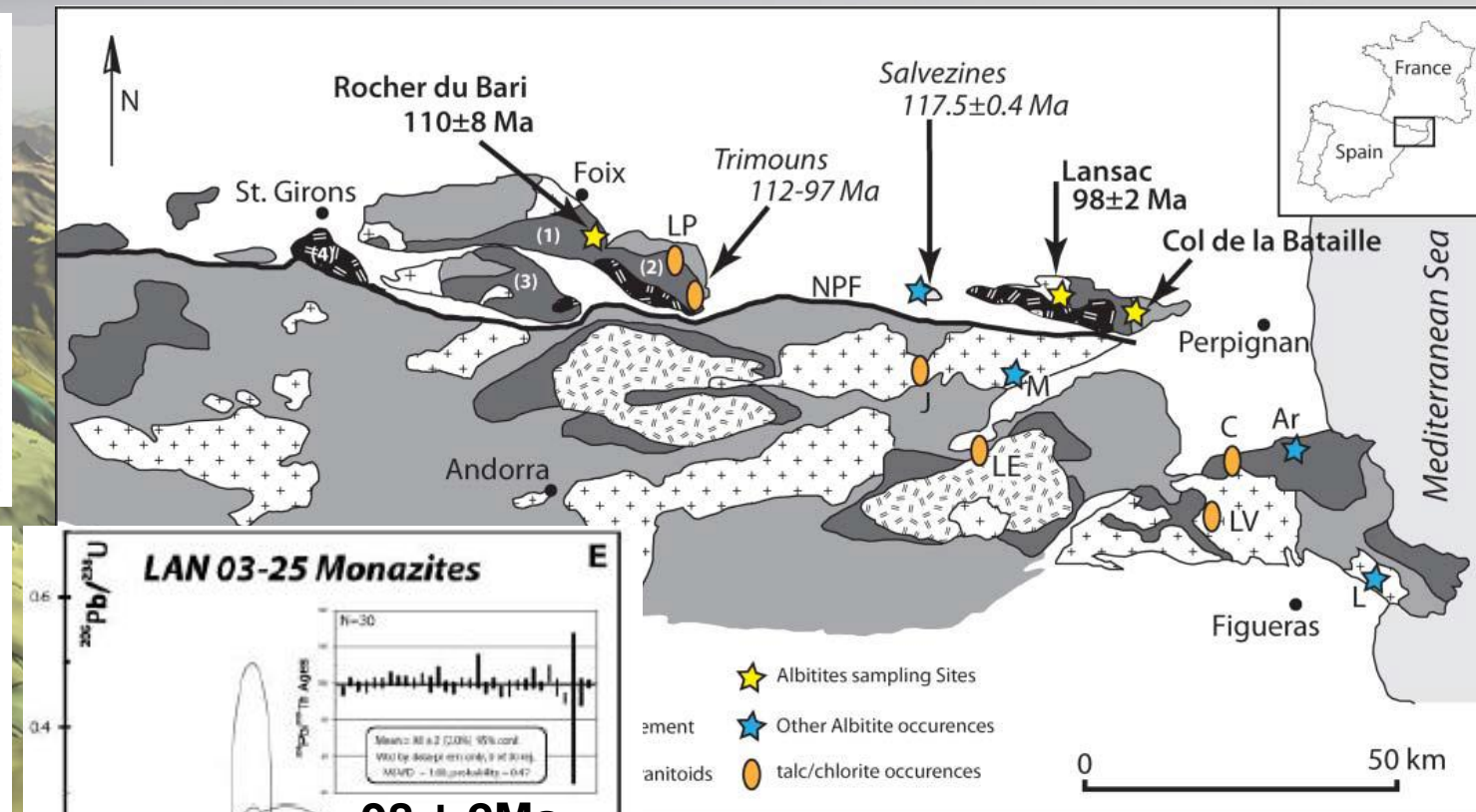
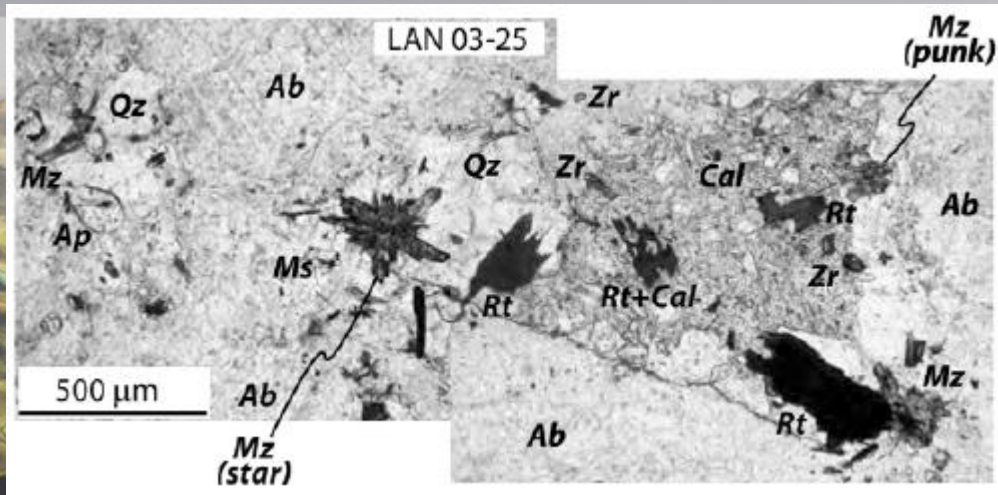
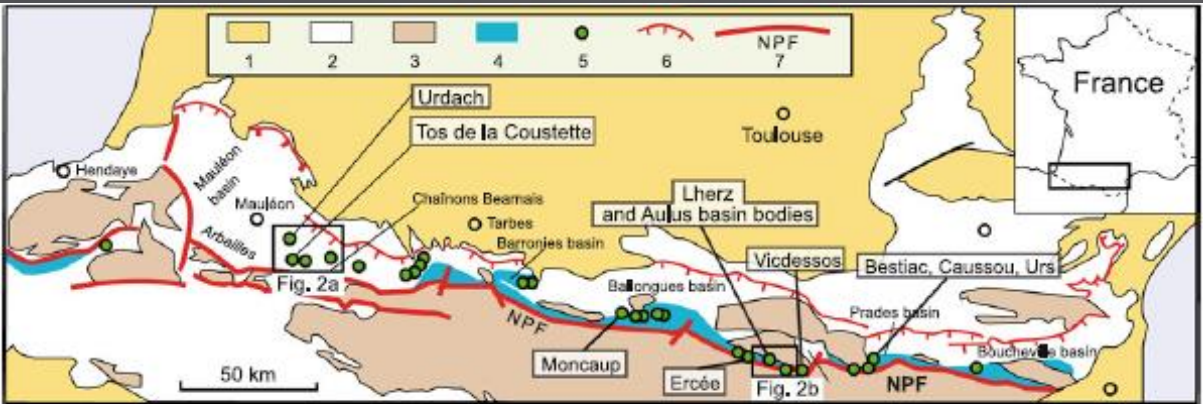


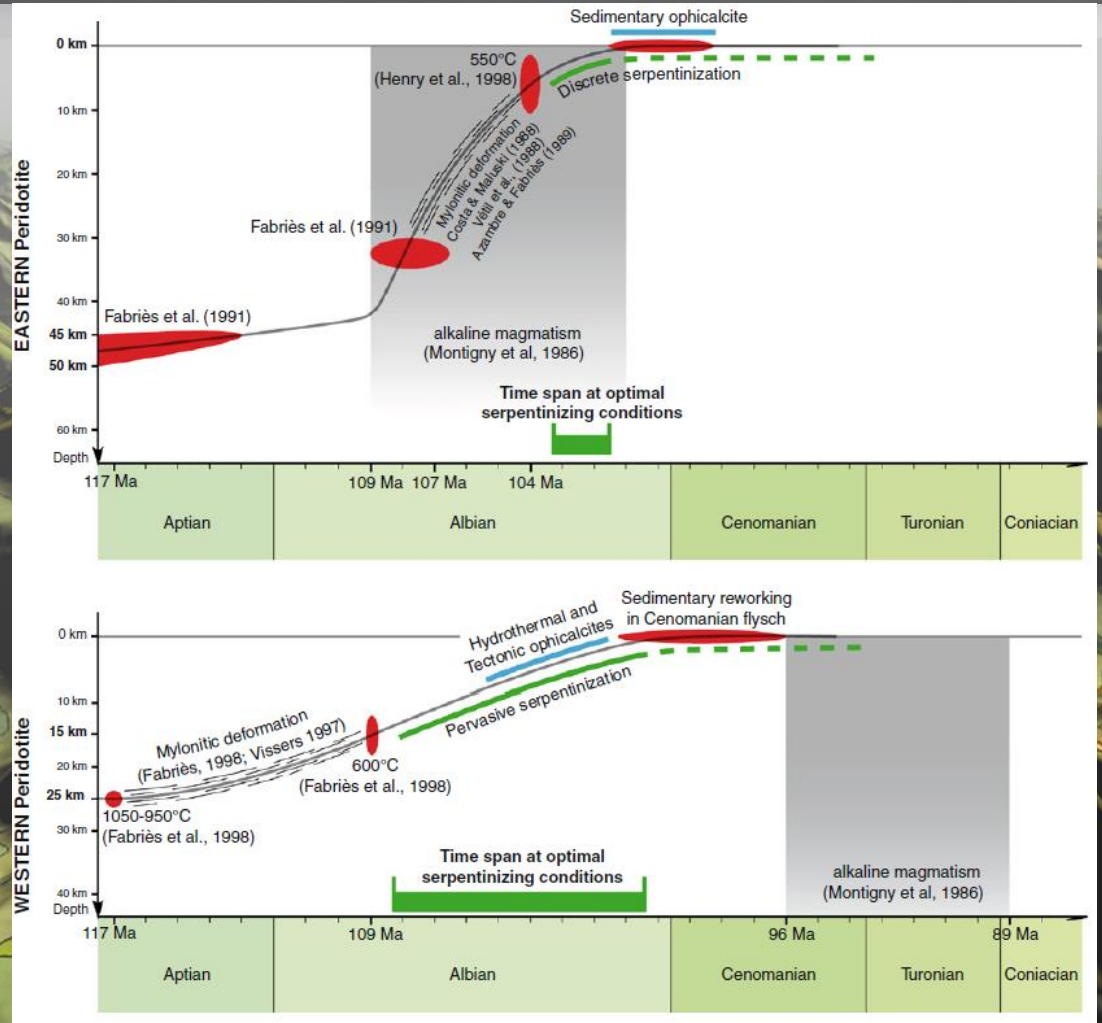
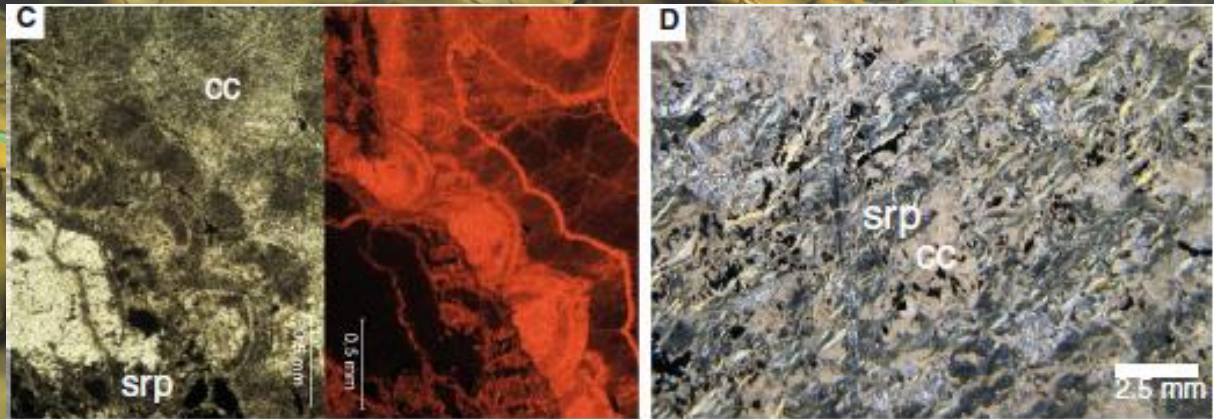
Fig. 7. Calcium chemical mapping of the monazite grains 'star' and 'punk' obtained by electron microprobe. 'Star' lies within a quartz matrix, 'punk' at the contact between calcite (left) and albite.

Poujol et al., J. Geol. Soc., 2010

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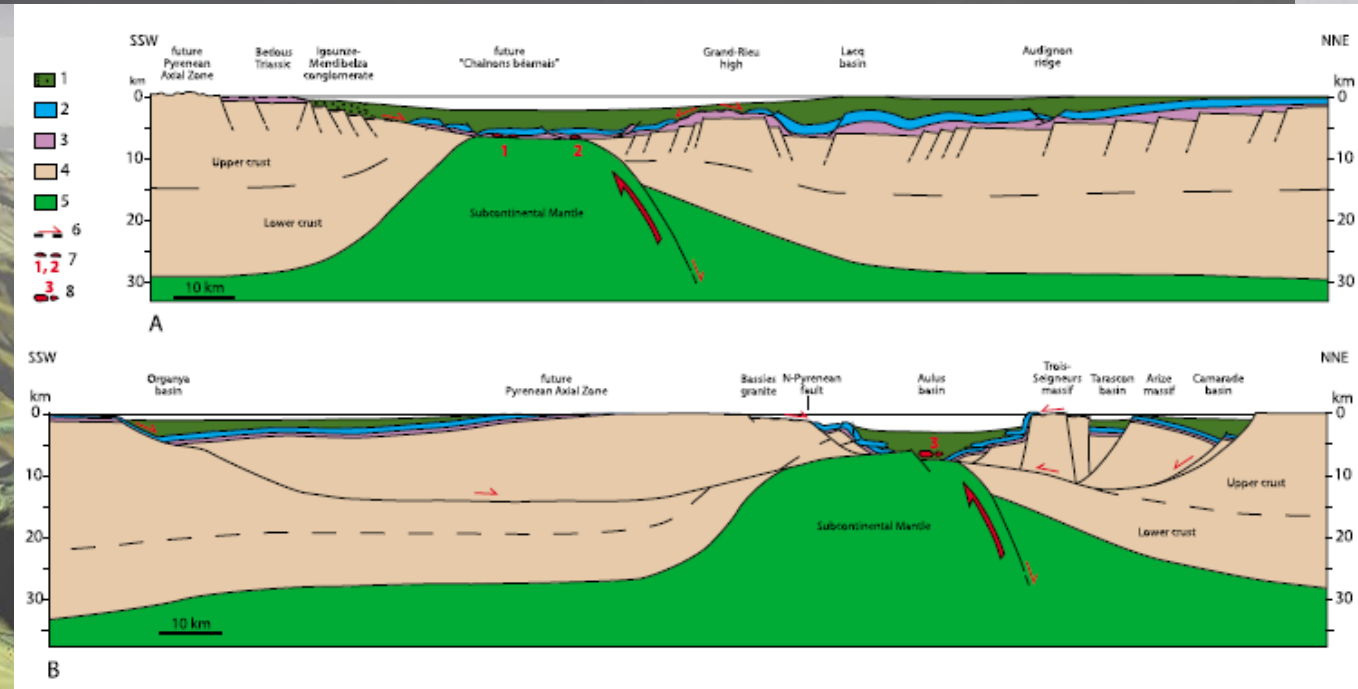
1, Oligocène and post-Oligocène; 2, Mesozoic and Eocene; 3, Paleozoic Basement; 4, area of HT-LP Pyrenean metamorphism; 5, peridotite; 6, main external thrusts; 7, North Pyrenean Fault (NPF)



Clerc et al., Int. J. Earth Sci. 2014

FLUIDES PYRÉNÉENS

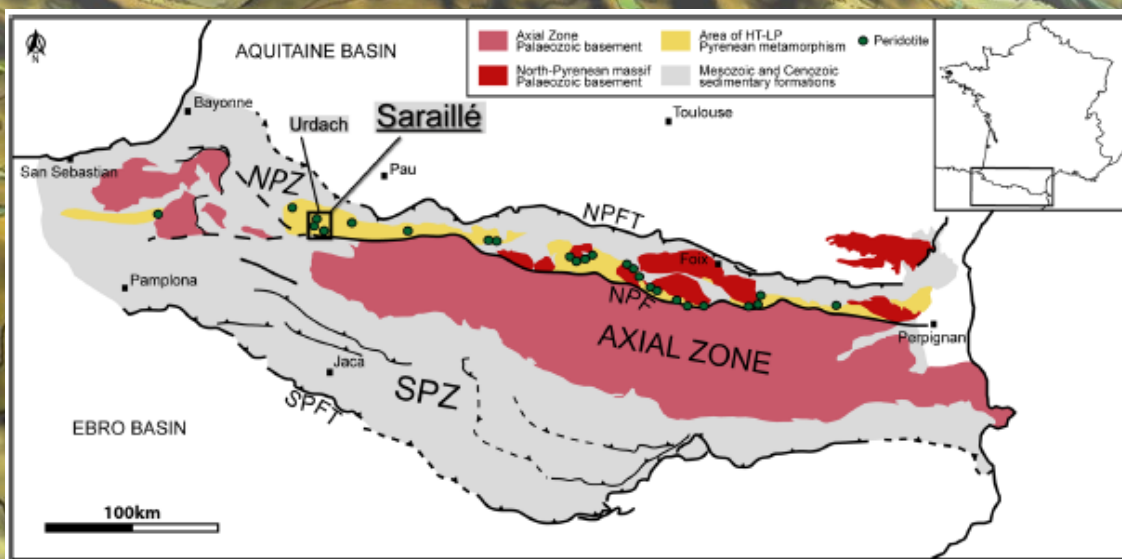
→ phase eo-pyrénéenne
(étirement)



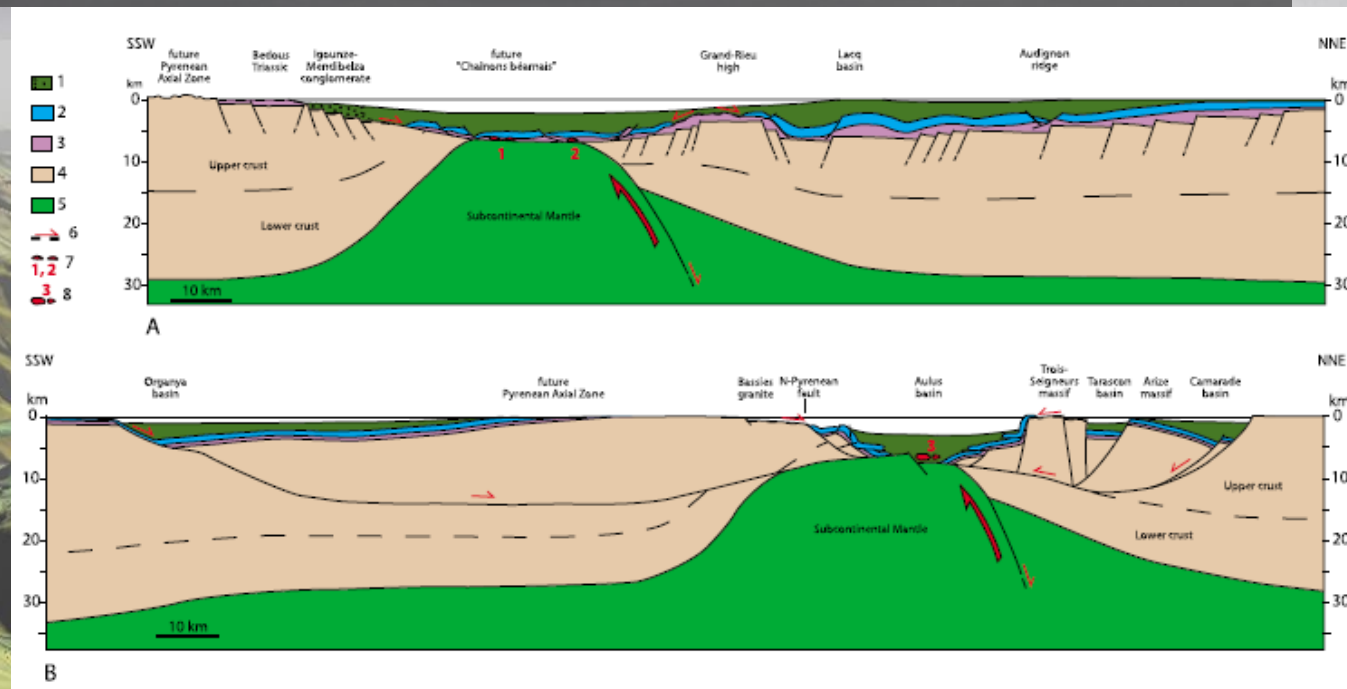
Lagabrielle et al., Tectonics, 2010

FLUIDES PYRÉNÉENS

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(étirement)

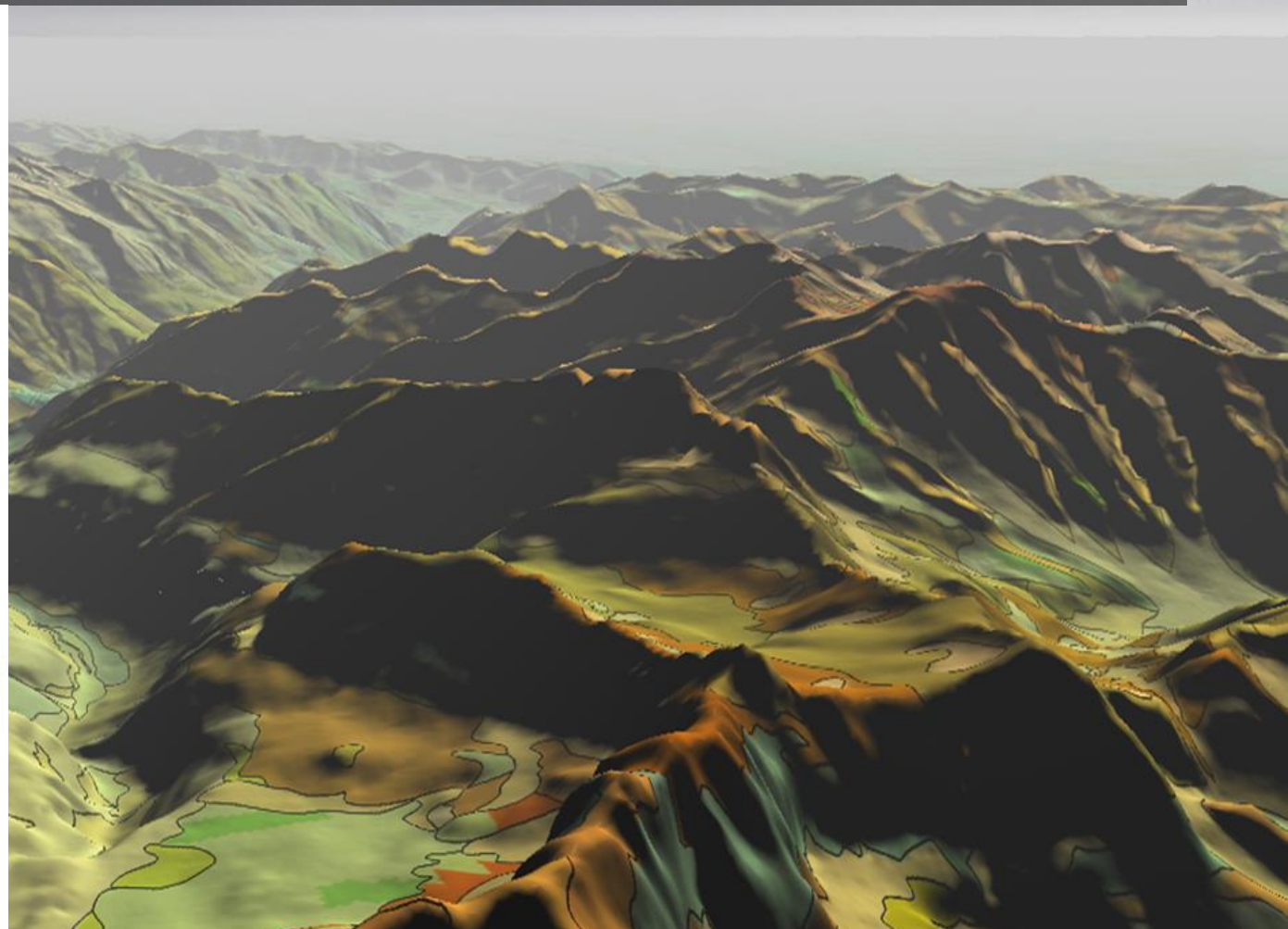
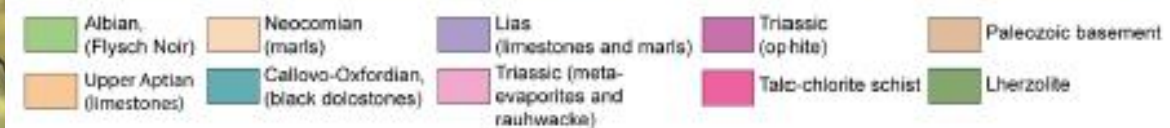
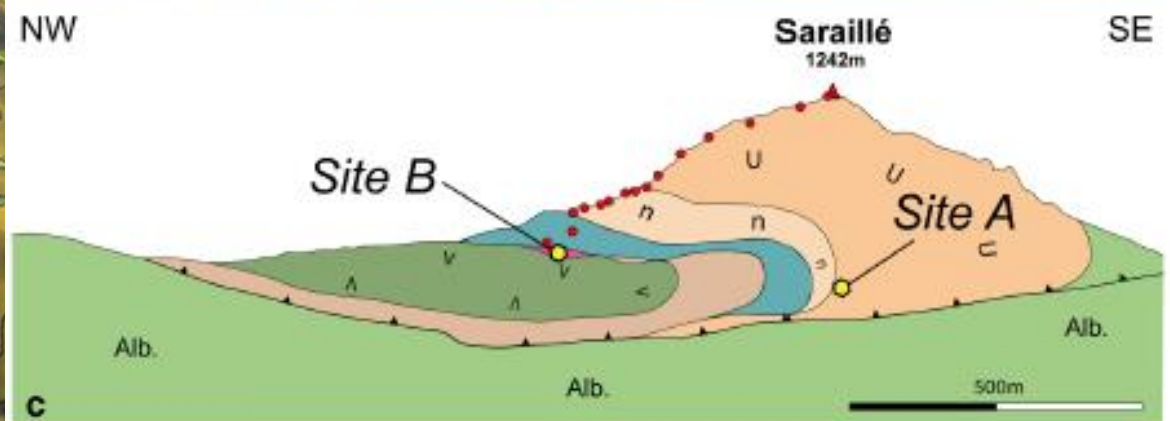
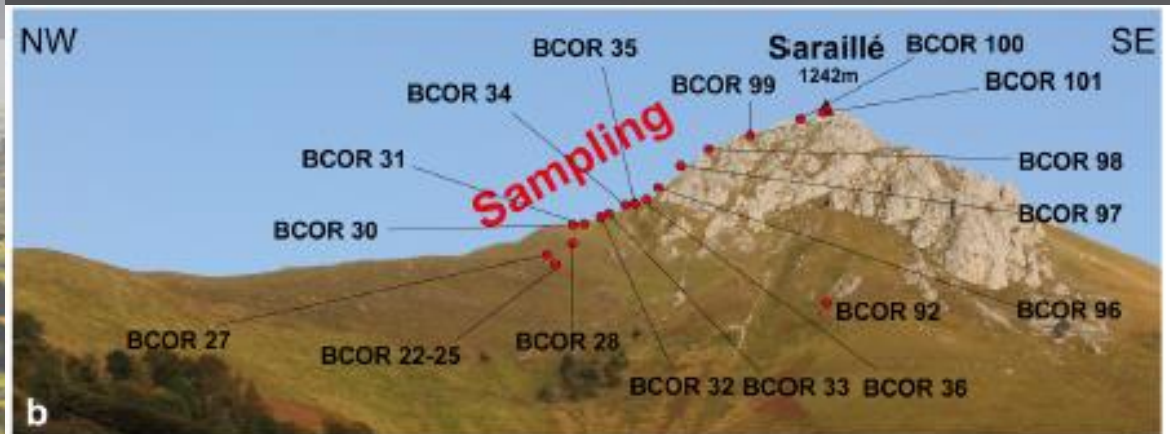


Corre et al., Min. Pet., 2018



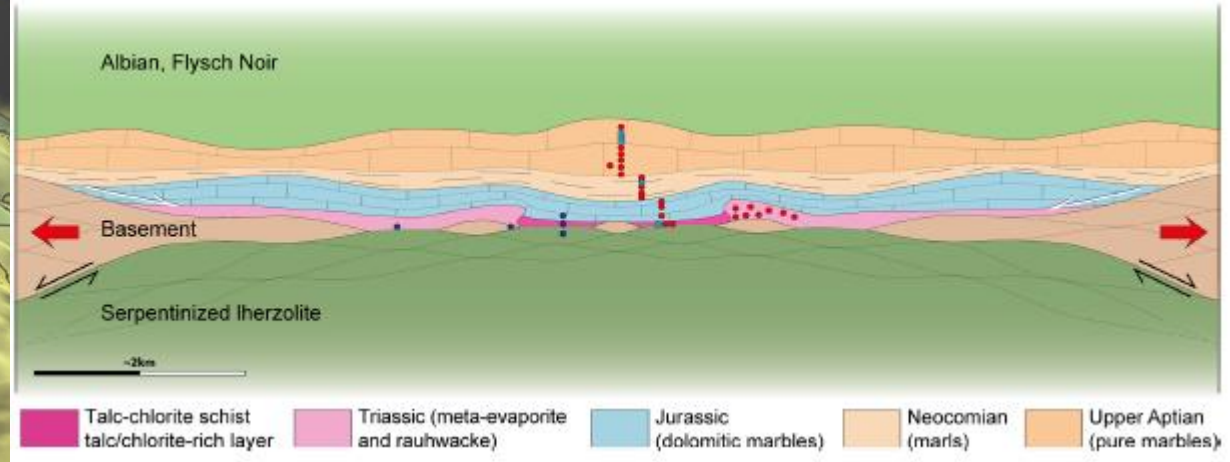
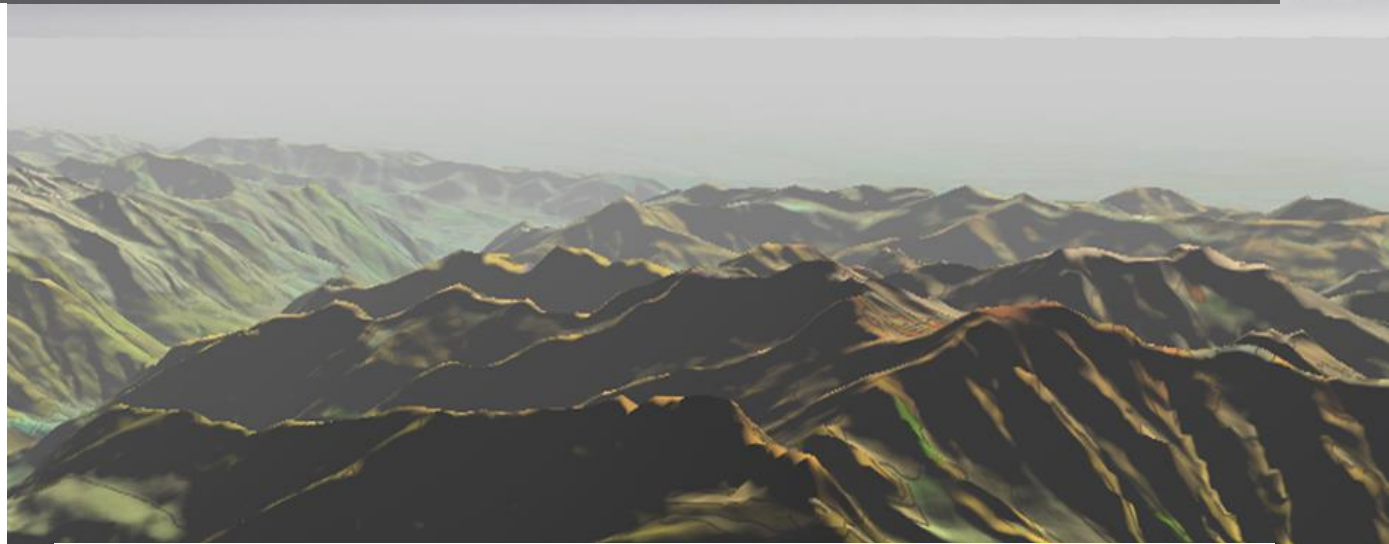
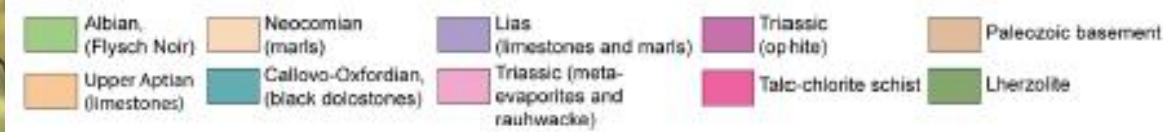
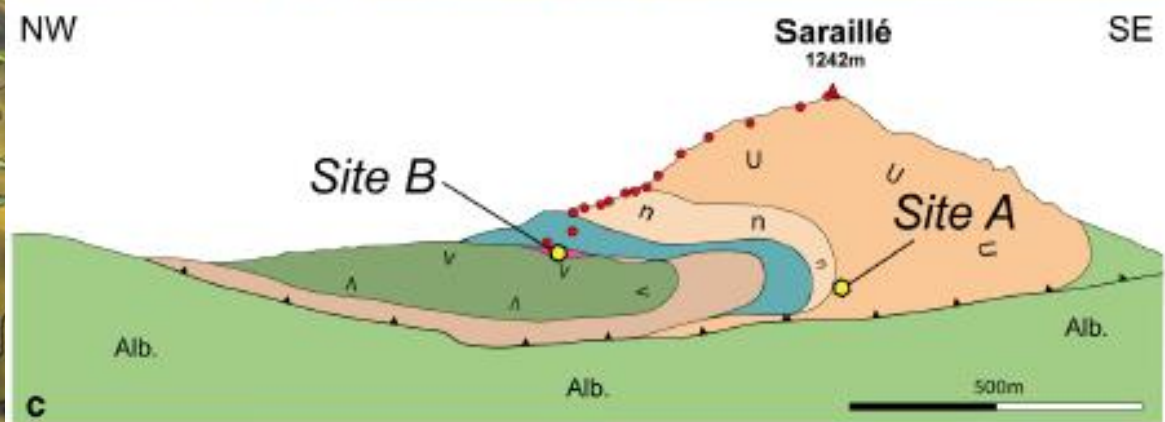
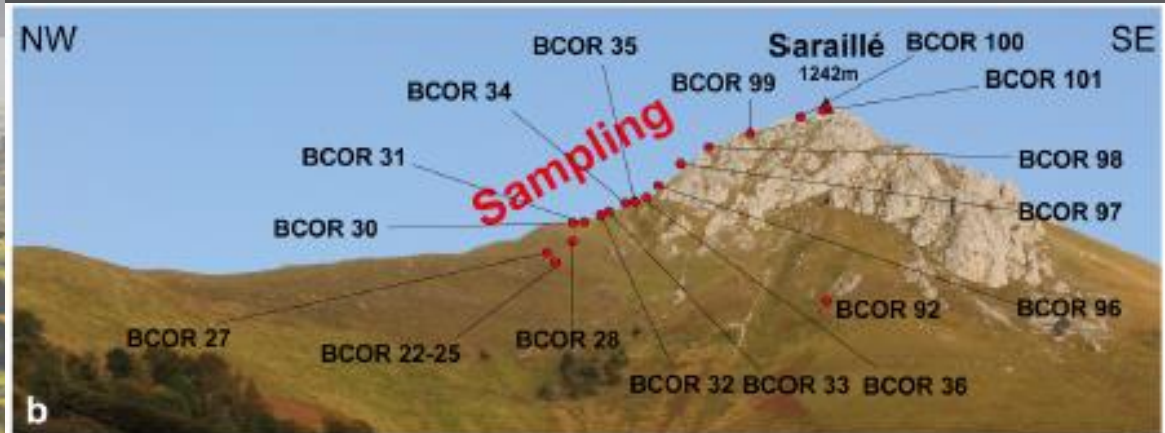
Lagabrielle et al., Tectonics, 2010

FLUIDES PYRÉNÉENS



Corre et al., Min. Pet., 2018

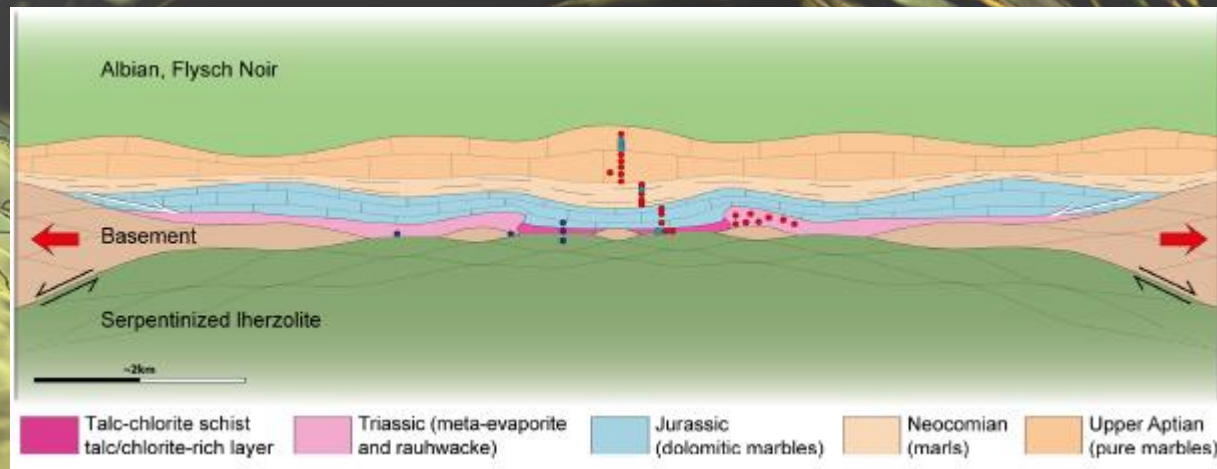
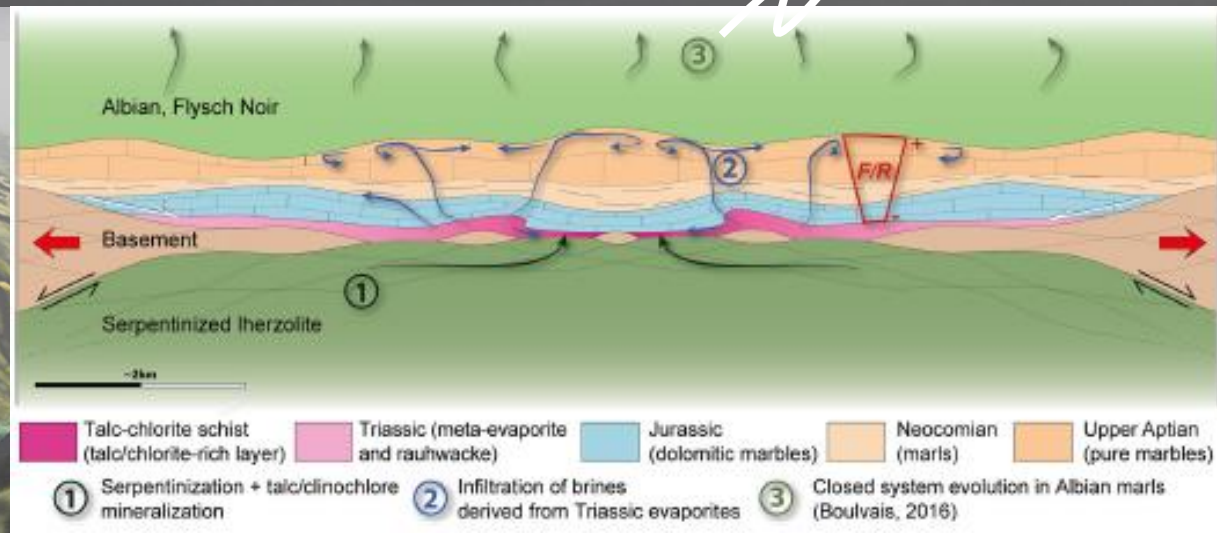
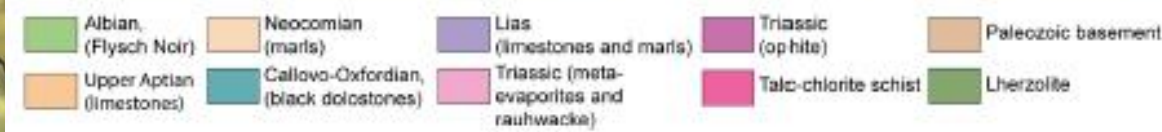
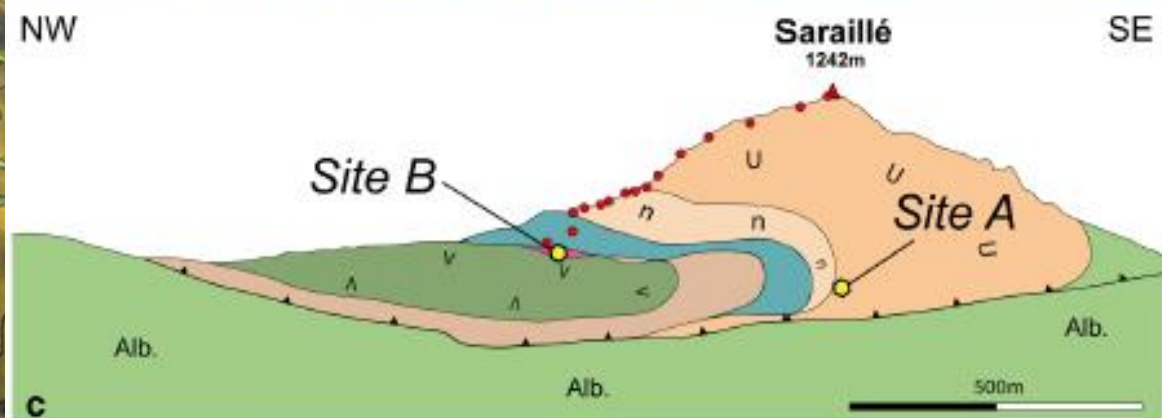
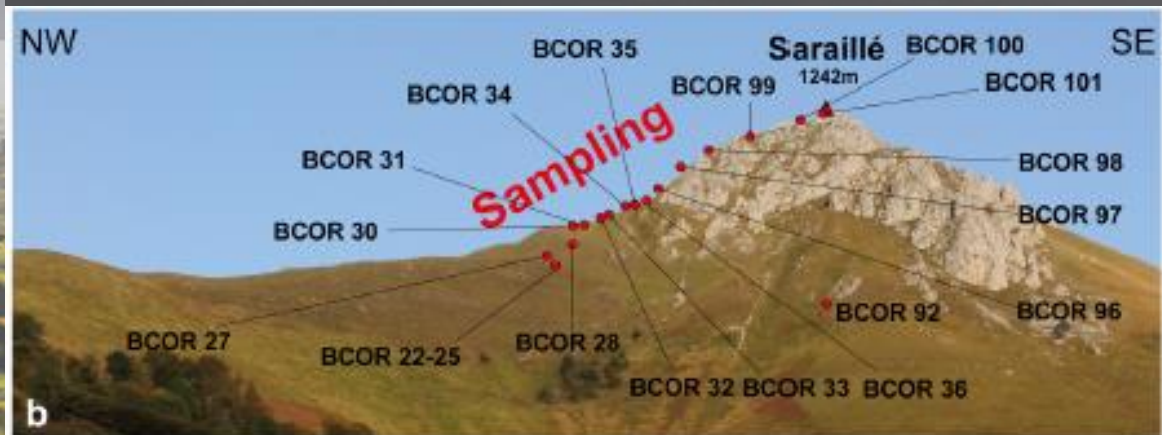
FLUIDES PYRÉNÉENS



Corre et al., Min. Pet., 2018

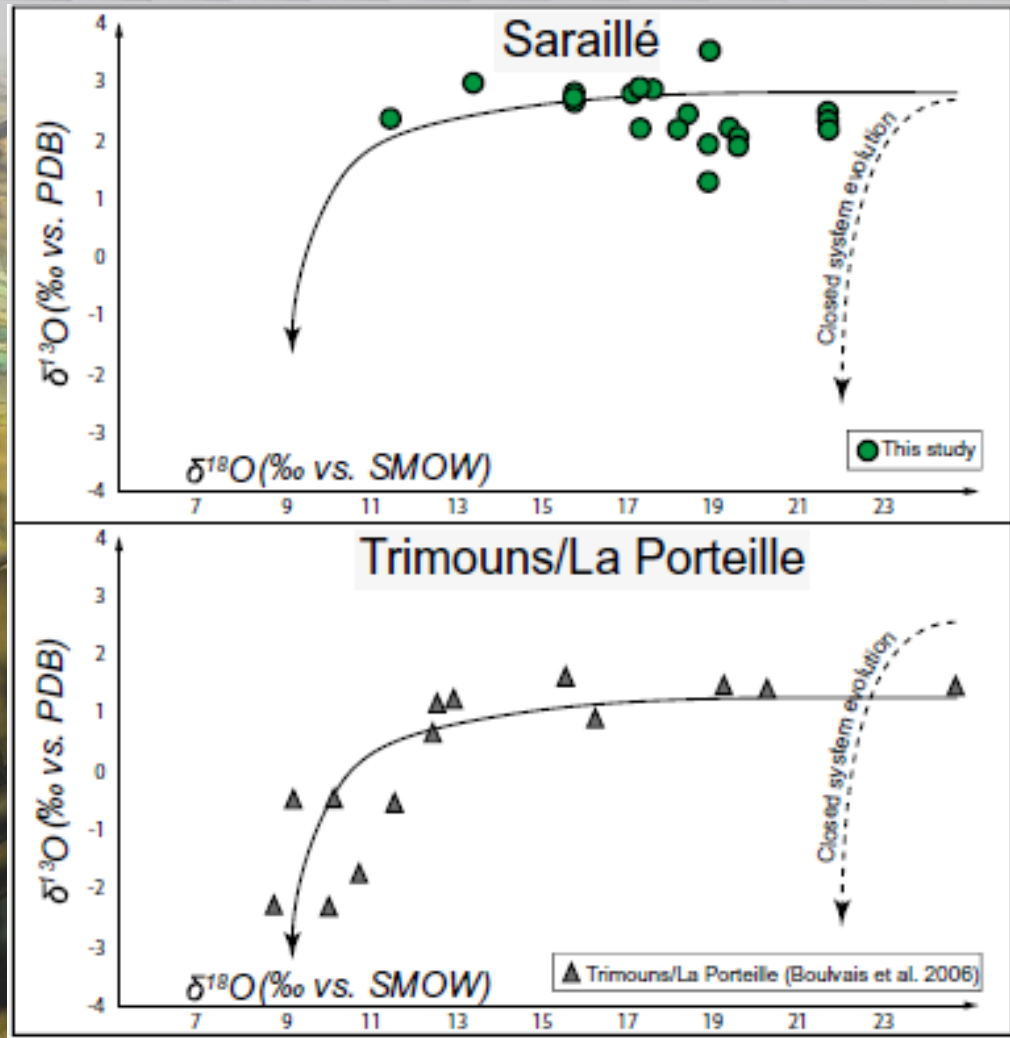
FLUIDES PYRÉNÉENS

Boulvais, CRG, 2016

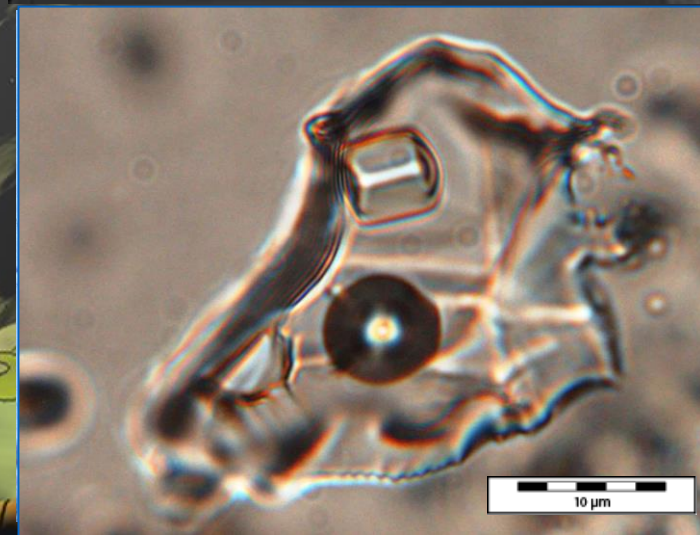
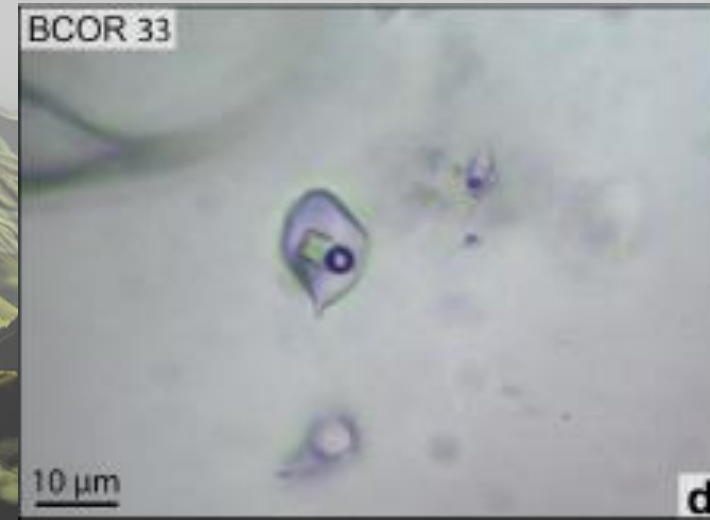
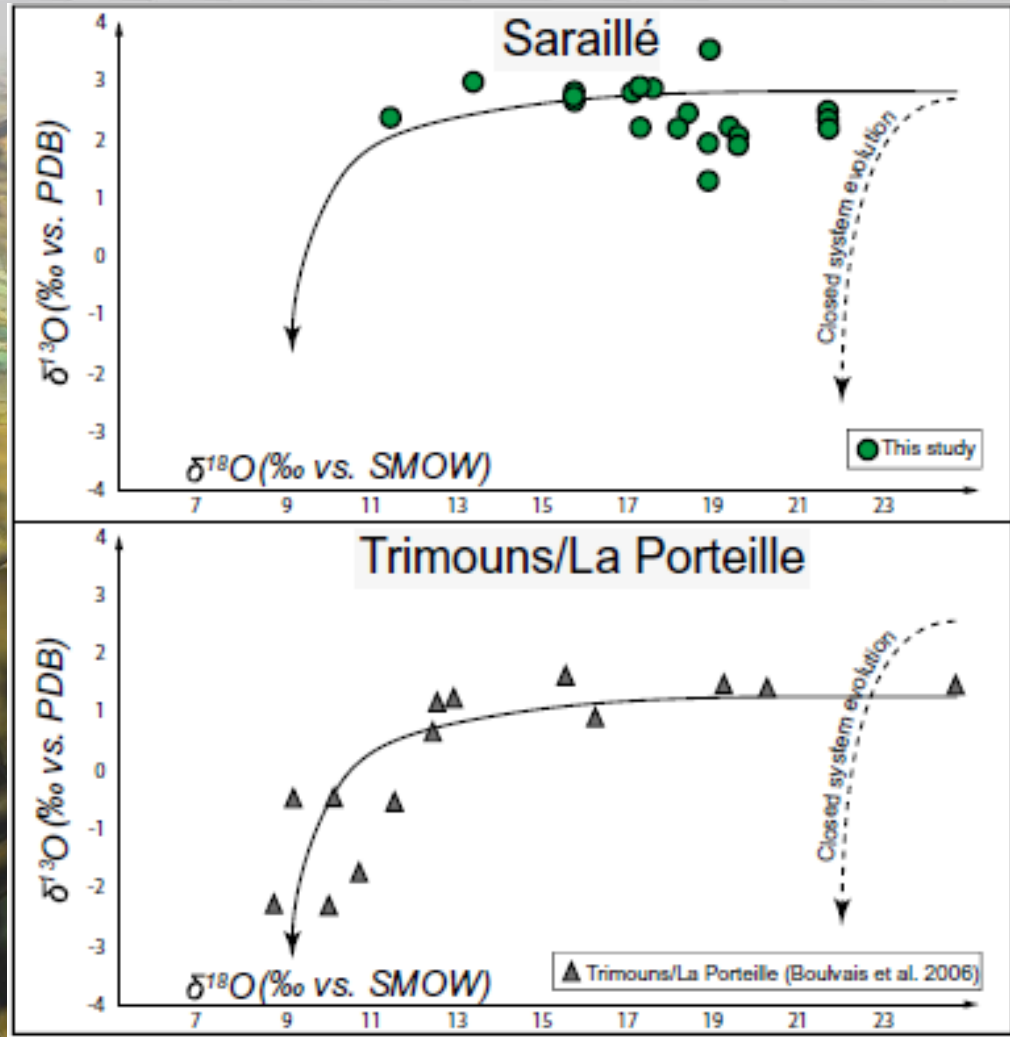


Corre et al., Min. Pet., 2018

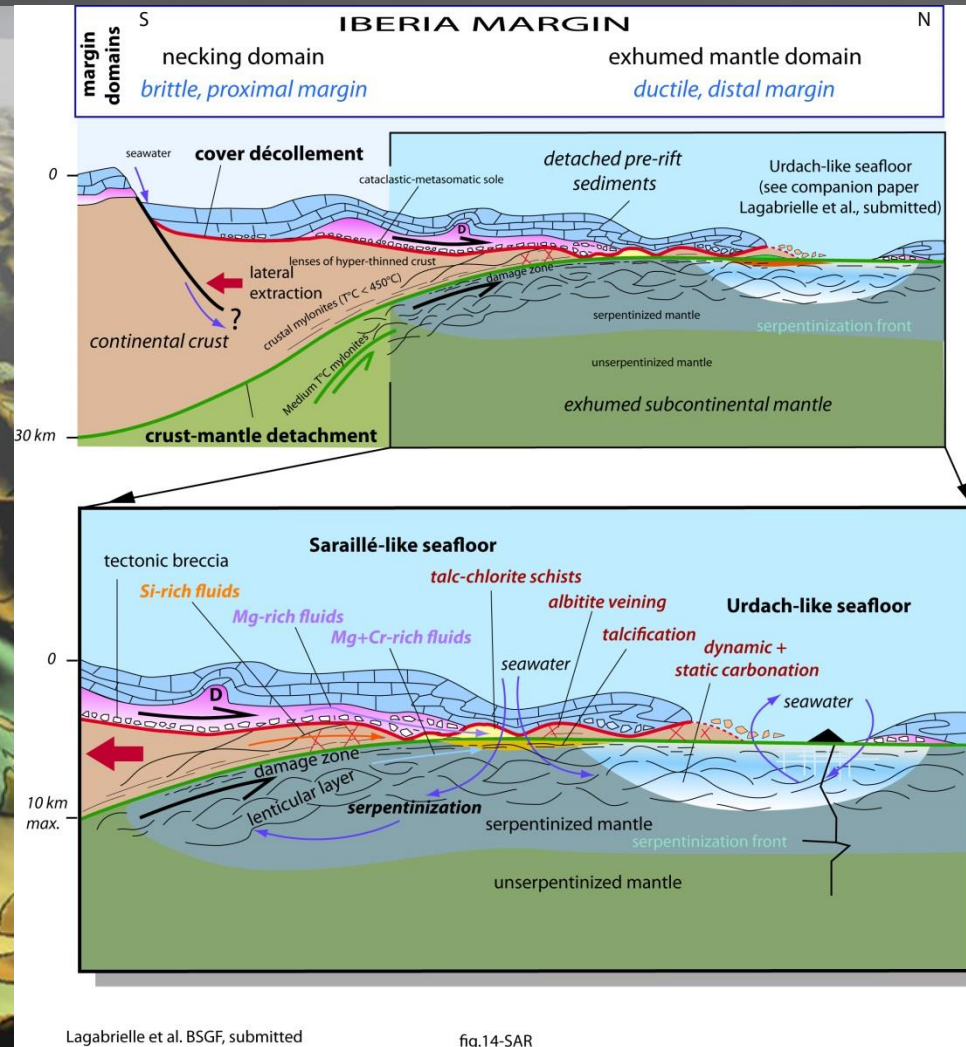
FLUIDES PYRÉNÉENS



FLUIDES PYRÉNÉENS



FLUIDES PYRÉNÉENS



Lagabrielle et al., BSGF,
sous presse

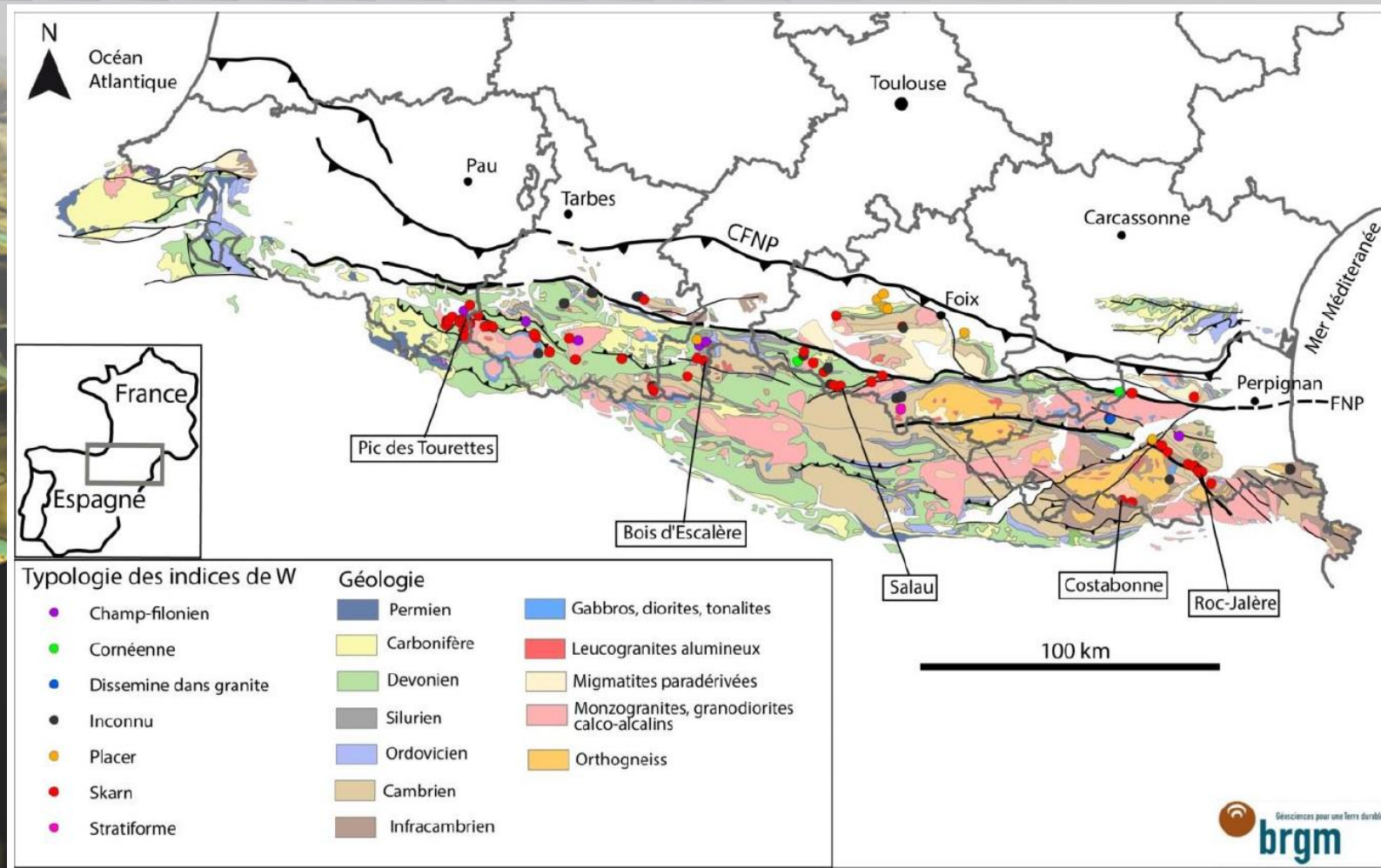
FLUIDES VARISQUES (MINERALISATIONS)

W

Au

Pb-Zn-Ge

MINERALISATION W



Circulations périgranitiques

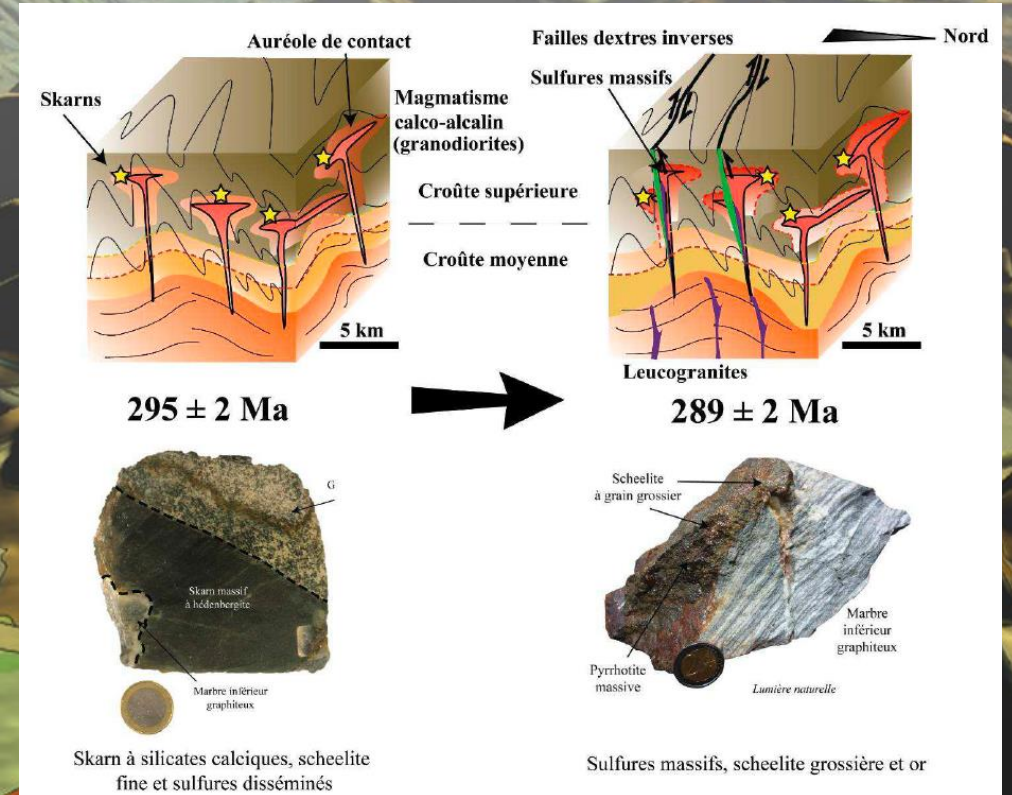
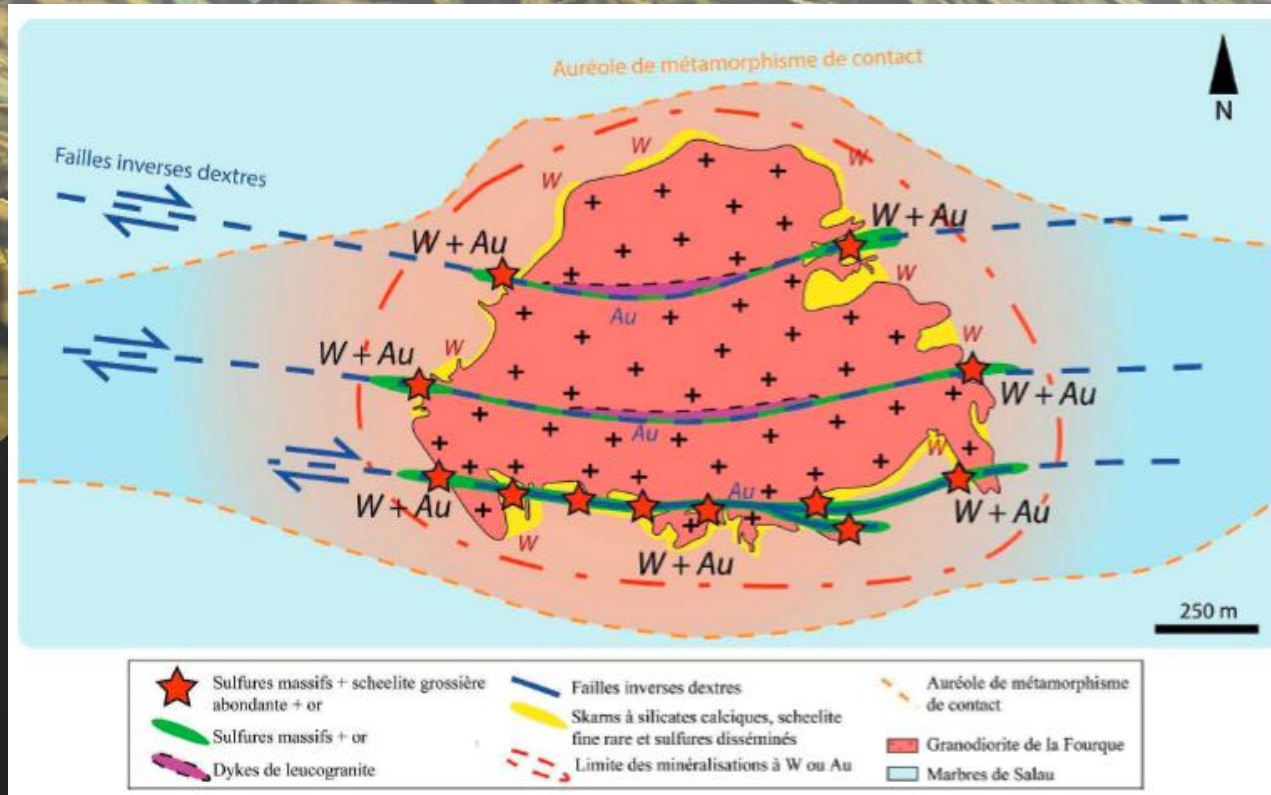
Minéralisations à W

Principalement les skarns

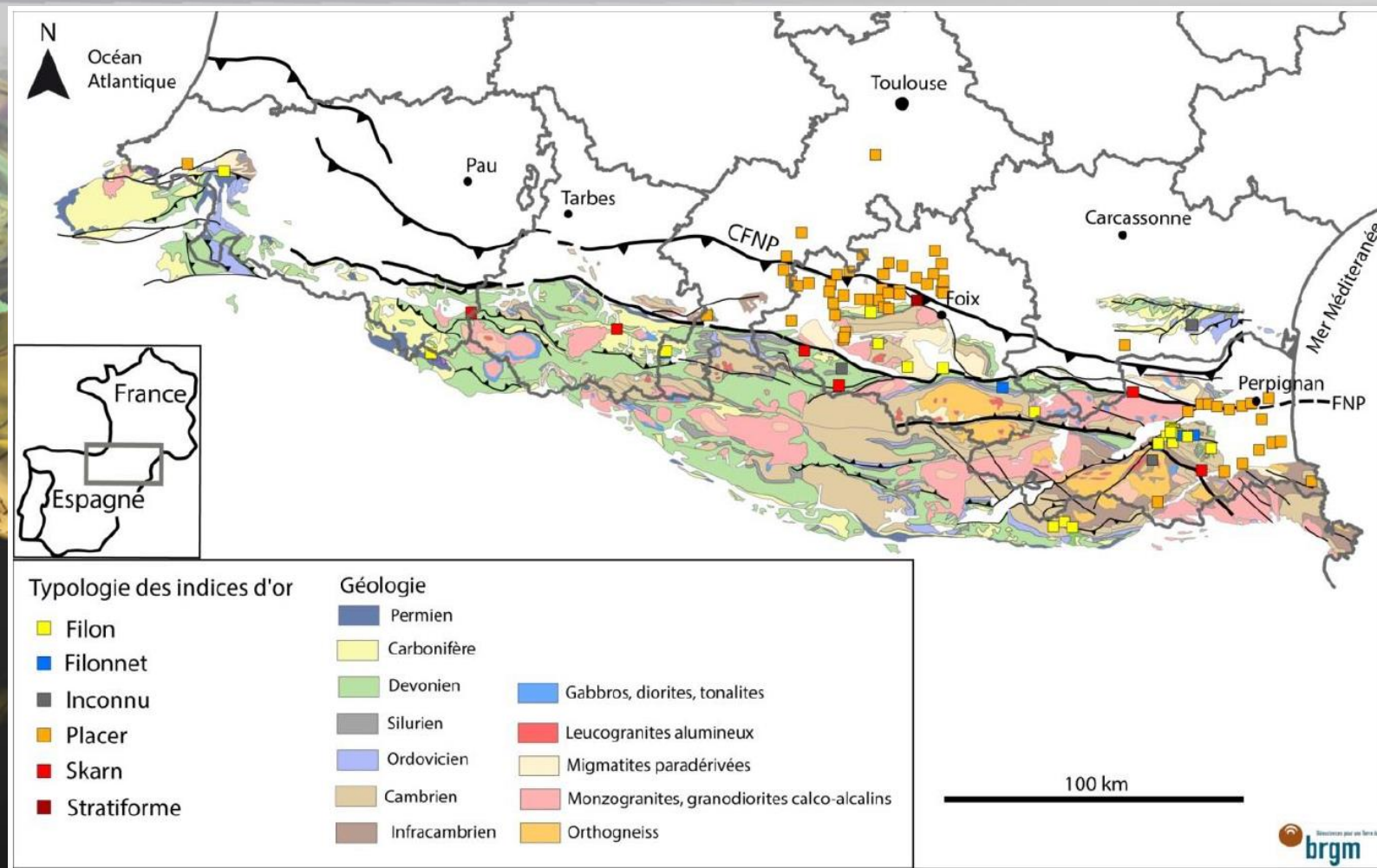
MINERALISATION W

Nouvelles hypothèses métallogéniques pour les minéralisations à W-Au de Salau

Poitrenaud (2018)



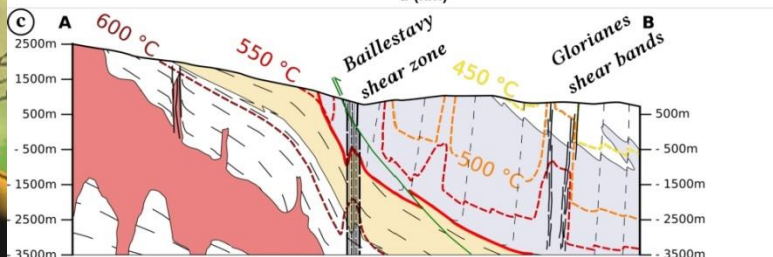
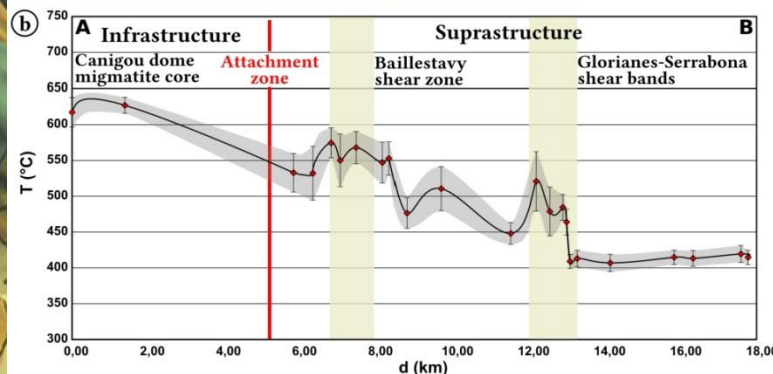
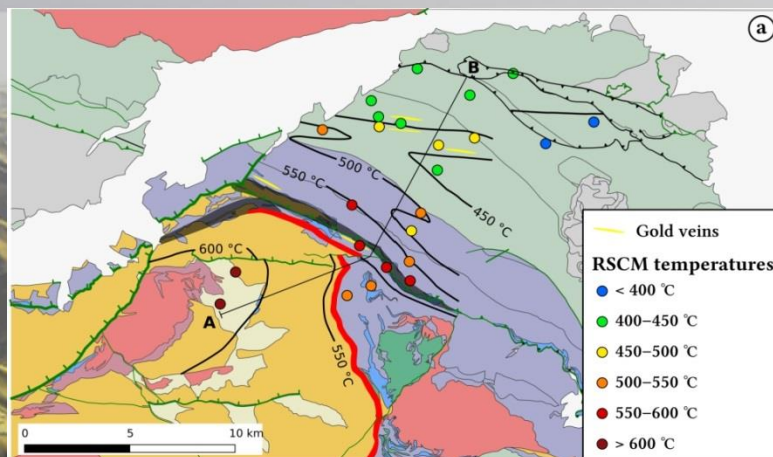
MINERALISATION AU



Vic & Tourlière (2016)

MINERALISATION AU

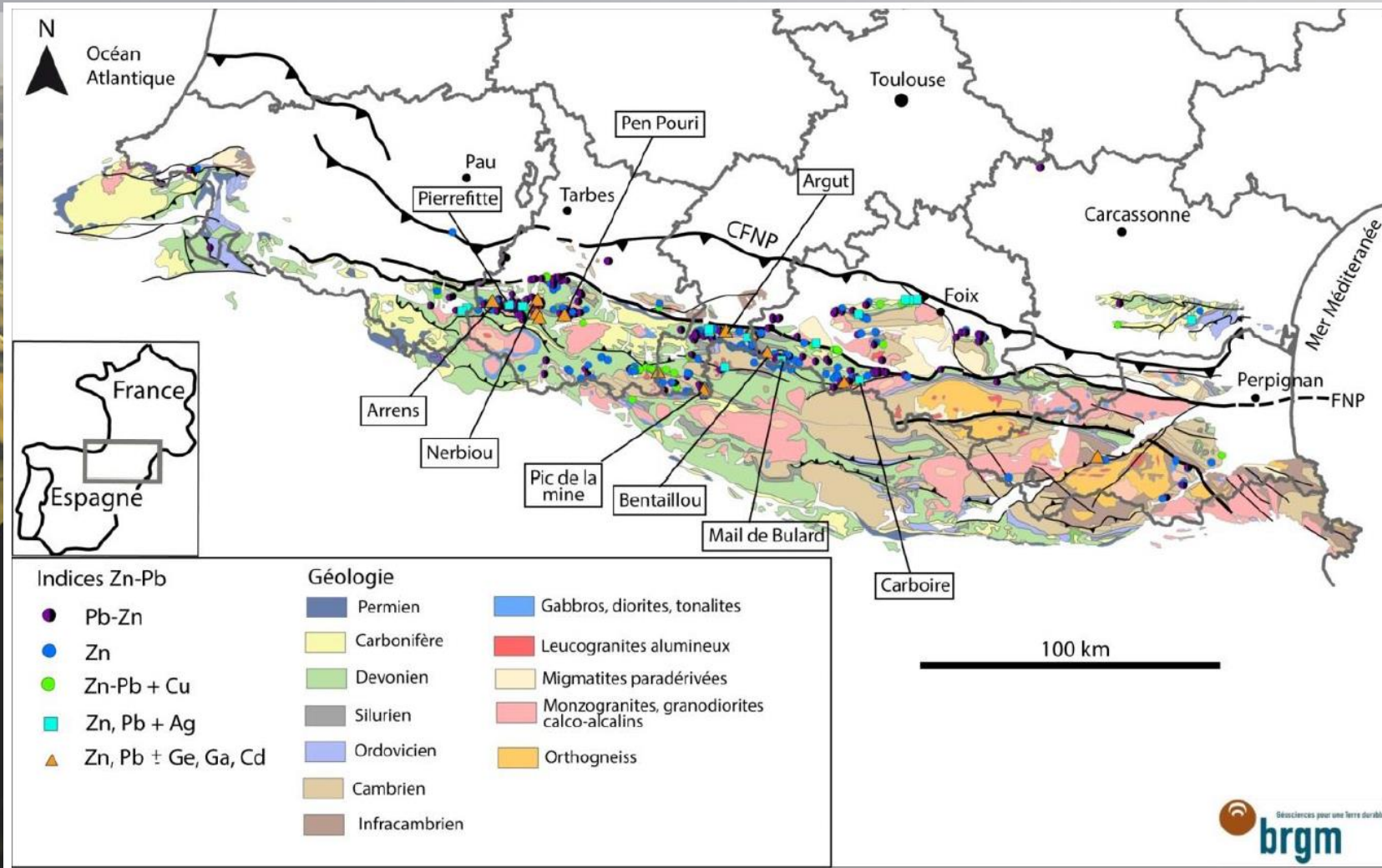
Thèse de G. Link (2016-2019)



Pic de température associé aux circulations hydrothermales à l'origine des circulations aurifères Estimé grâce à la méthode RSCM

Link et al. (SGA, sous presse)

MINÉRALISATION PB-ZN-GE

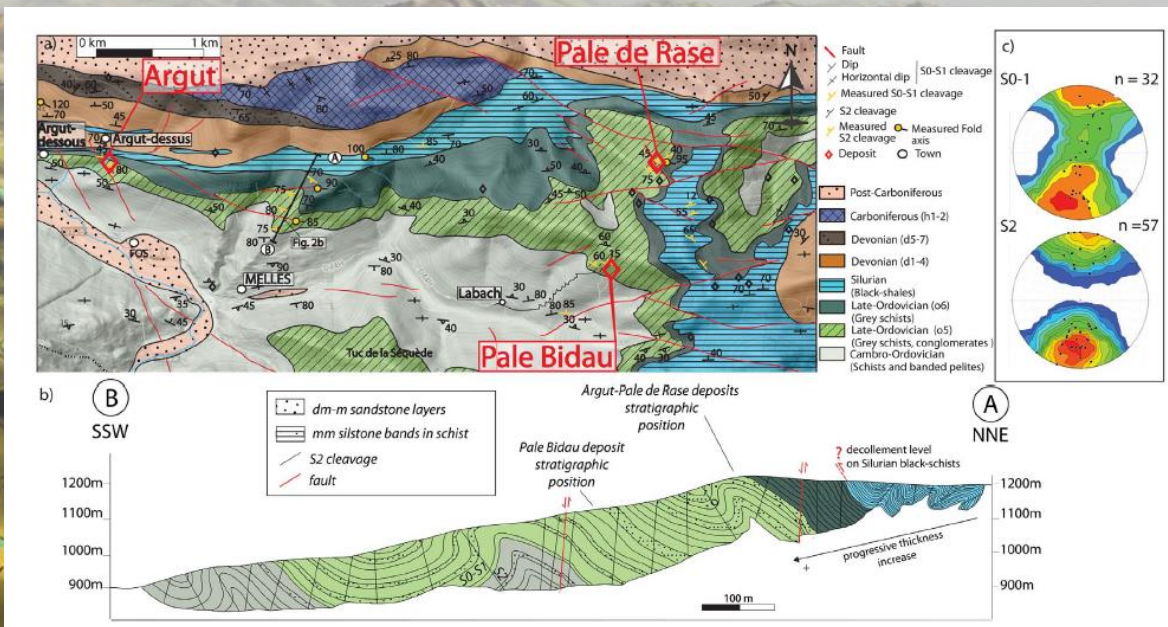


Considérés comme de type Sedex pour la plupart

Présence notable de minéraux à Ge

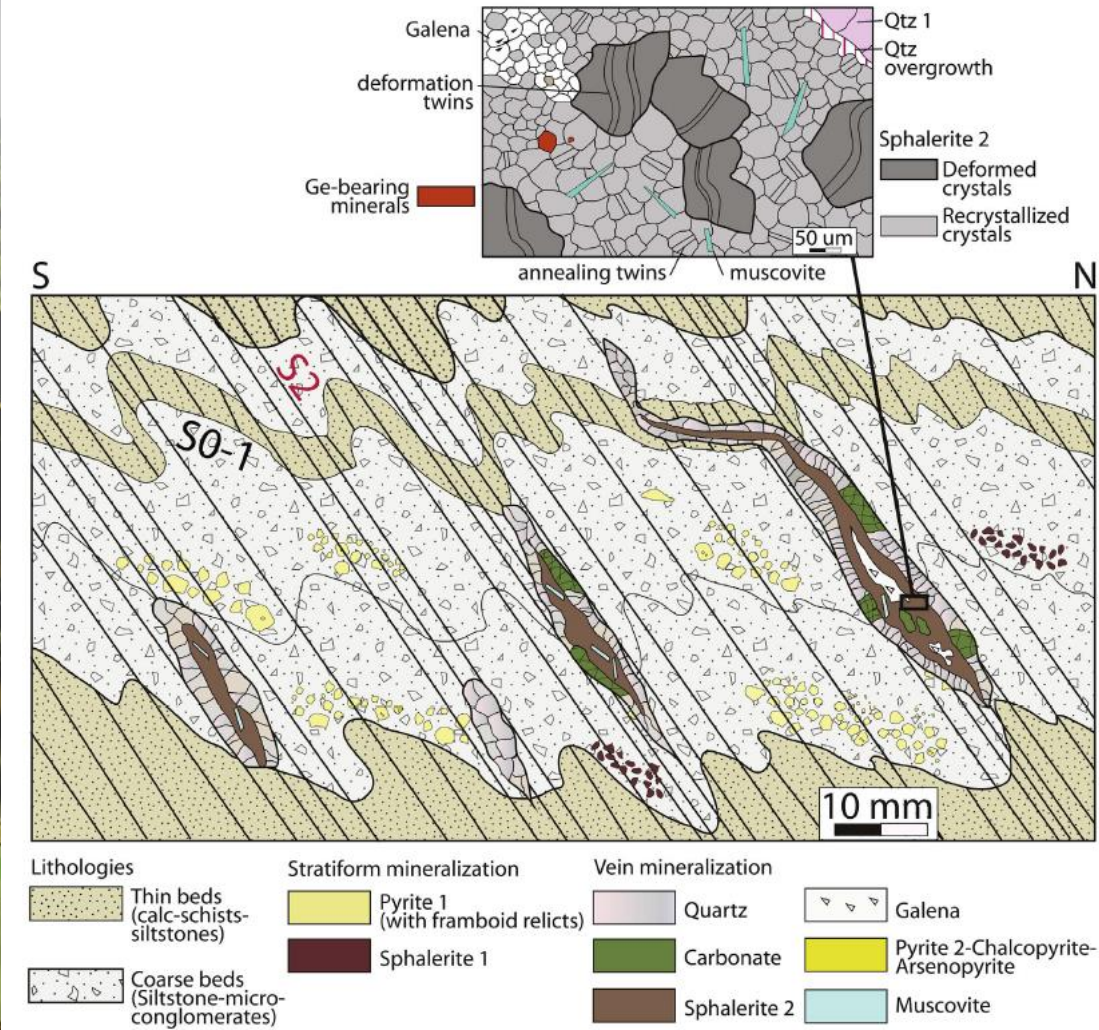
MINERALISATION PB-ZN-GE

Thèse de A. Cugerone (2016-2019)



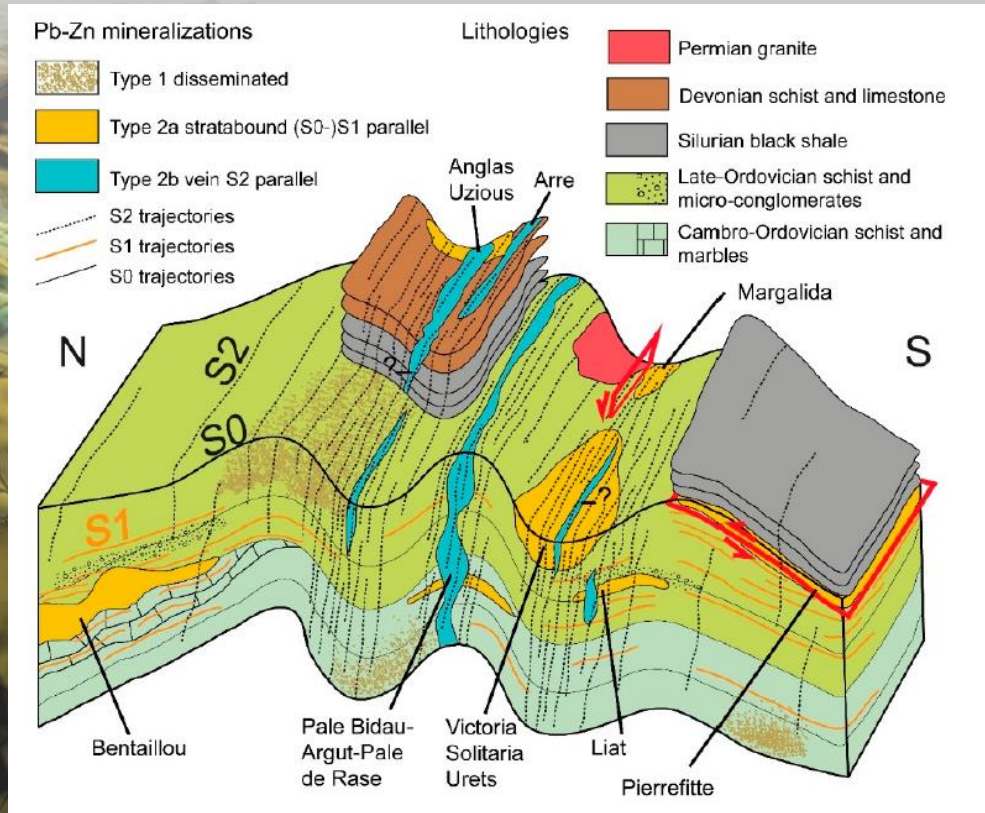
Importance du métamorphisme de bas degrés et de la déformation dans la formation des minéralisations à Ge

Cugerone et al. (2018). Ore Geology Review



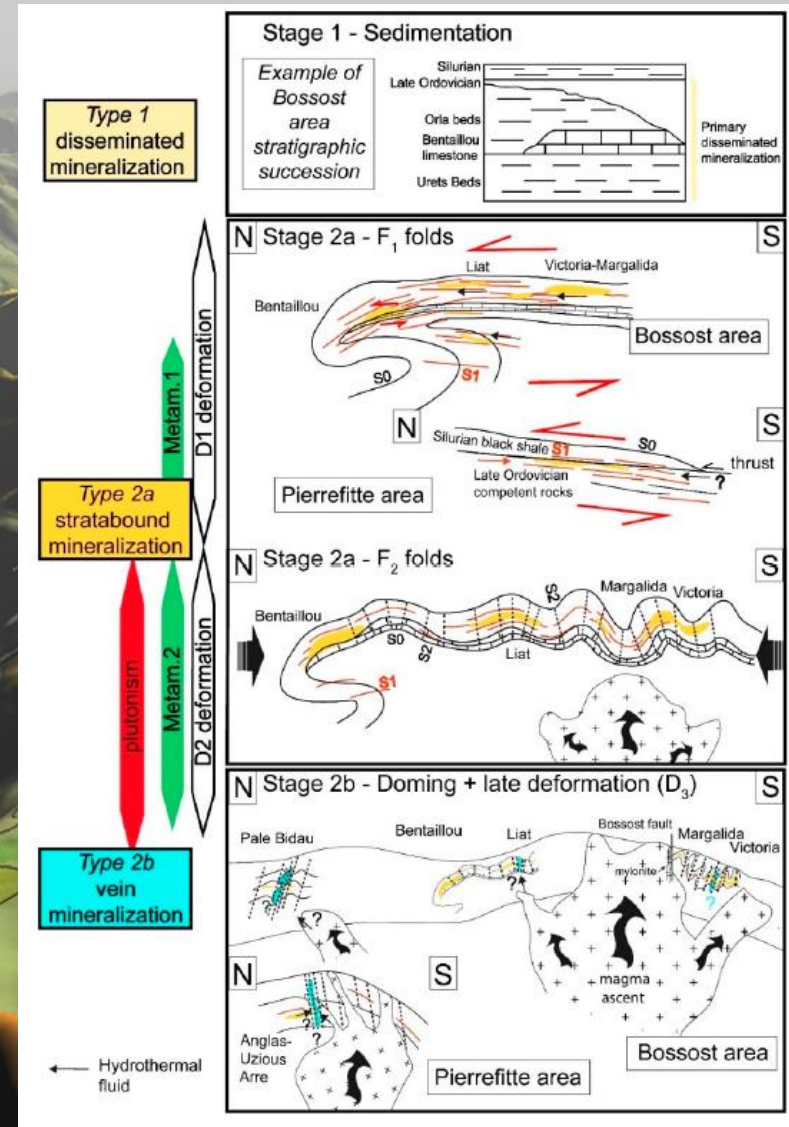
MINERALISATION PB-ZN-GE

Thèse de A. Cugerone (2016-2019)



Trois types de minéralisations
Importance de la tectonique varisque

Cugerone et al. (2018). Minerals



Géosciences pour une Terre durable

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cristaux de rutile (albite de Lansac)
© Philippe Rémy

Merci...

philippe.boulvais@univ-re

j.melleton@brgm.fr



CHANTIER RGF - PYRÉNÉES

Introduction

03 juin 2019 - Pau

SURTITRE (FACULTATIF)

Titre de la slide

Accroche pour introduire brièvement le sujet de la slide.

Texte de la slide, paragraphe simple.

Intertitre

Texte de la slide, paragraphe simple.

Intertitre

Texte de la slide, paragraphe simple.

- Énumération niveau 1
- Énumération niveau 1
 - Énumération niveau 2
 - Énumération niveau 3
 - Énumération niveau 3
 - Énumération niveau 2
- Énumération niveau 1