université PARIS-SACLAY

UNIVERSITÉ PARIS SUD | GEOPS GEOSCIENCES PARIS SUD

Relief, Bassin et Ressources

UMR 8148 GEOPS

Société Géologique de France

7 octobre 2022

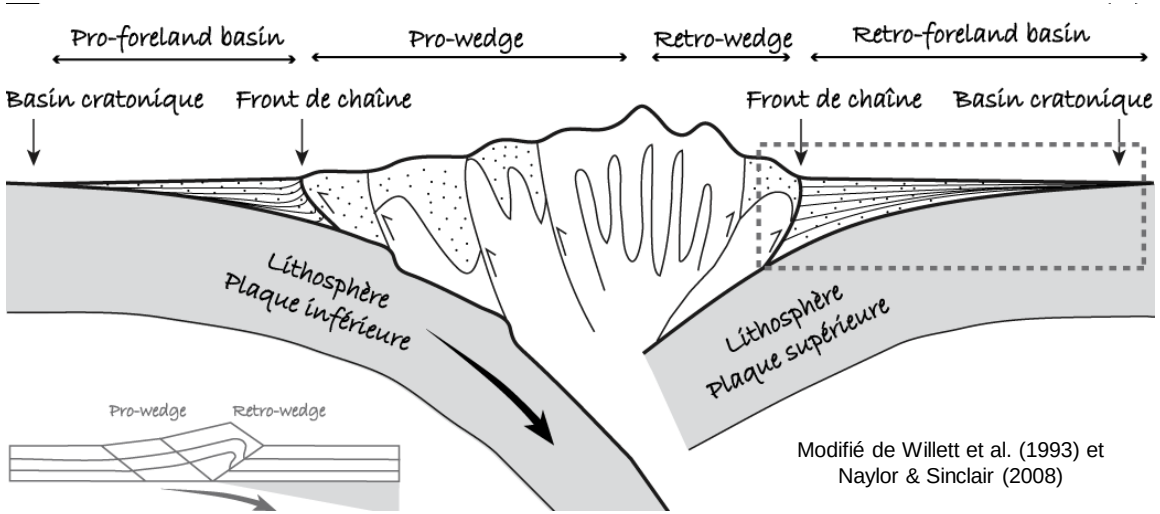
EXPRESSION ET AGE DE LA DEFORMATION INTRAPLAQUE AU FRONT D'UN OROGENE: DU CHEVAUCHEMENT FRONTAL NORD PYRENEEN A LA BORDURE SUD DU MASSIF CENTRAL, FRANCE

Thèse soutenue le 15 décembre 2021

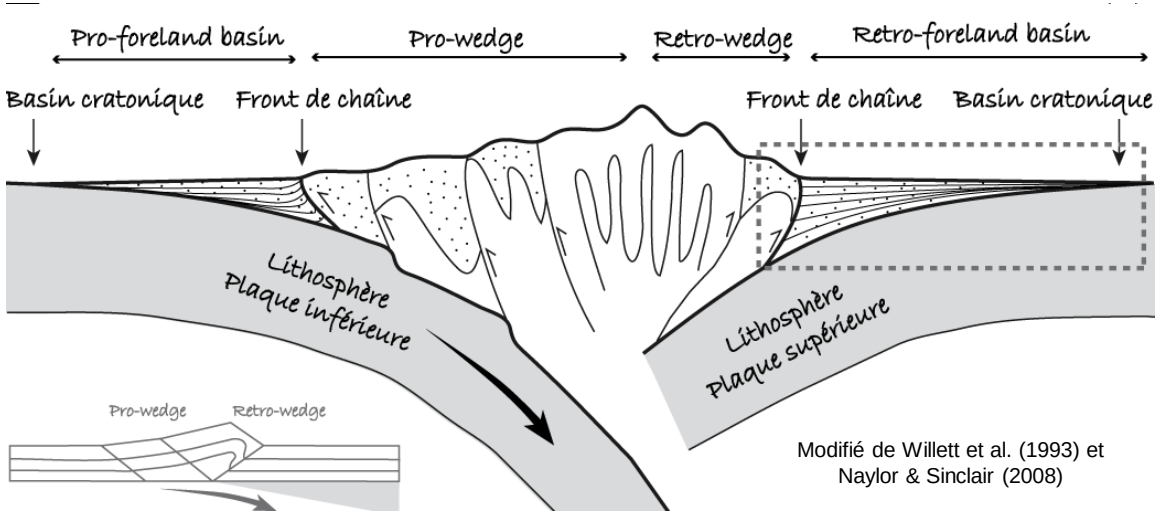
Yves Missenard (Univ. Paris-Saclay) : Directeur de thèse
Philippe Sarda (Univ. Paris-Saclay) : Co-Directeur de thèse

Xavier Quidelleur (Univ. Paris-Saclay) : Président du Jury
Delphine Bosch (Univ. Montpellier 2) : Rapporteur
Michel Séranne (Univ. Montpellier 2) : Rapporteur
Laurent Jolivet (UPMC) : Examinateur
Cécile Allanic (BRGM) : Invitée

Oriane PARIZOT



Modifié de Willett et al. (1993) et Naylor & Sinclair (2008)



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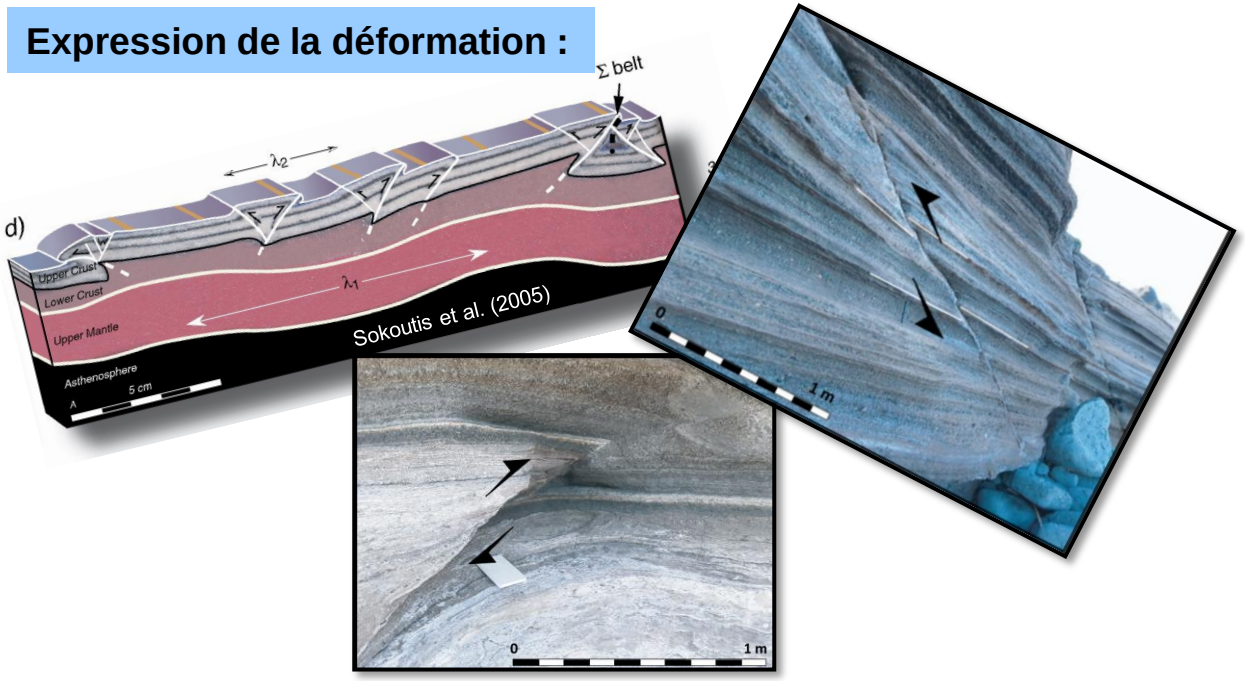

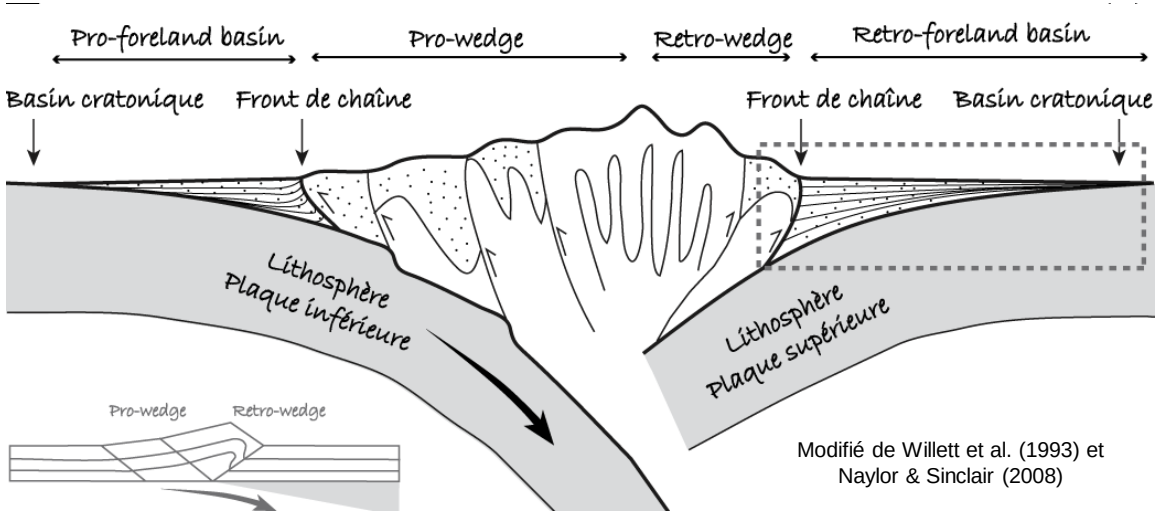

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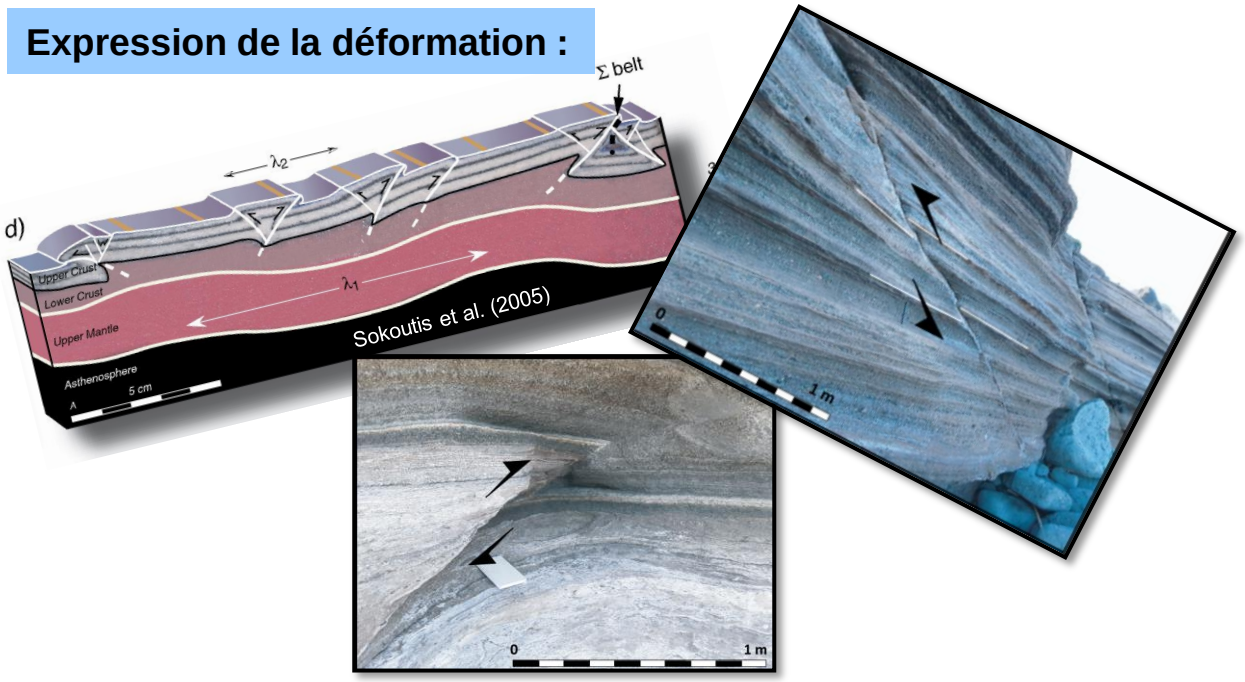
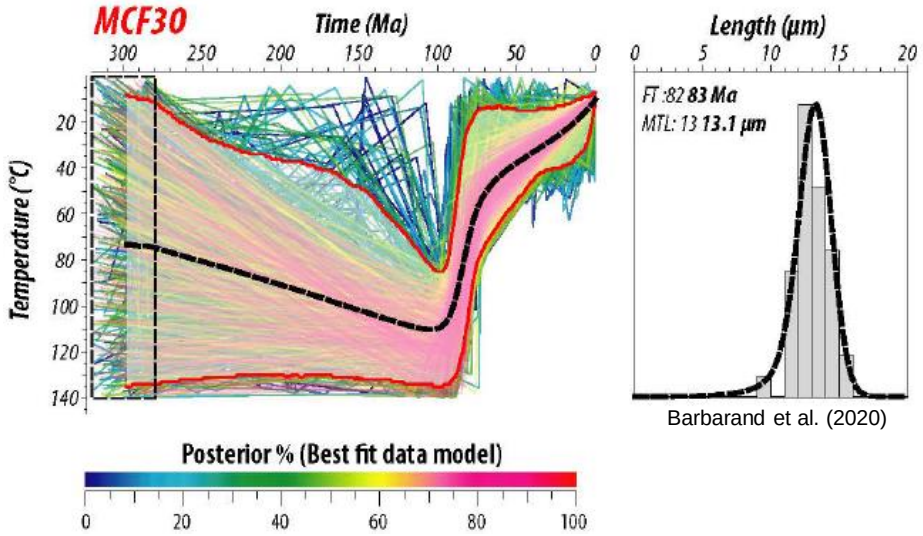
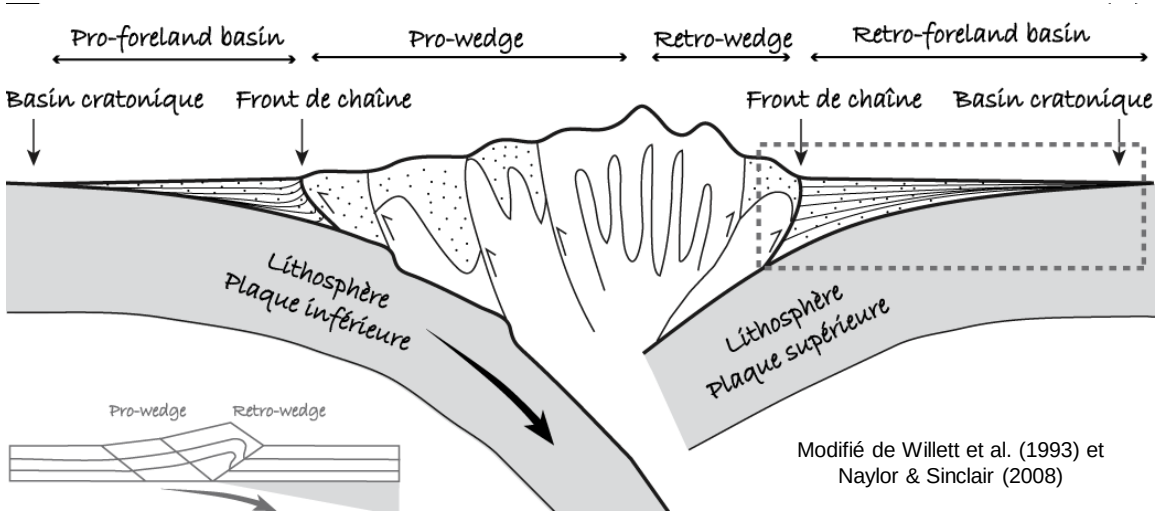


Age de la déformation :

THERMOCHRONOLOGIE



Barbarand et al. (2020)



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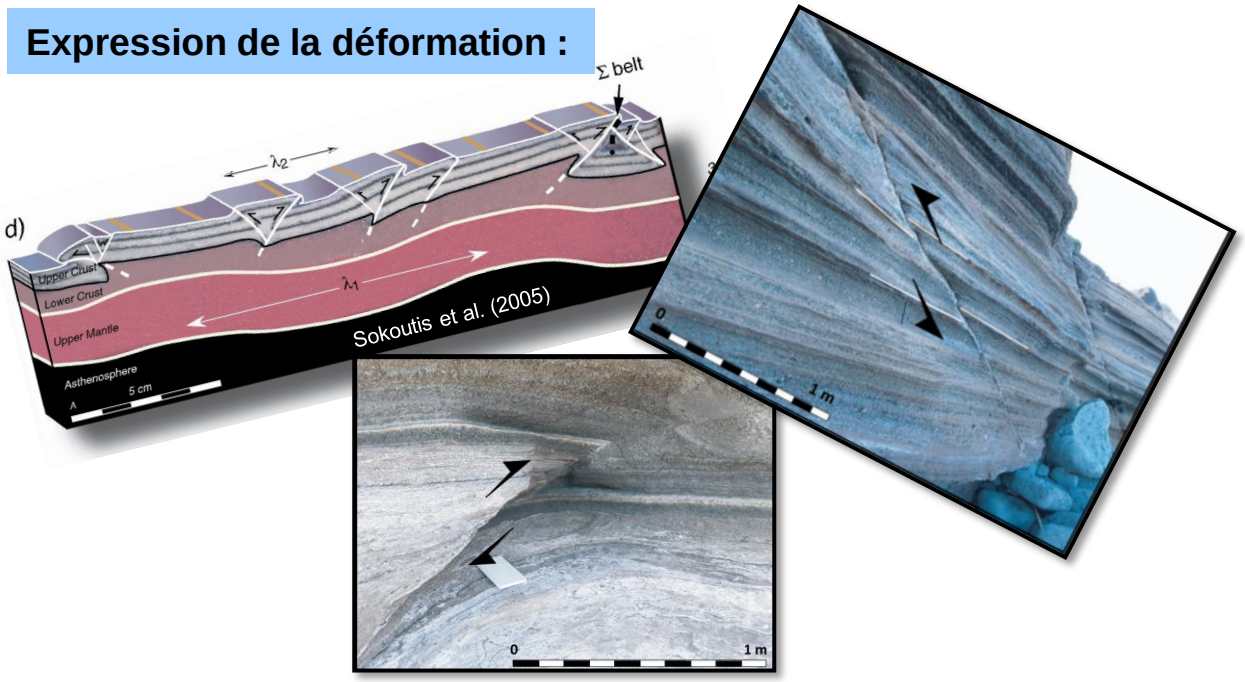

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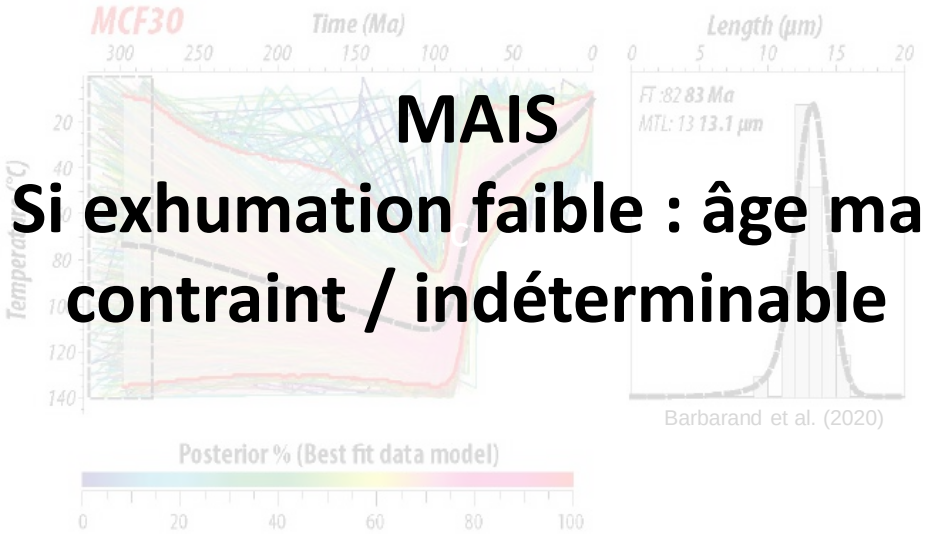
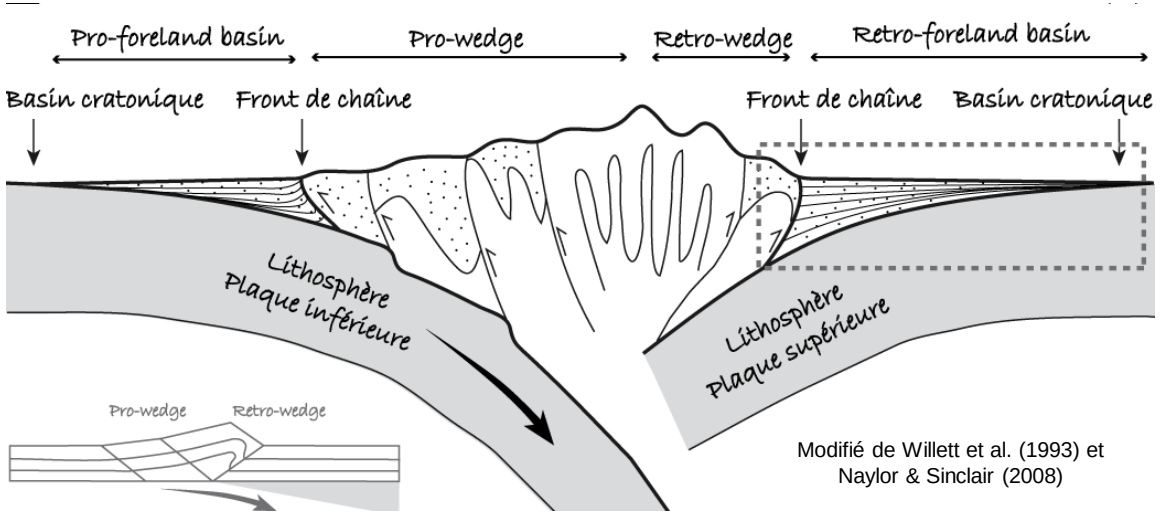


Barbarand et al. (2020)

MAIS

Si exhumation faible : âge mal contraint / indéterminable



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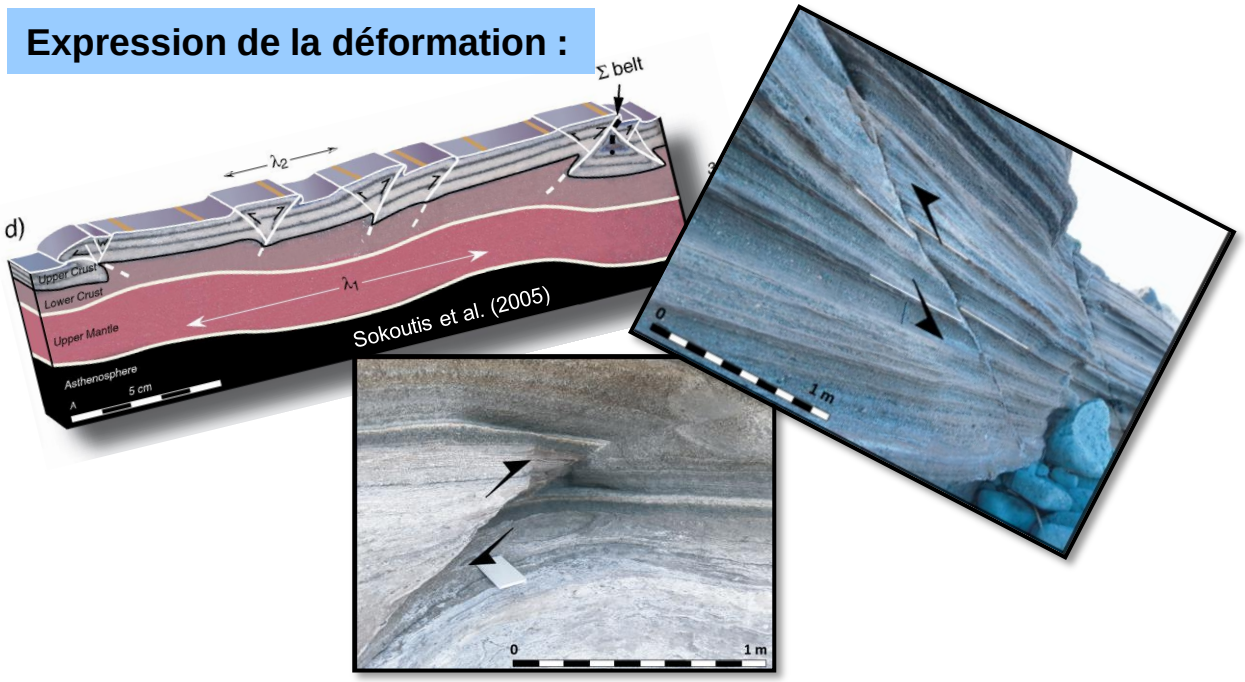

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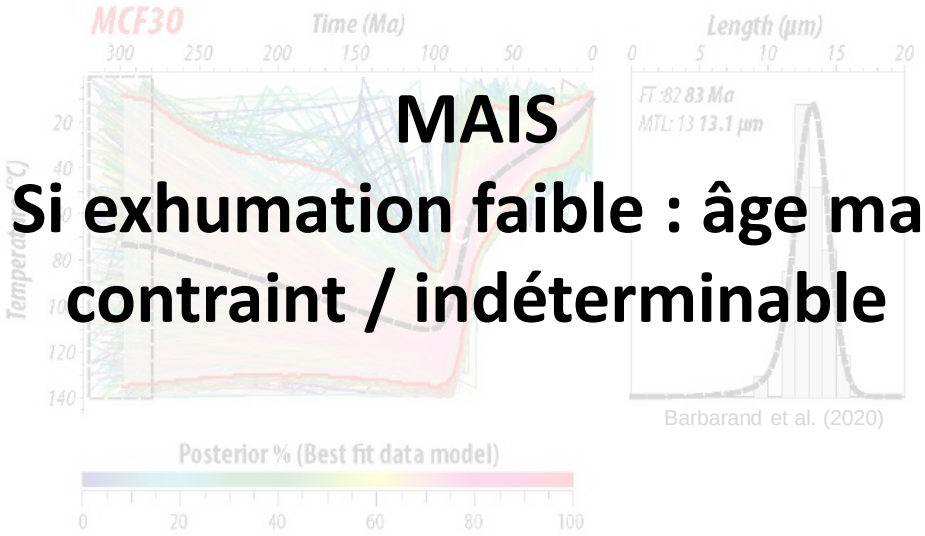

Barbarand et al. (2020)

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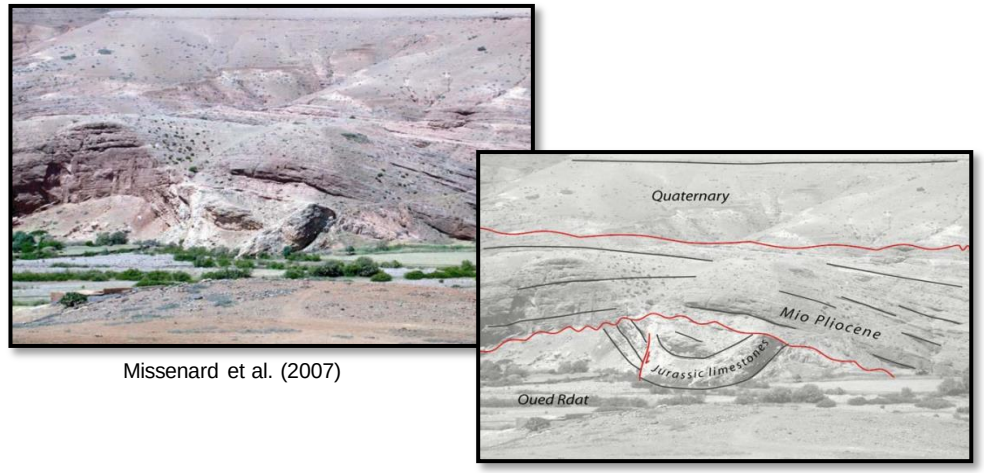
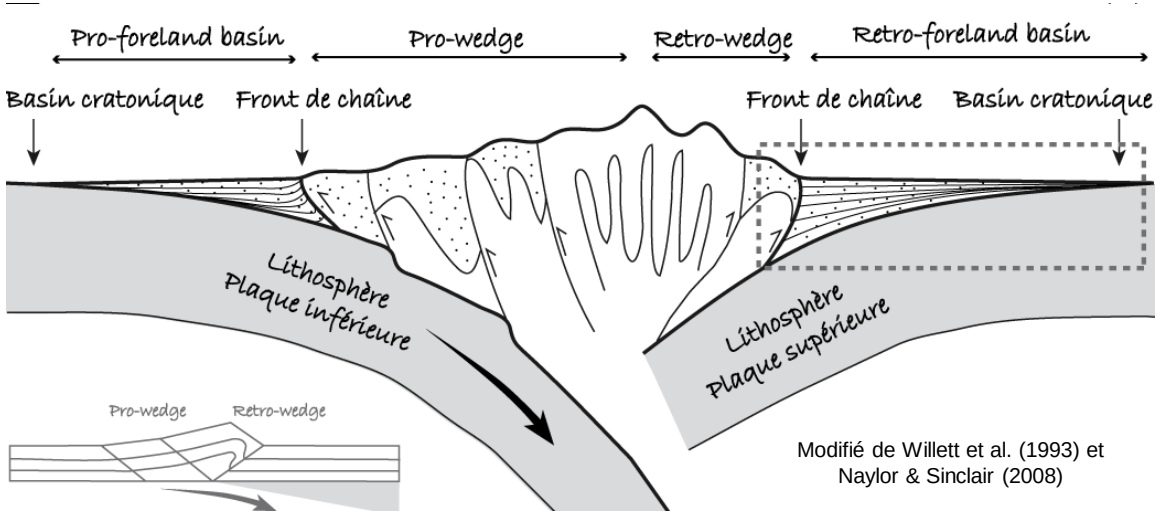
ENREGISTREMENT SÉDIMENTAIRE



Missenard et al. (2007)



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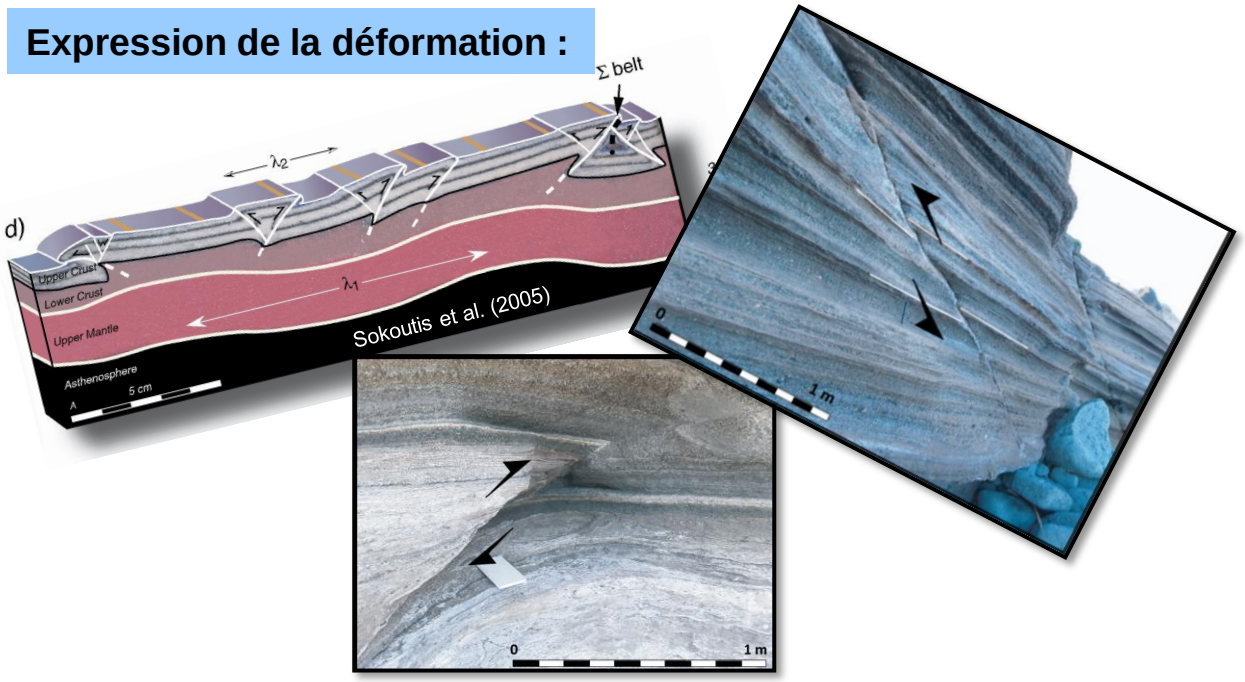

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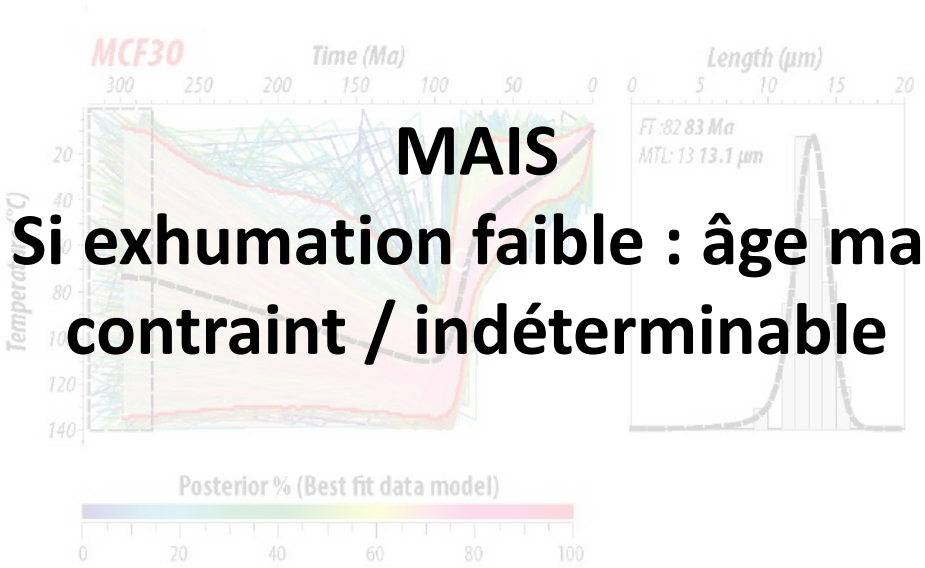

MAIS

Si exhumation faible : âge mal contraint / indéterminable

ENREGISTREMENT SÉDIMENTAIRE

MAIS

Si enregistrement sédimentaire absent : âge mal contraint / indéterminable

Missenard et al. (2007)

Quelle est la chronologie de la déformation associée à la formation d'un orogène dans le domaine intraplaque ?

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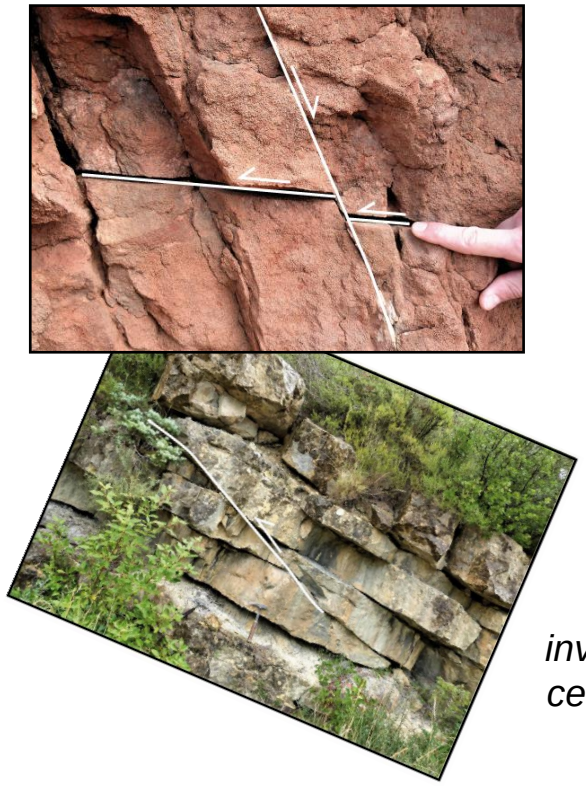
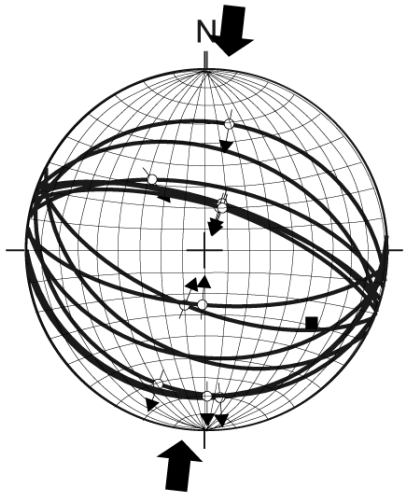
GÉOLOGIE STRUCTURALE



Failles inverses et décrochantes & centimétriques à métriques

Quelle est la chronologie de la déformation associée à la formation d'un orogène dans le domaine intraplaque ?

GÉOLOGIE STRUCTURALE



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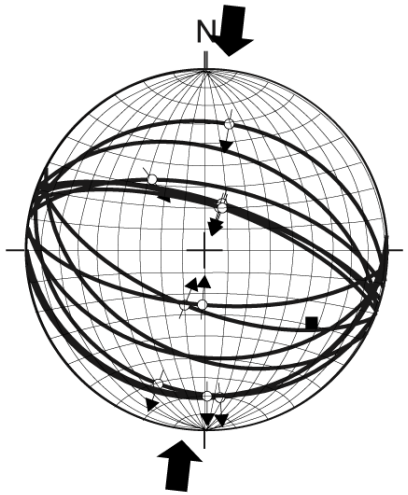
GÉOLOGIE STRUCTURALE & GÉOCHRONOLOGIE



Failles inverses et décrochantes & centimétriques à métriques

Datation U-Pb sur carbonate au LA-ICP-MS → **Méthode récente: Li et al. (2014)** → **Développée à GEOPS depuis 2018**

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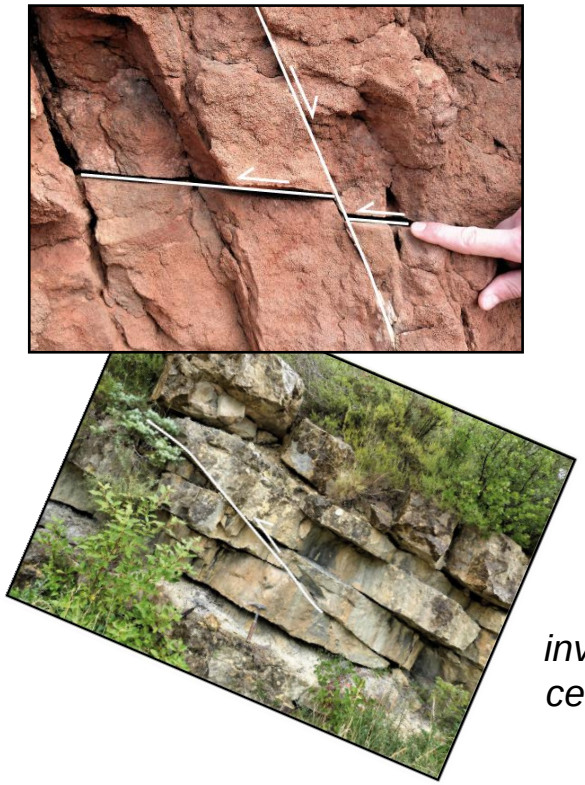
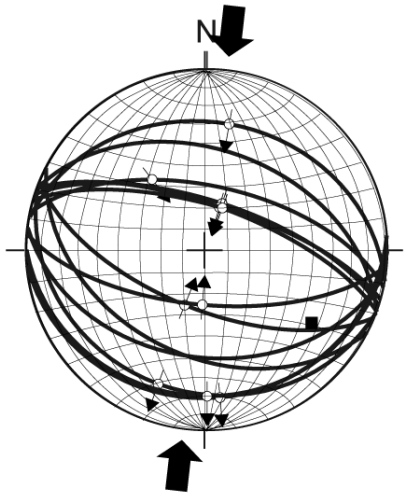
GÉOLOGIE STRUCTURALE & GÉOCHRONOLOGIE





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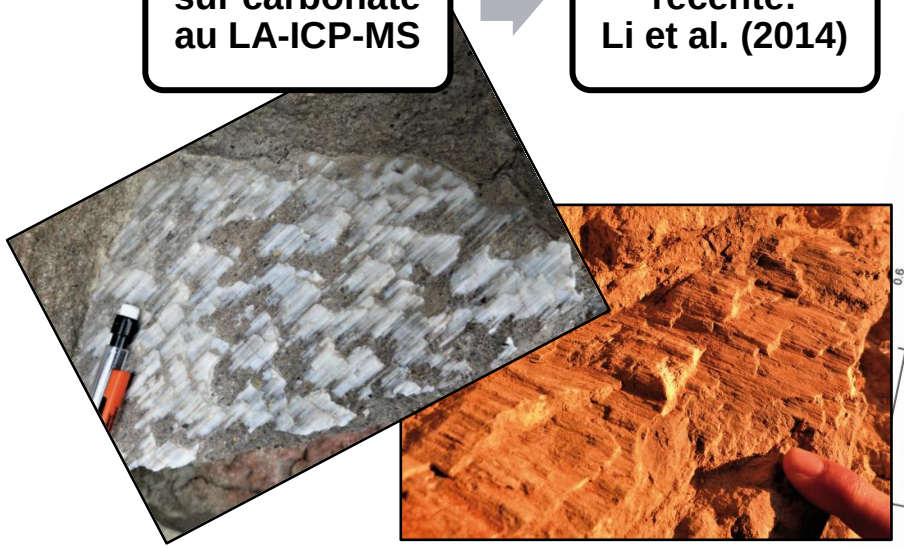

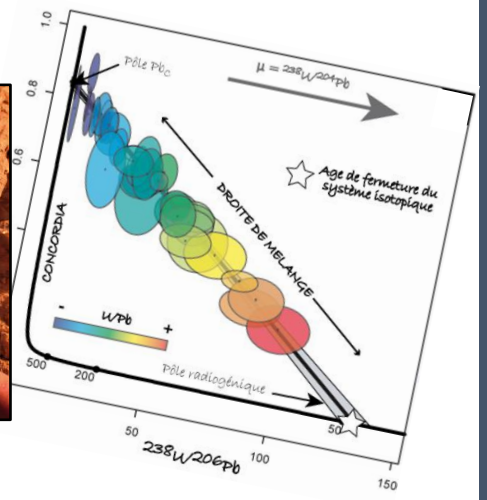

Calcite syntectonique & monophasée sur plan de faille centimétrique à métrique

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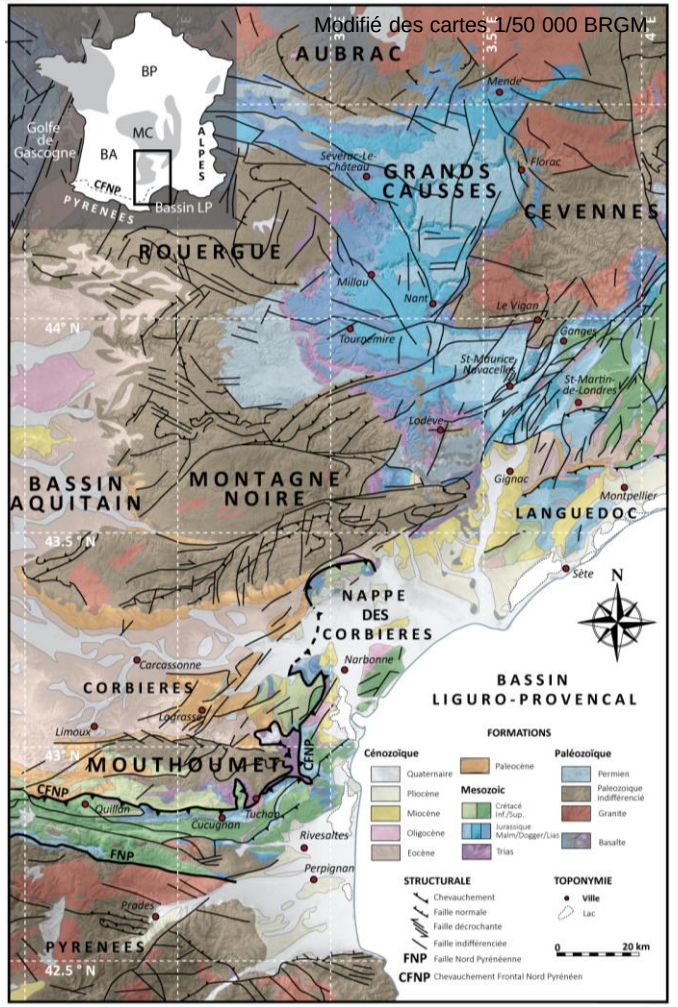

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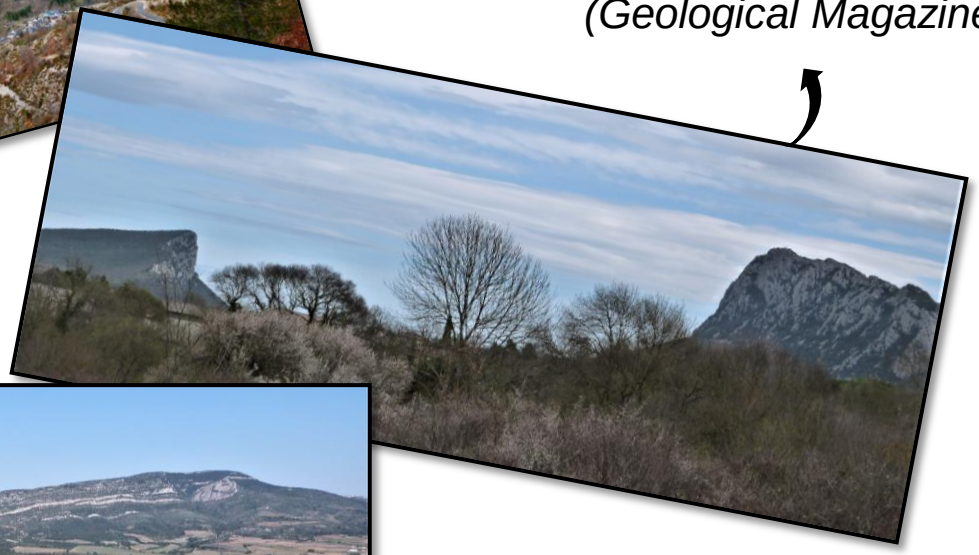
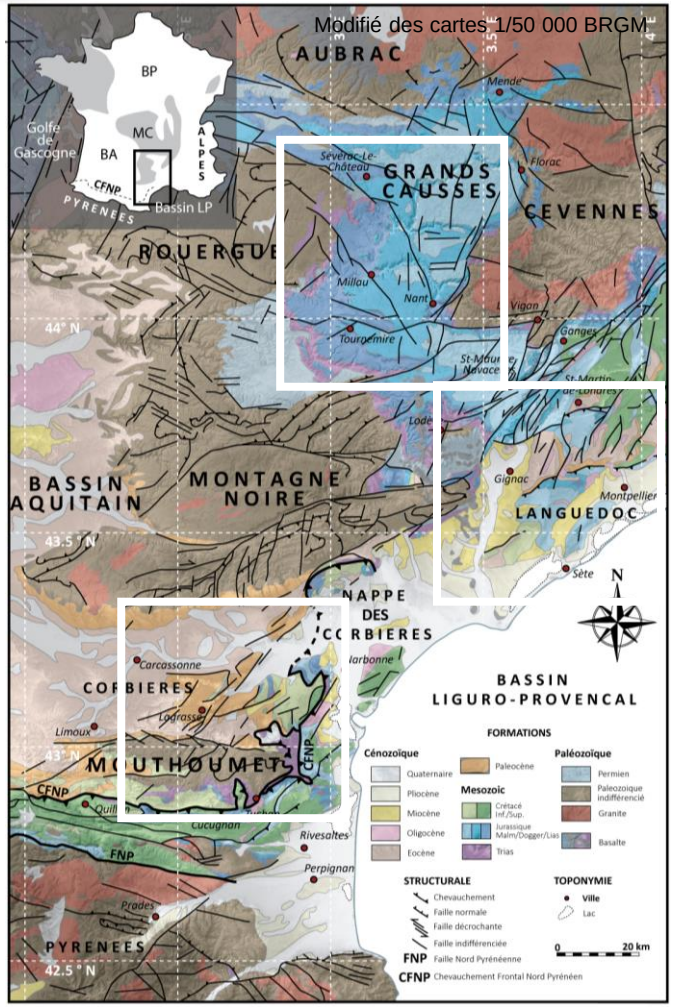
Parizot et al. (2020)
(Geofluids)

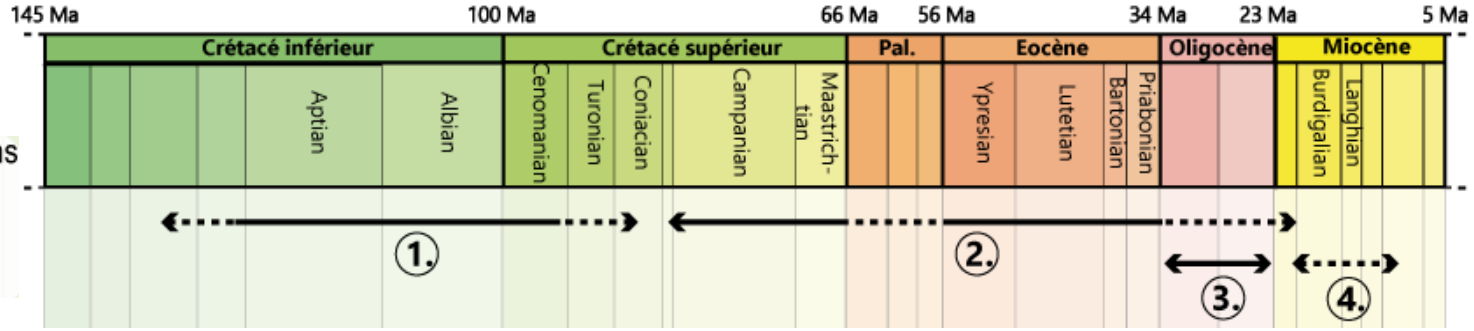


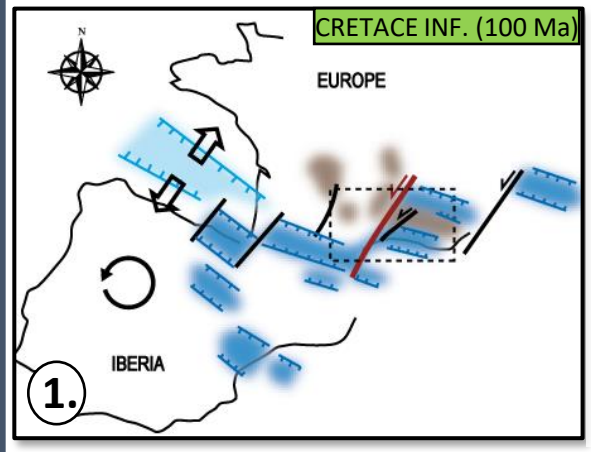
Parizot et al. (2022)
(Geological Magazine)

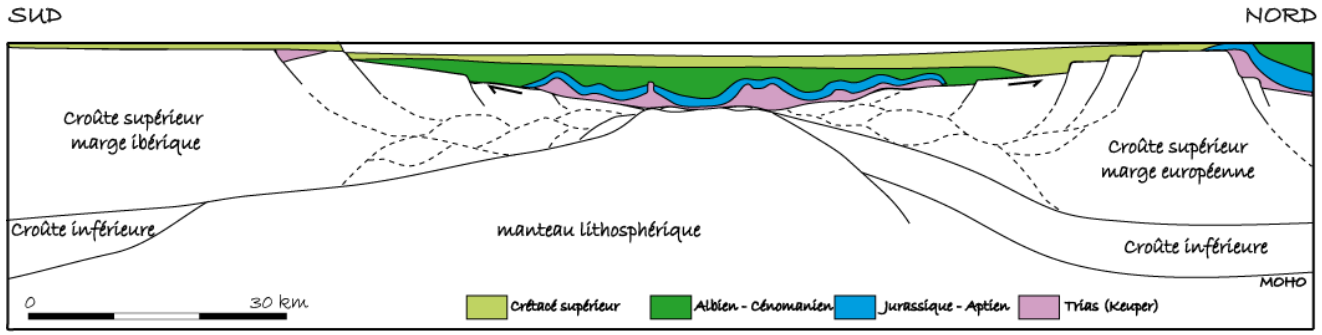
Parizot et al. (2021)
(Terra Nova)



1. Ouverture des bassins pyrénéens
2. Orogène pyrénéen
3. Ouverture du Golfe du Lion
4. Surfaces "perchées"







Modifié de Teixell et al. (2016)

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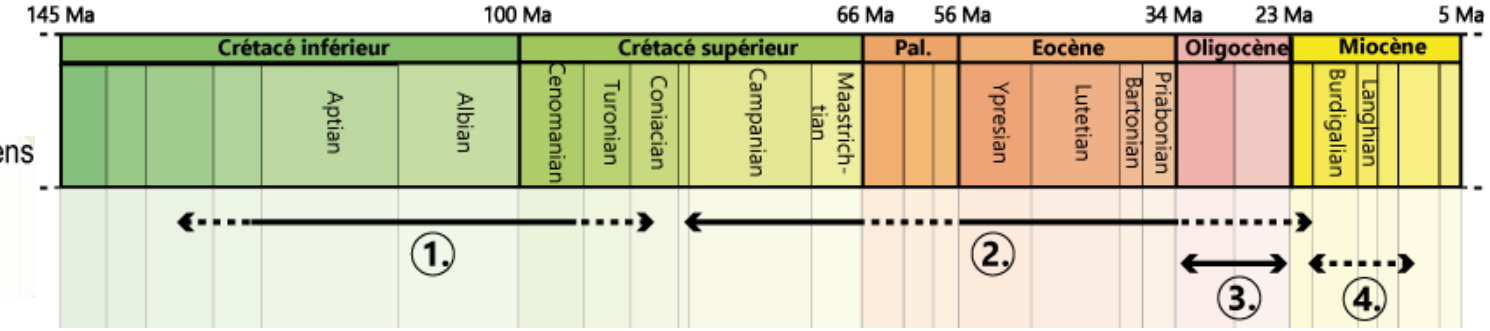

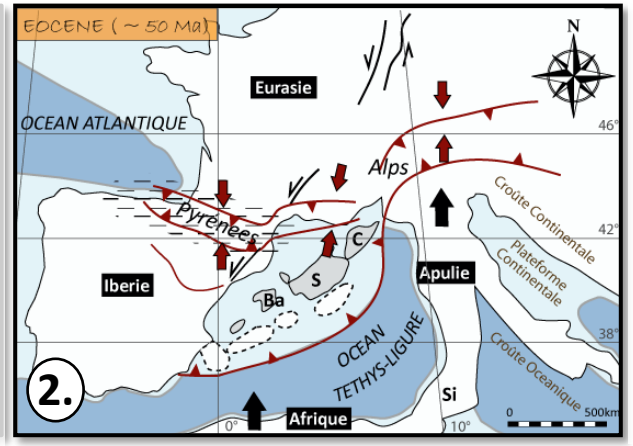

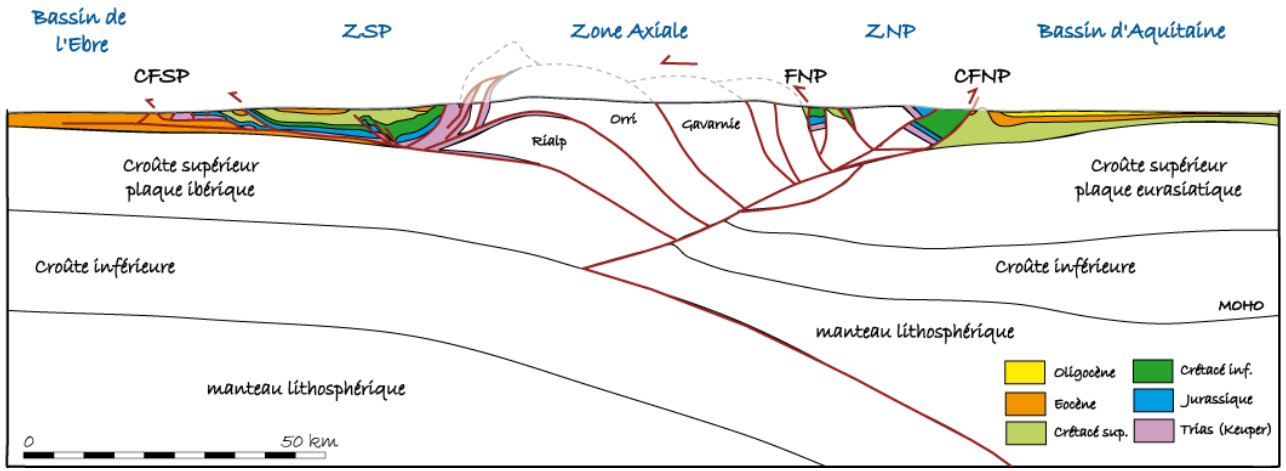

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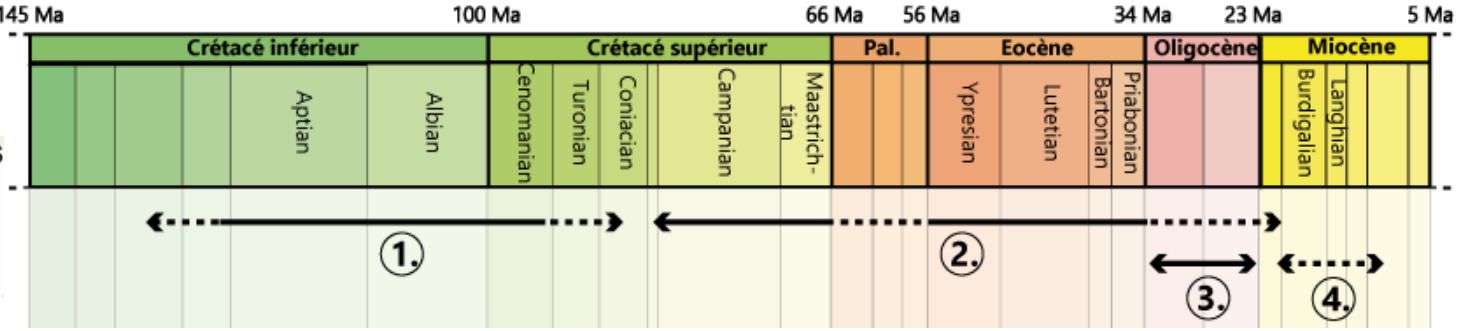

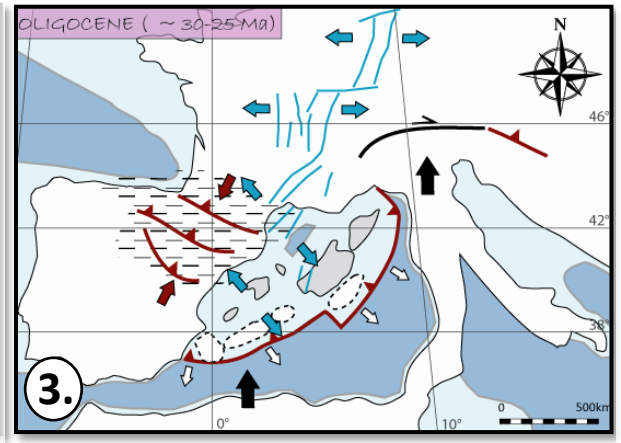

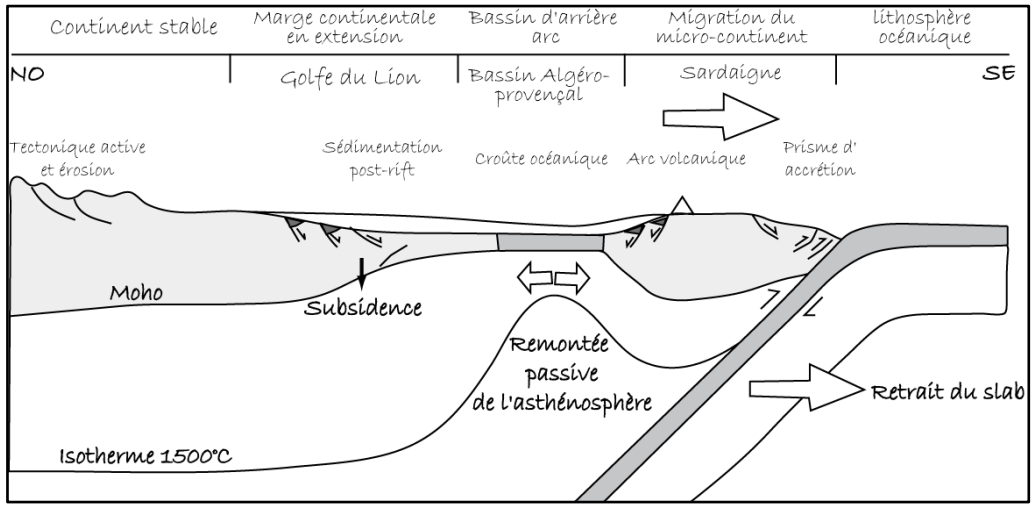

Modifié de Séranne et al. (1999) (2021)

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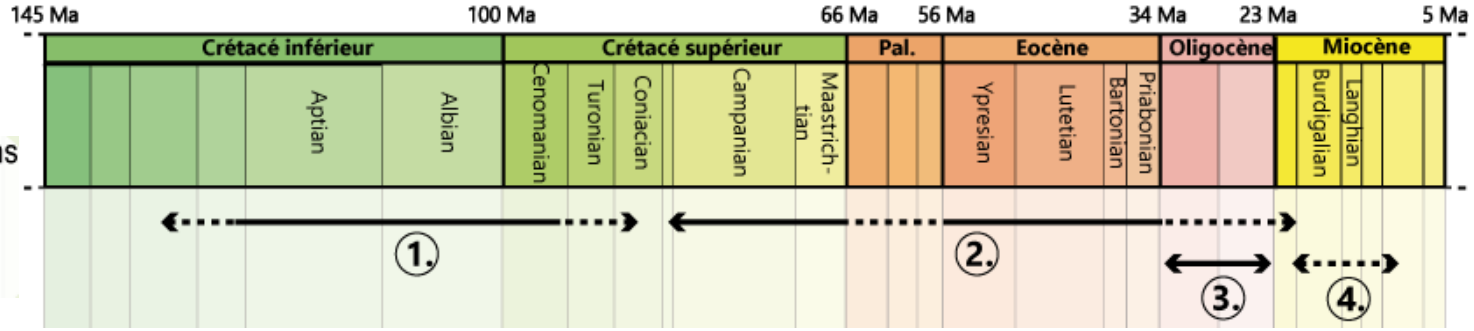
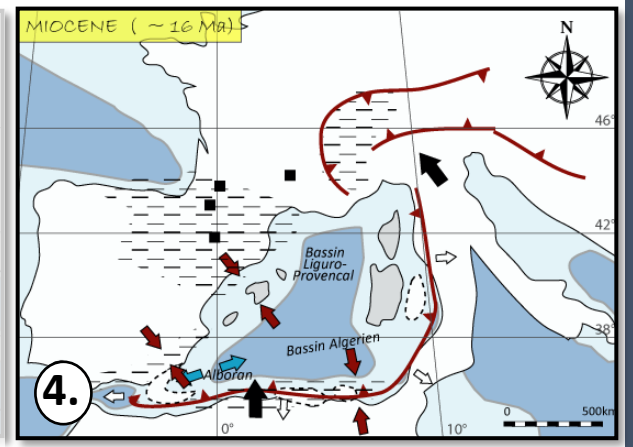
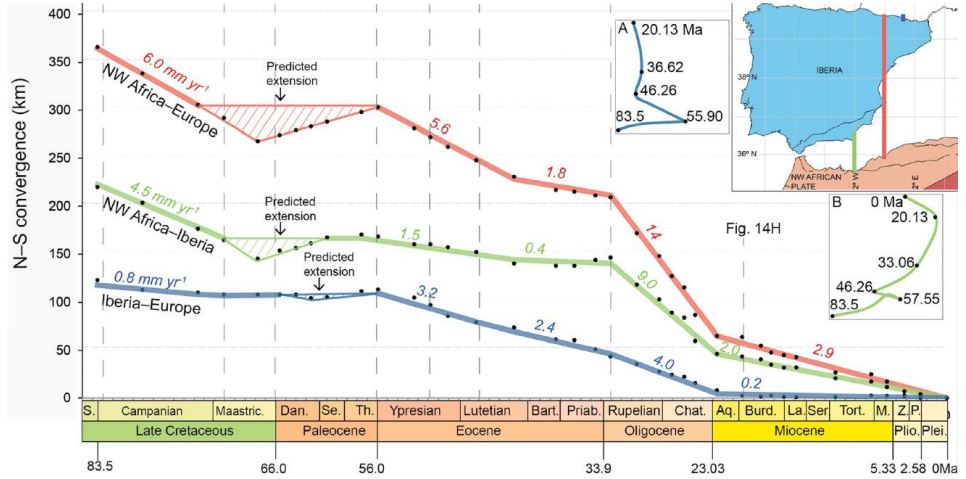


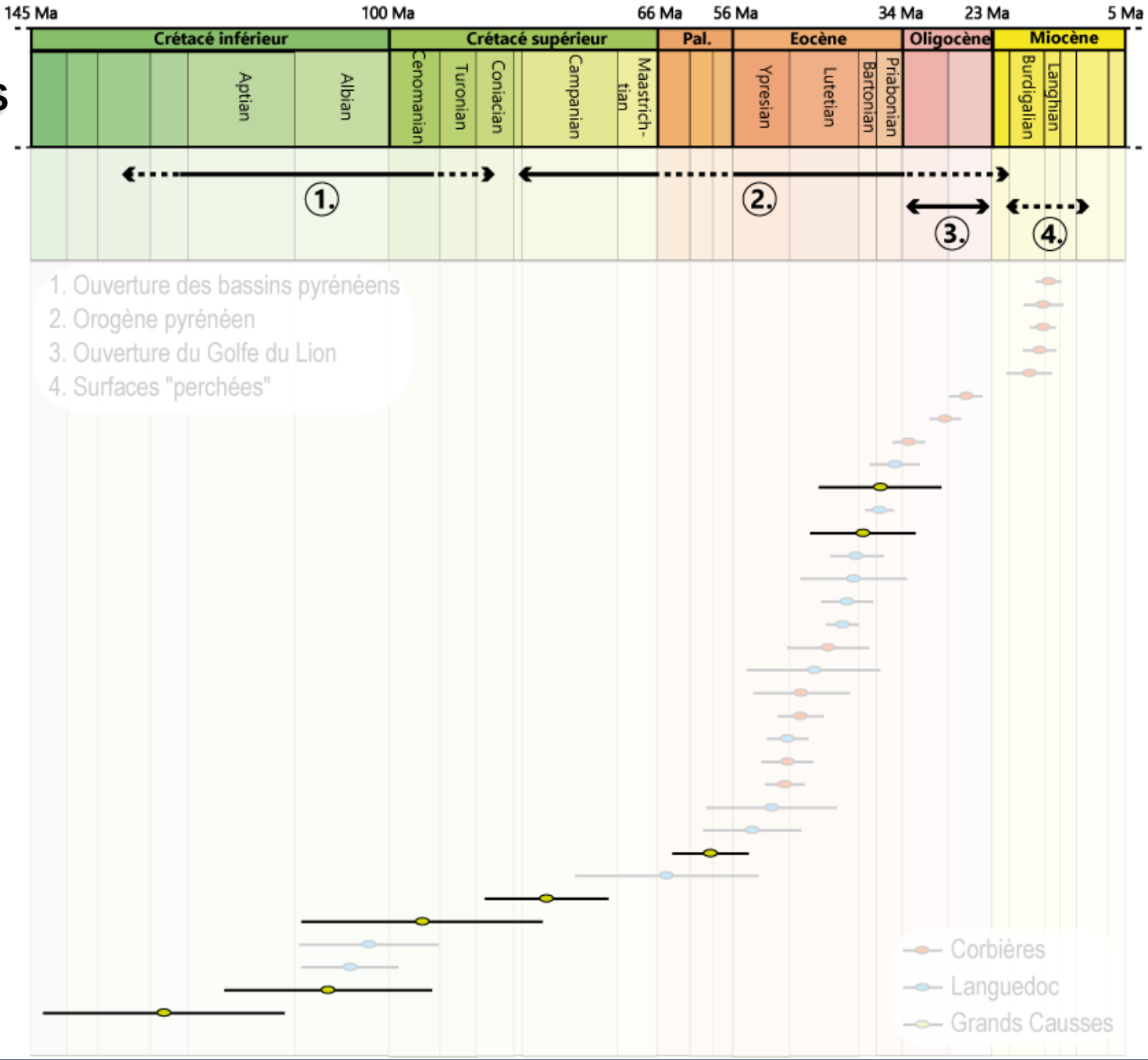


Bosch et al. (2016)

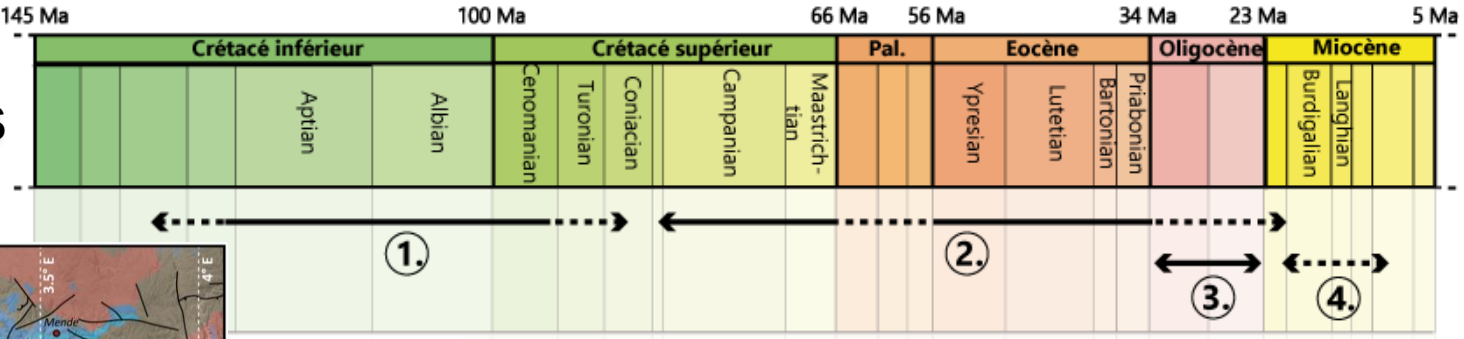


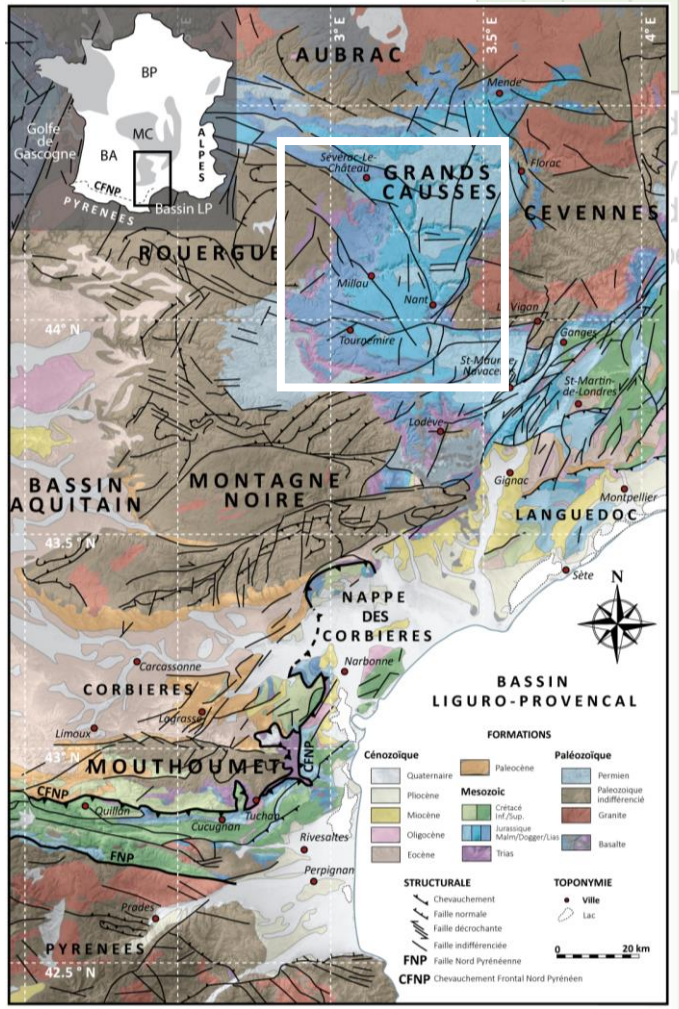
Macchiavelli et al. (2017)

GRANDS CAUSSES

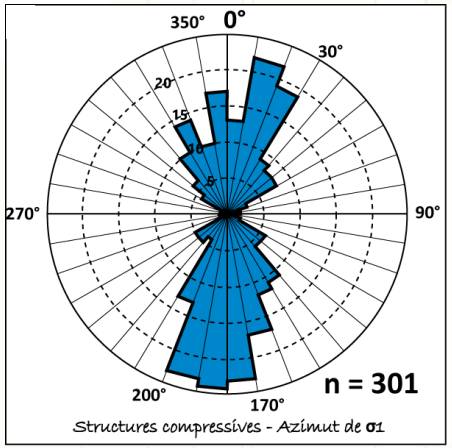


GRANDS CAUSSES

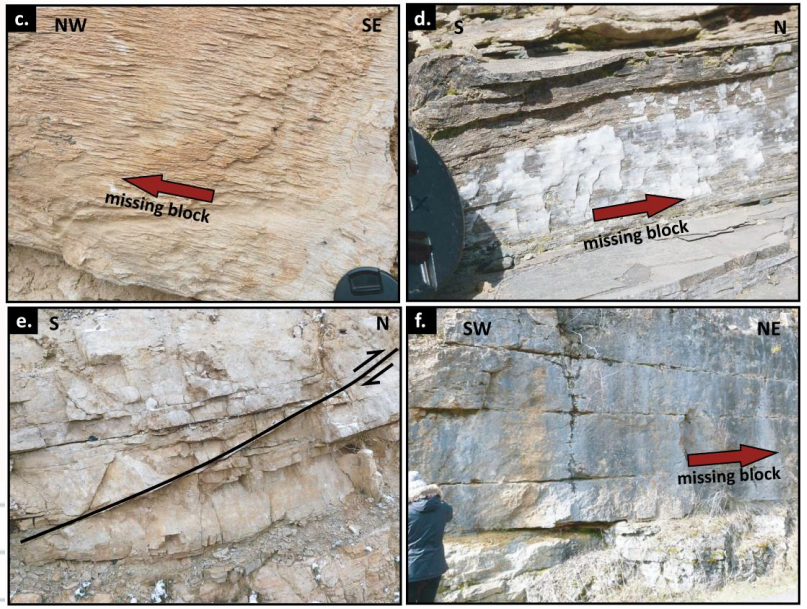




Modifié des cartes 1/50 000 BRGM

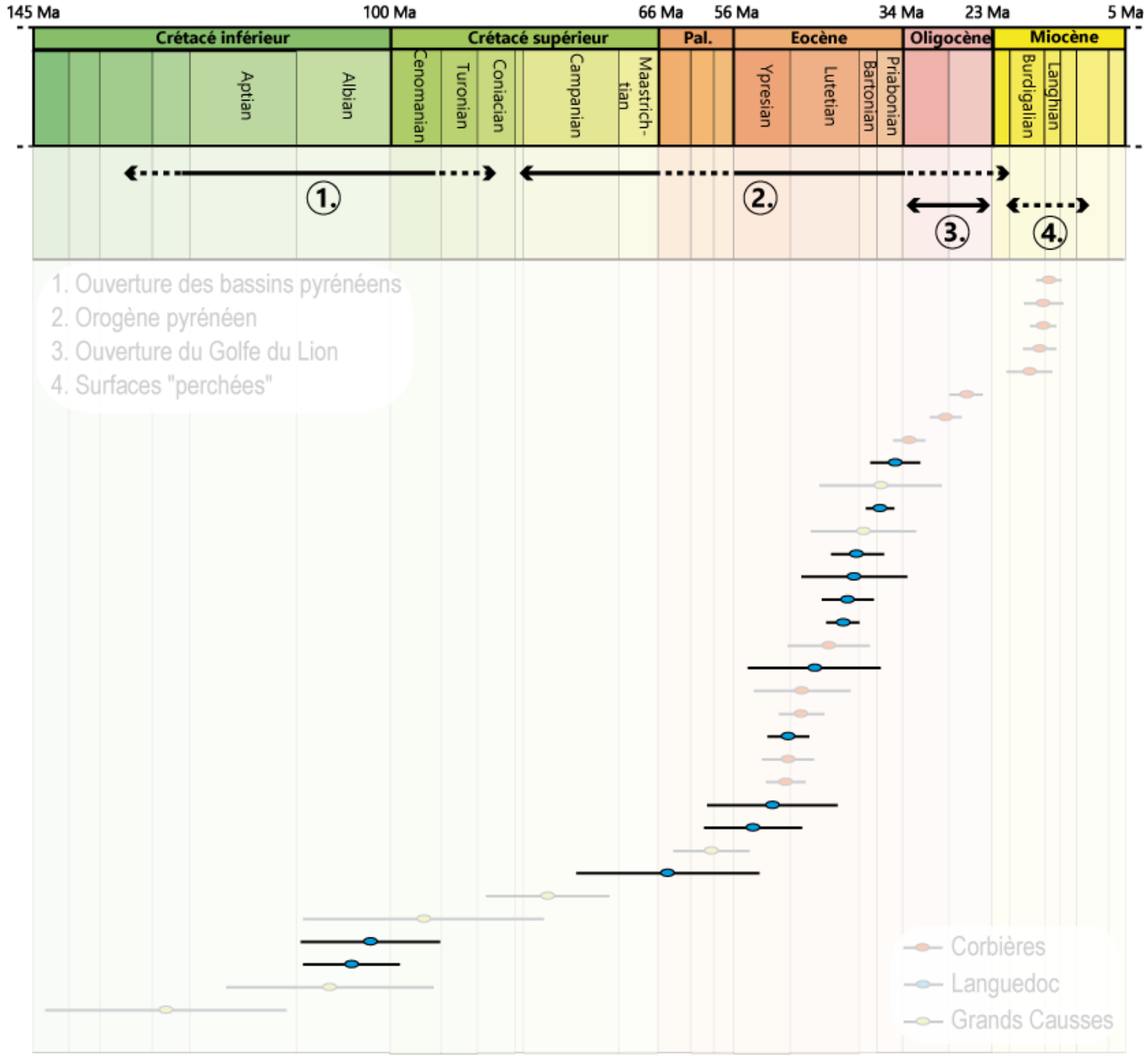


DÉFORMATION DE LA COUVERTURE SÉDIMENTAIRE LONGUE ET CONTINUE DANS LE TEMPS



Parizot et al. (2020)

LANGUEDOC


145 Ma
100 Ma
66 Ma
56 Ma
34 Ma
23 Ma
5 Ma
Crétacé inférieur
Crétacé supérieur
Pal.
Eocène
Oligocène
Miocène
Aptian
Albian
Cenomanian
Turonian
Coniacian
Campanian
Maastrich-tian
Ypresian
Lutetian
Bartonian
Priabonian
Burdigalian
Langhian
1.
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Languedoc
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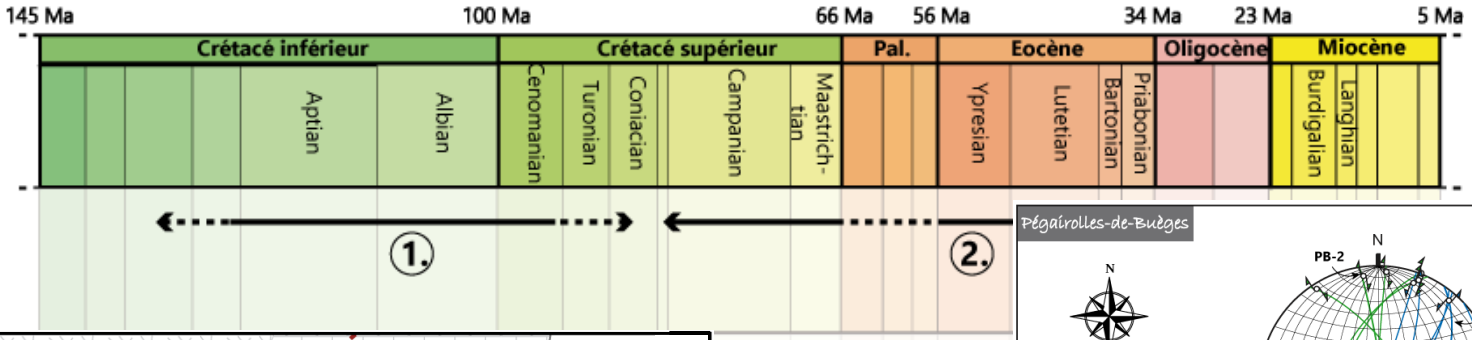
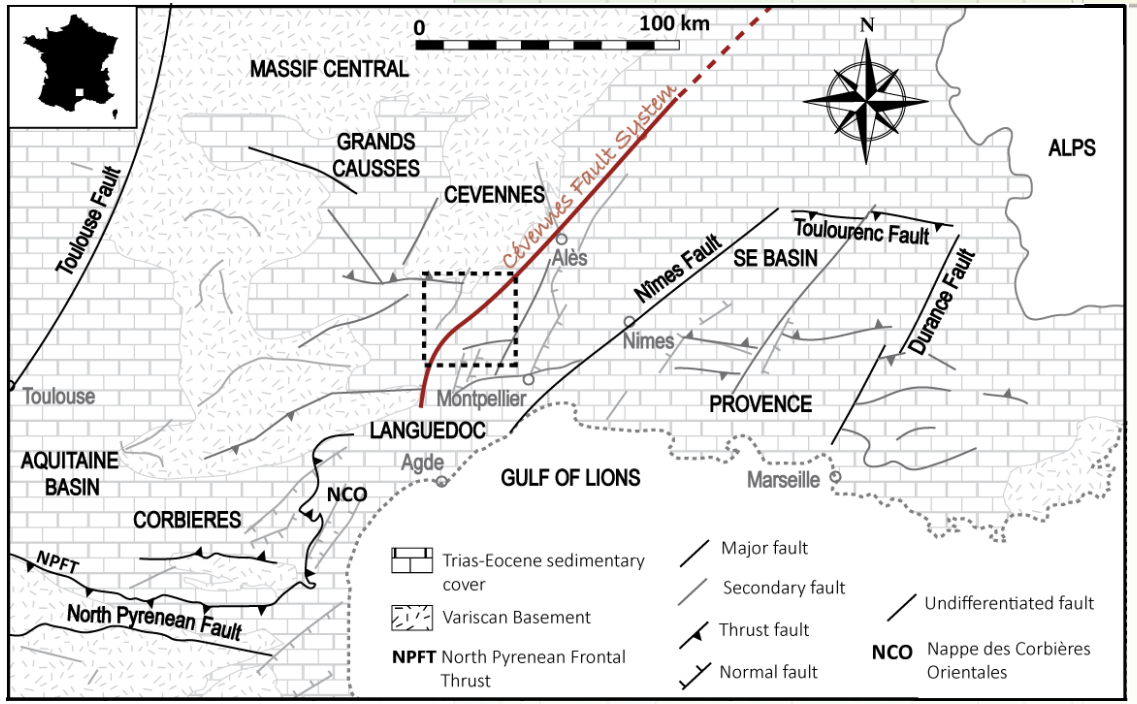
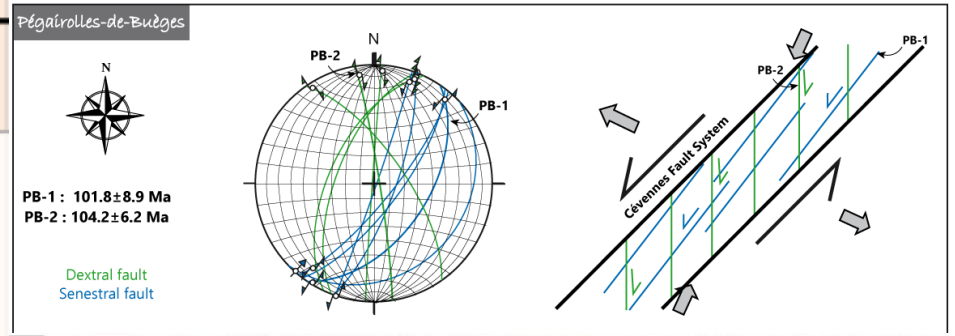
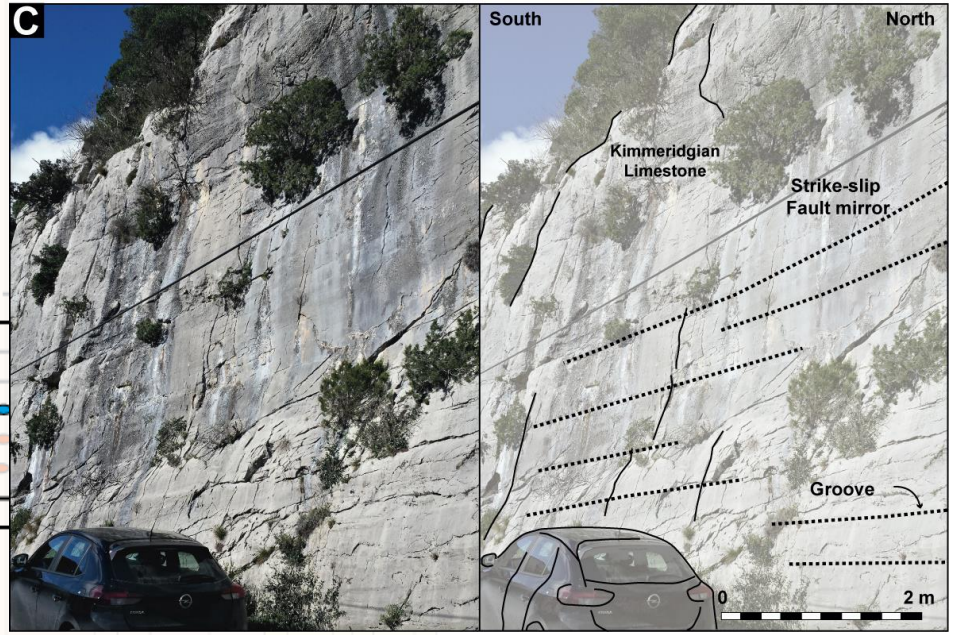
LANGUEDOC





Parizot et al. (2022)



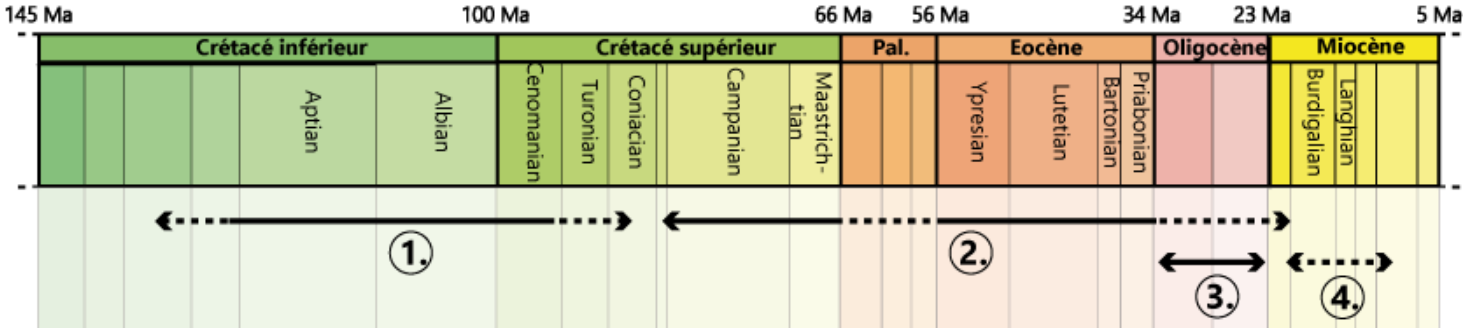


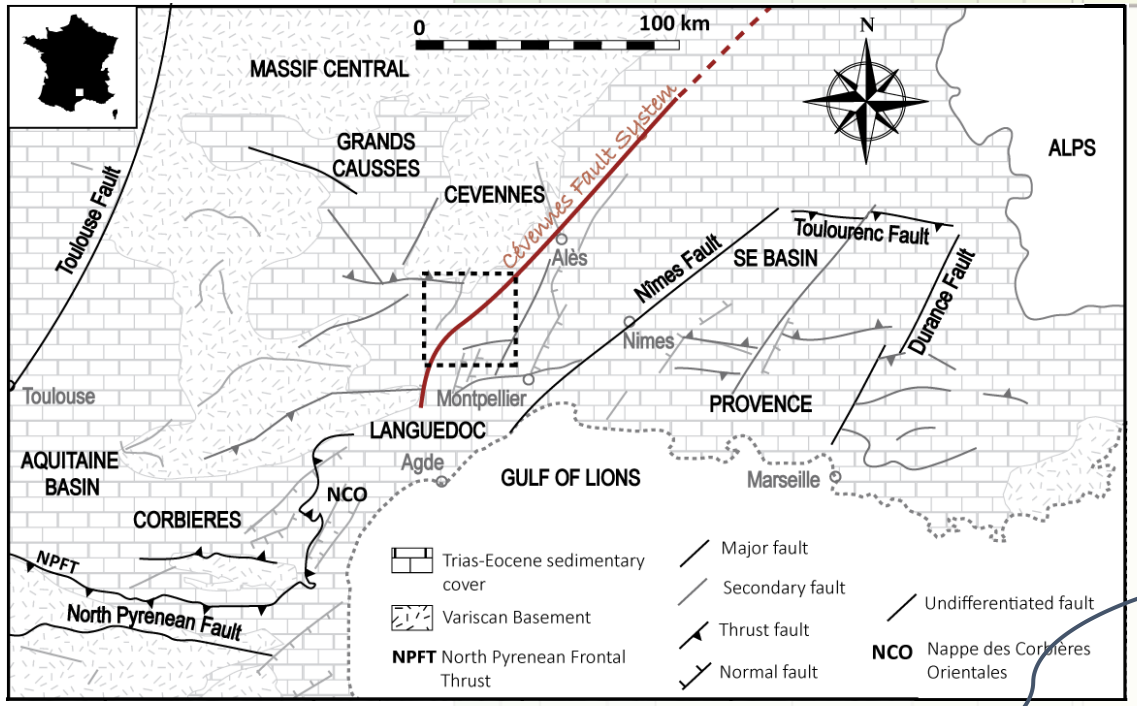
Pégairolles-de-Buèges

Parizot et al. (2022)

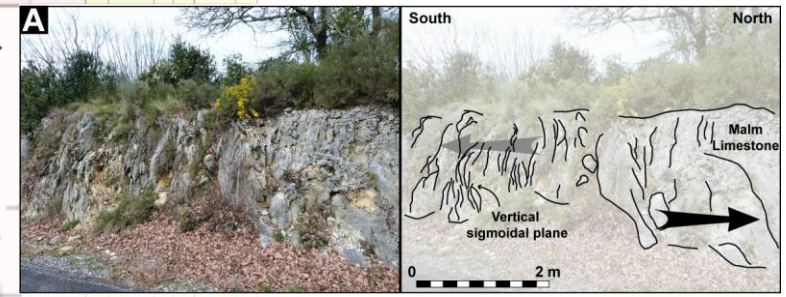
MISE EN EVIENCE D'UNE ACTIVITE DE LA FDC A L'ALBIEN

LANGUEDOC

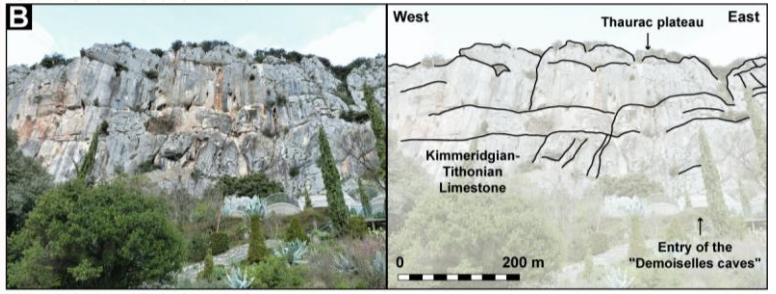




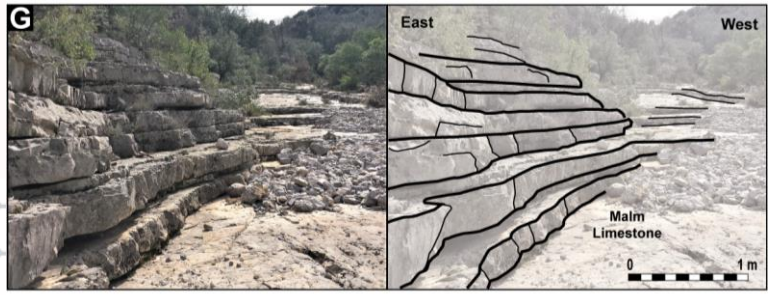
Parizot et al. (2022)



Lentille Jurassique de St-Bauzille de P.



Grotte des Demoiselles

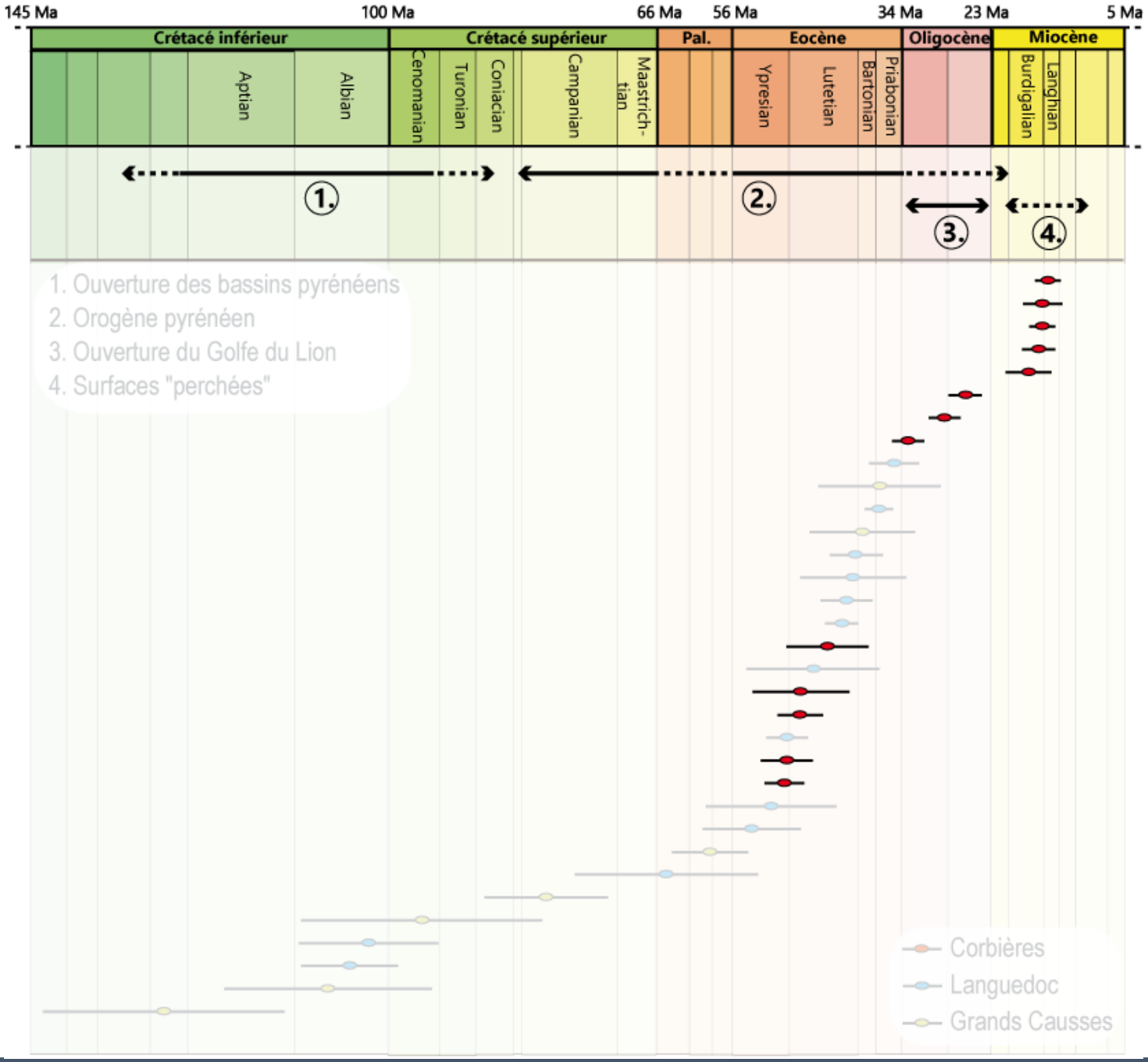


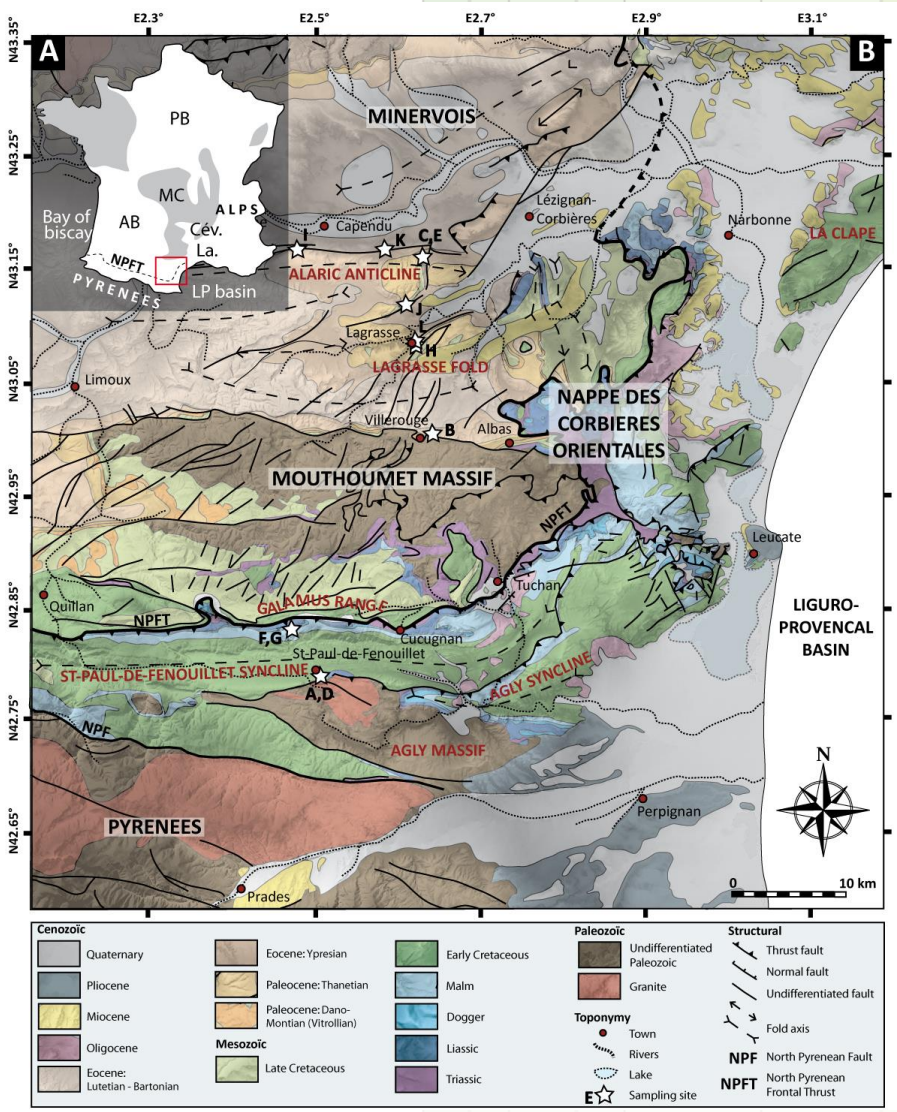
Dalle des Matelles

Parizot et al. (2022)

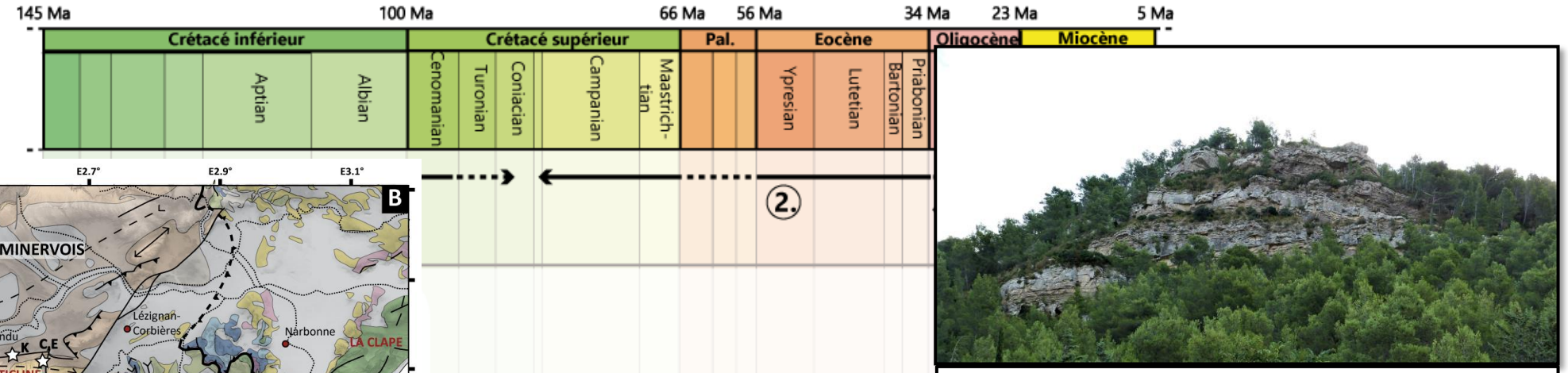
ACTIVITE CONTINUE DE LA FDC LORS DE LA PHASE PYRENEENNE

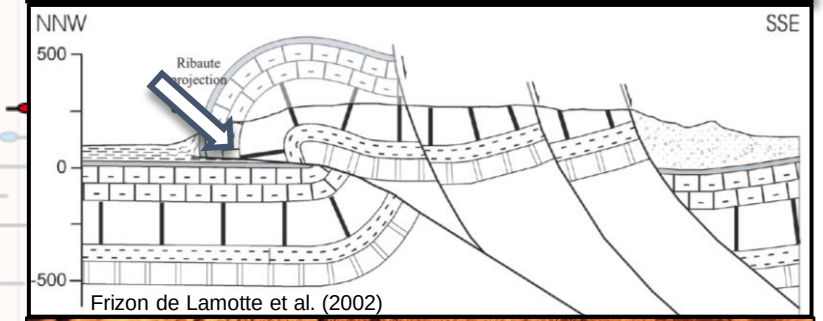
CORBIERES


145 Ma
100 Ma
66 Ma
56 Ma
34 Ma
23 Ma
5 Ma
Crétacé inférieur
Crétacé supérieur
Pal.
Eocène
Oligocène
Miocène
Aptian
Albian
Cenomanian
Turonian
Coniacian
Campanian
Maastrich-tian
Ypresian
Lutetian
Bartonian
Priabonian
Burdigalian
Langhian
1.
2.
3.
4.
1. Ouverture des bassins pyrénéens
2. Orogène pyrénéen
3. Ouverture du Golfe du Lion
4. Surfaces "perchées"
Corbières
Languedoc
Grands Causses

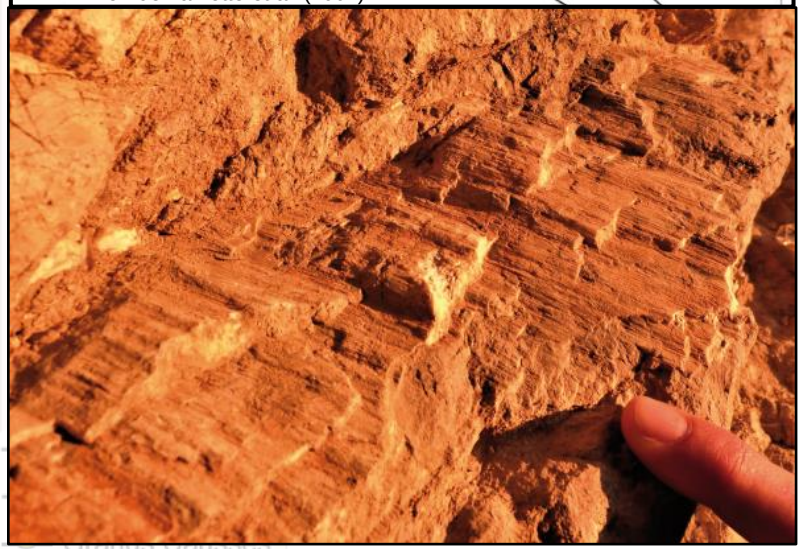


Modifié des cartes 1/50 000 BRGM

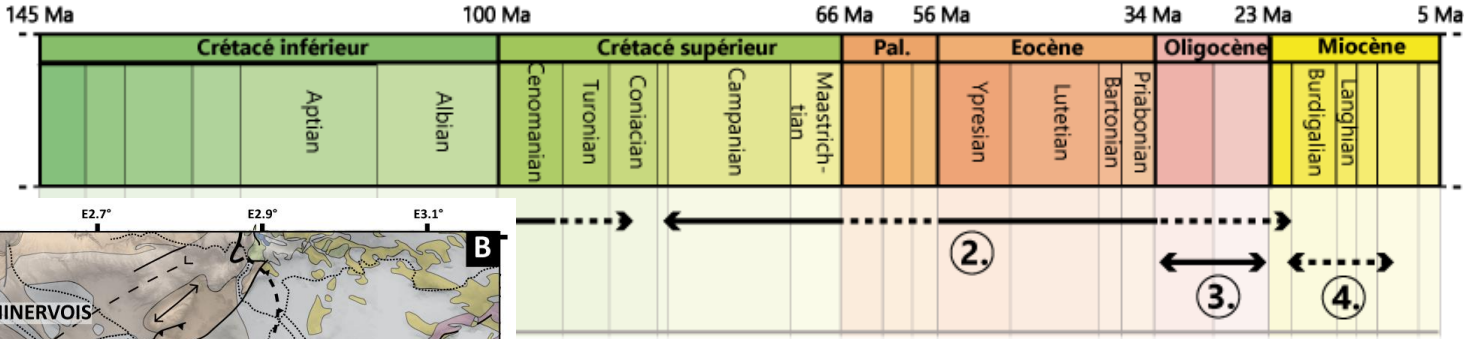


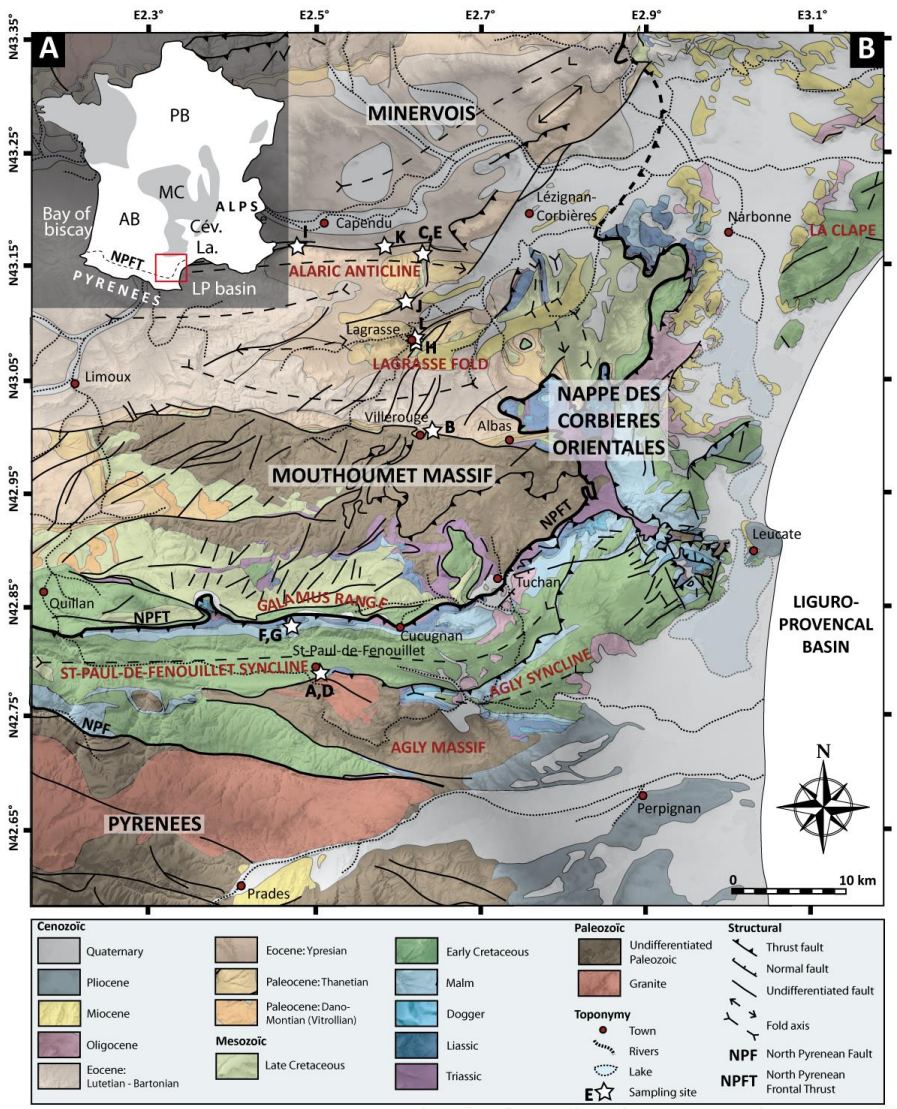


Frizon de Lamotte et al. (2002)

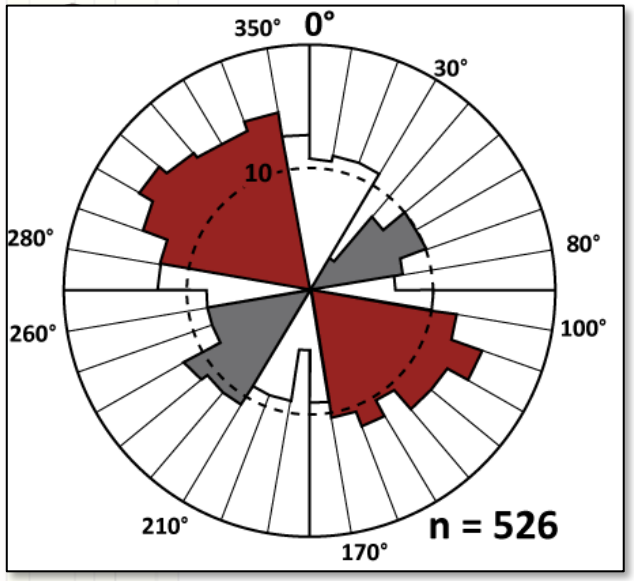


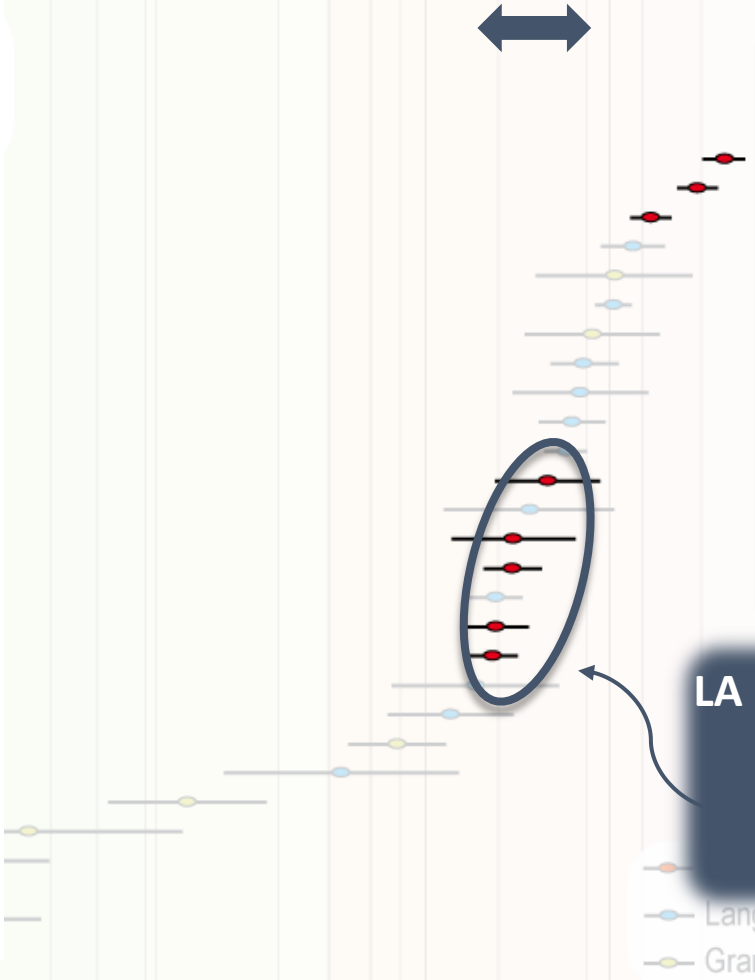
Chaînon de Lagrasse



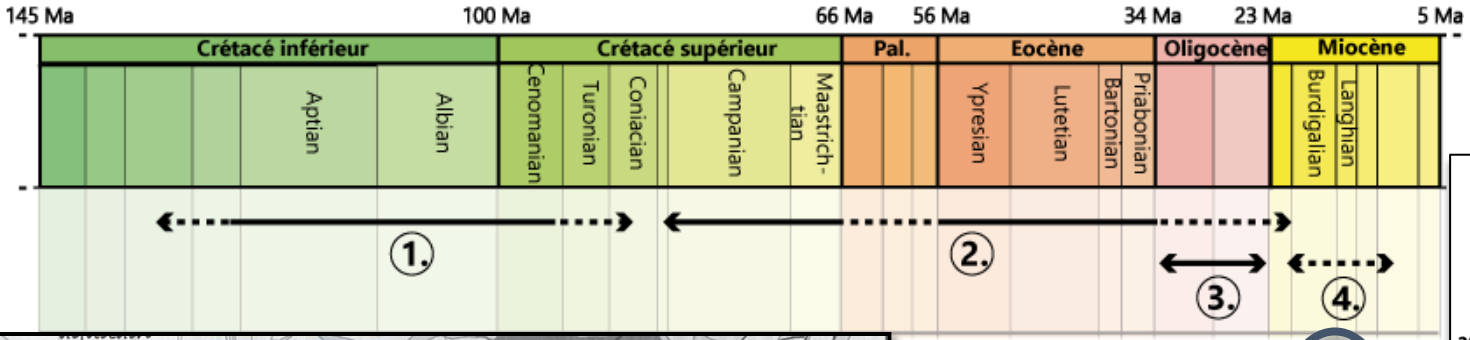


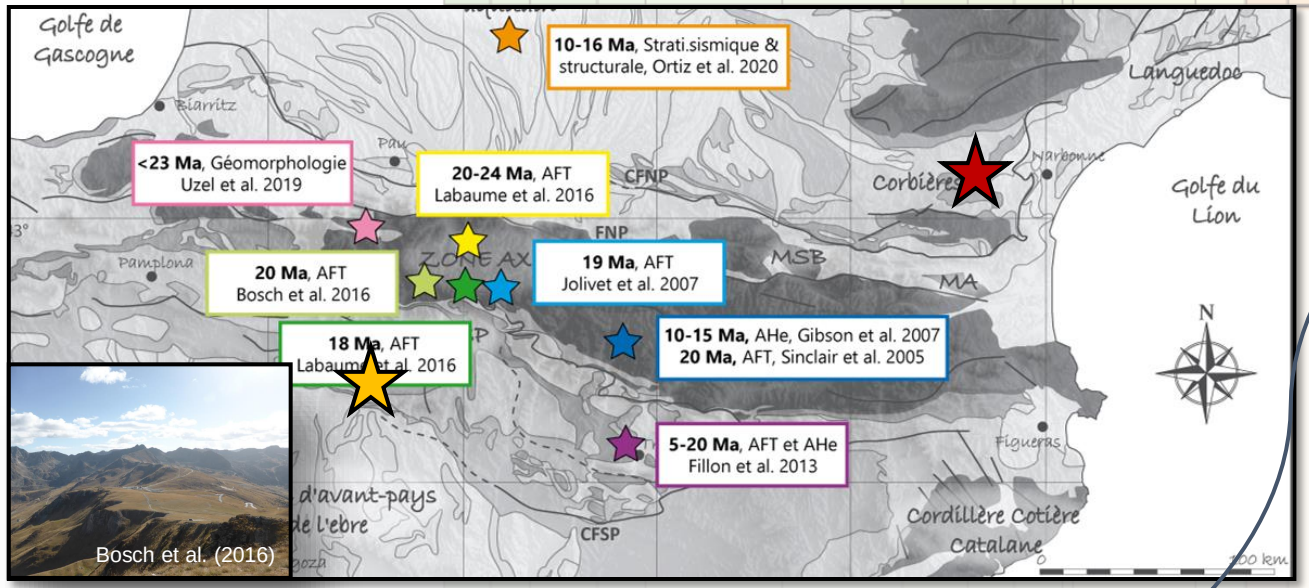
Modifié des cartes 1/50 000 BRGM

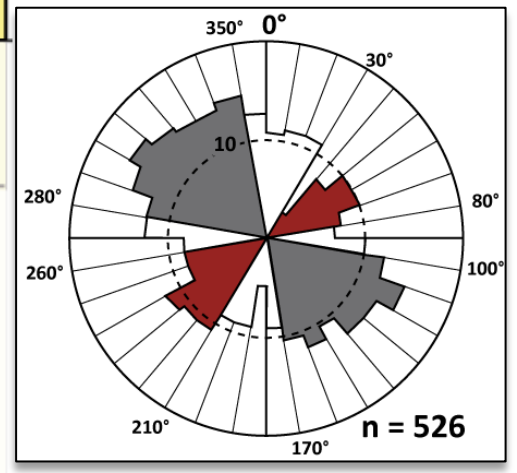


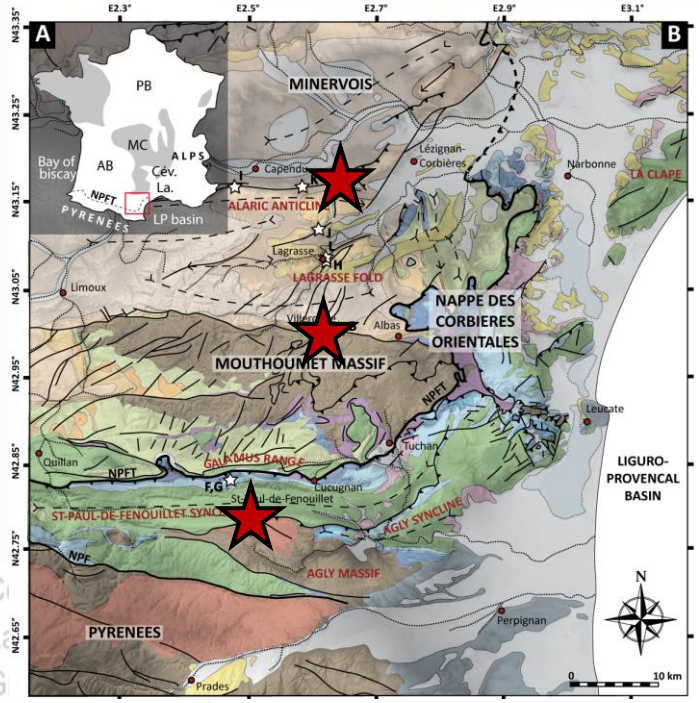


LA PHASE PYRENEENNE A L'ORIGINE D'UNE DEFORMATION DE LA COUVERTURE SEDIMENTAIRE AU LUTETIEN



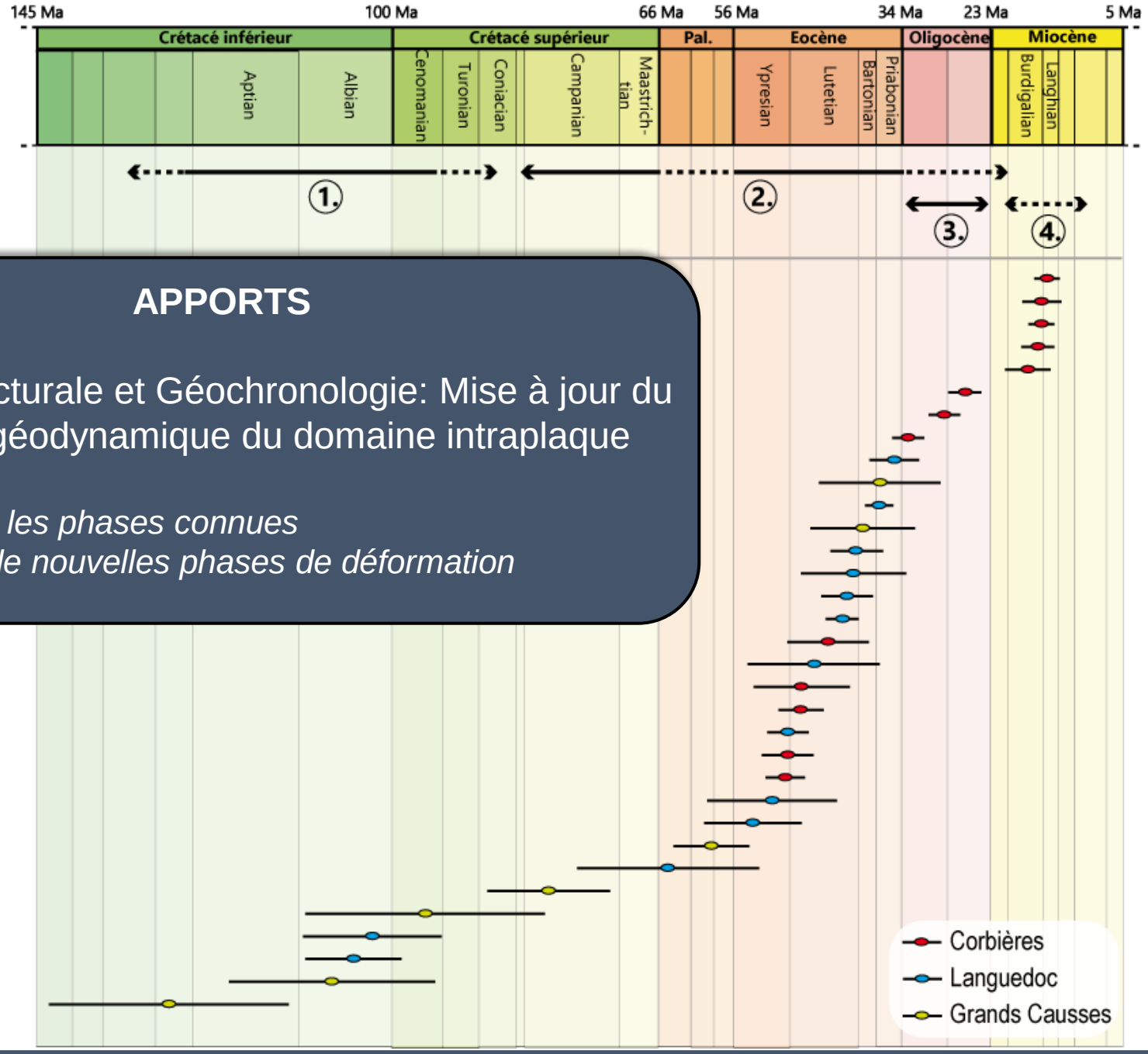






Modifié des cartes 1/50 000 BRGM

MISE EN EVIDENCE D'UNE PHASE DE DEFORMATION A LA TRANSITION LANGHIEN/BURDIGALIEN



APPORTS

Géologie structurale et Géochronologie: Mise à jour du calendrier géodynamique du domaine intraplaque

- *Précision sur les phases connues*
- *Découverte de nouvelles phases de déformation*

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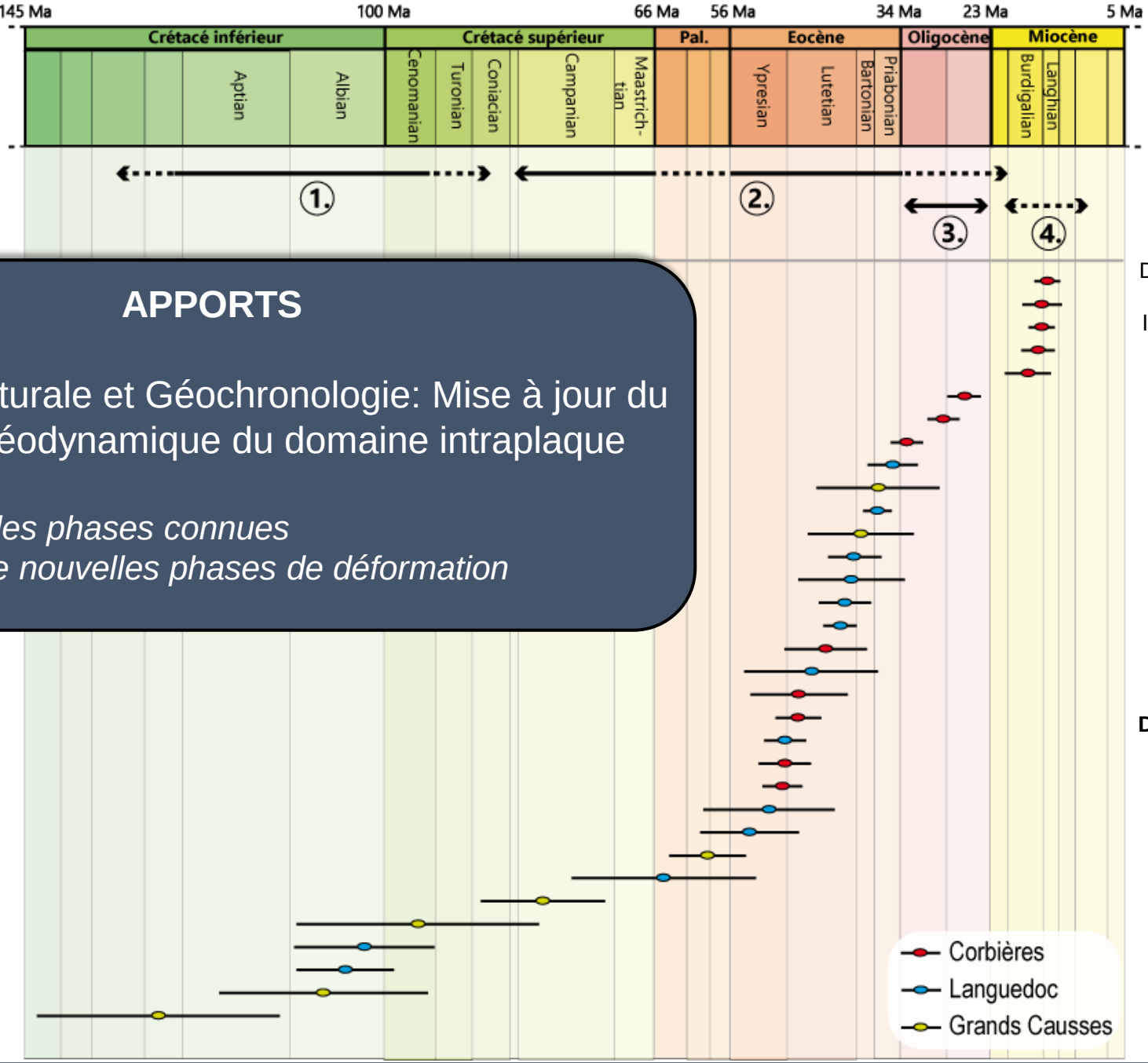

APPORTS

Géologie structurale et Géochronologie: Mise à jour du calendrier géodynamique du domaine intraplaque

- *Précision sur les phases connues*
- *Découverte de nouvelles phases de déformation*

Relief, Bassin et Ressources

UMR 8148 GEOPS

MERCI

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Co-directeur : **Philippe SARDA**
Ingénieur d'étude: **Frederic HAURINE**
Superviseurs: **Thomas BLAISE, Jocelyn BARBARAND, Dominique FRIZON DE LAMOTTE**

Jury:
Président du Jury: **Xavier QUIDELLEUR**
Rapporteurs: **Delphine BOSCH** & **Michel SERANNE**
Examinateur: **Laurent JOLIVET**
Invité: **Cécile ALLANIC**

En collaboration avec:
Claire BOUKARI - **Guillaume DELPECH** - **Valérie GODARD** - **Julius NOUET** - **Pauline SOULOUMMIAC** - **Pierre VERGELY**