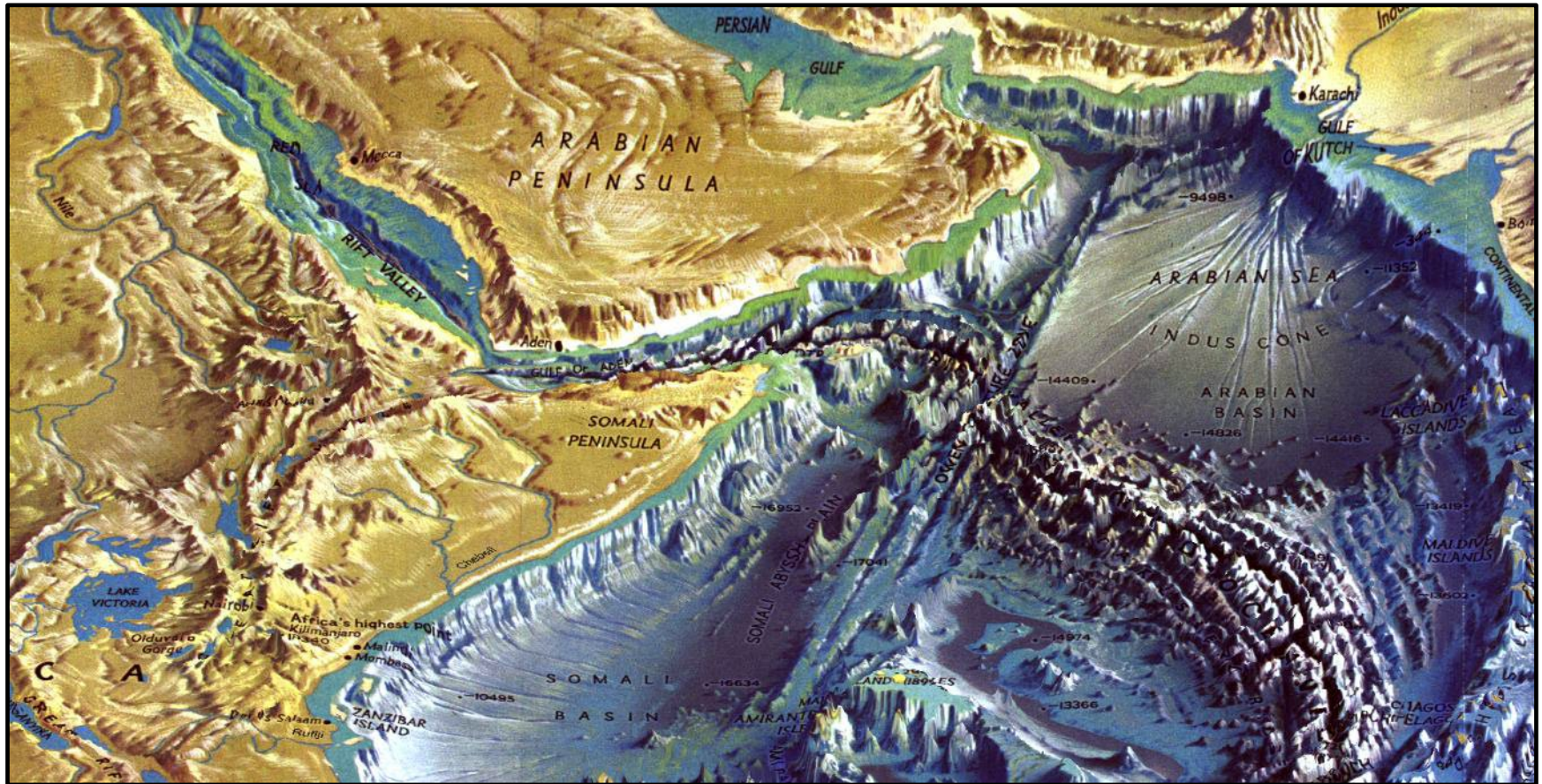


# Facteurs de contrôle sur la sédimentation gravitaire profonde



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Enseignements -  
Sébastien Zaragosi

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[S1ST9213B](#)  
 [SIG](#)

S1st925t:start

**S1ST925T - SEDIMENTATION DES MILIEUX MARINS PROFONDS** [Modifier](#)

**COURS**

 [Facteurs de contrôle sur la sédimentation gravitaire profonde](#) [Modifier](#)

**DIVERS**

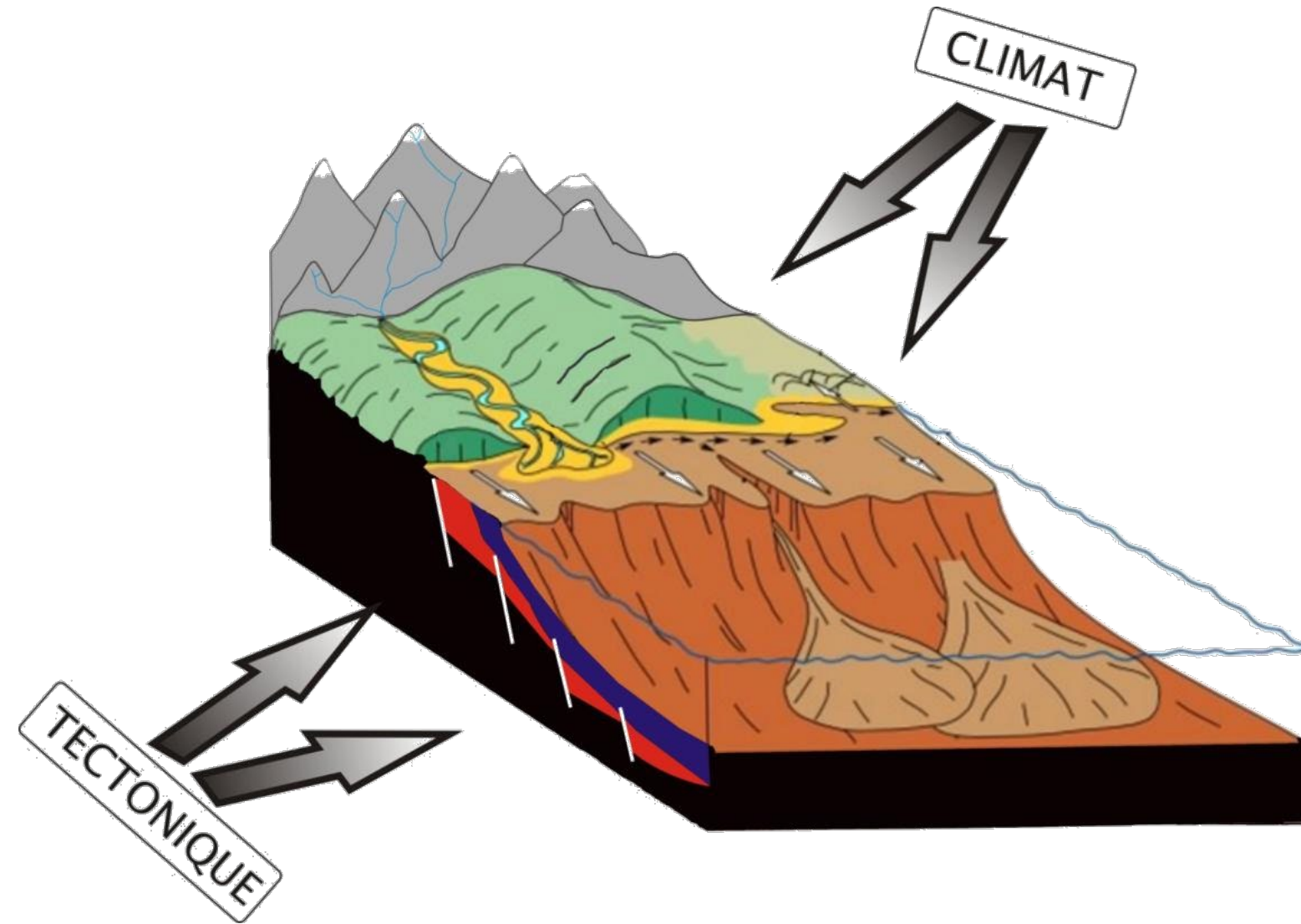
 [Références bibliographiques](#)

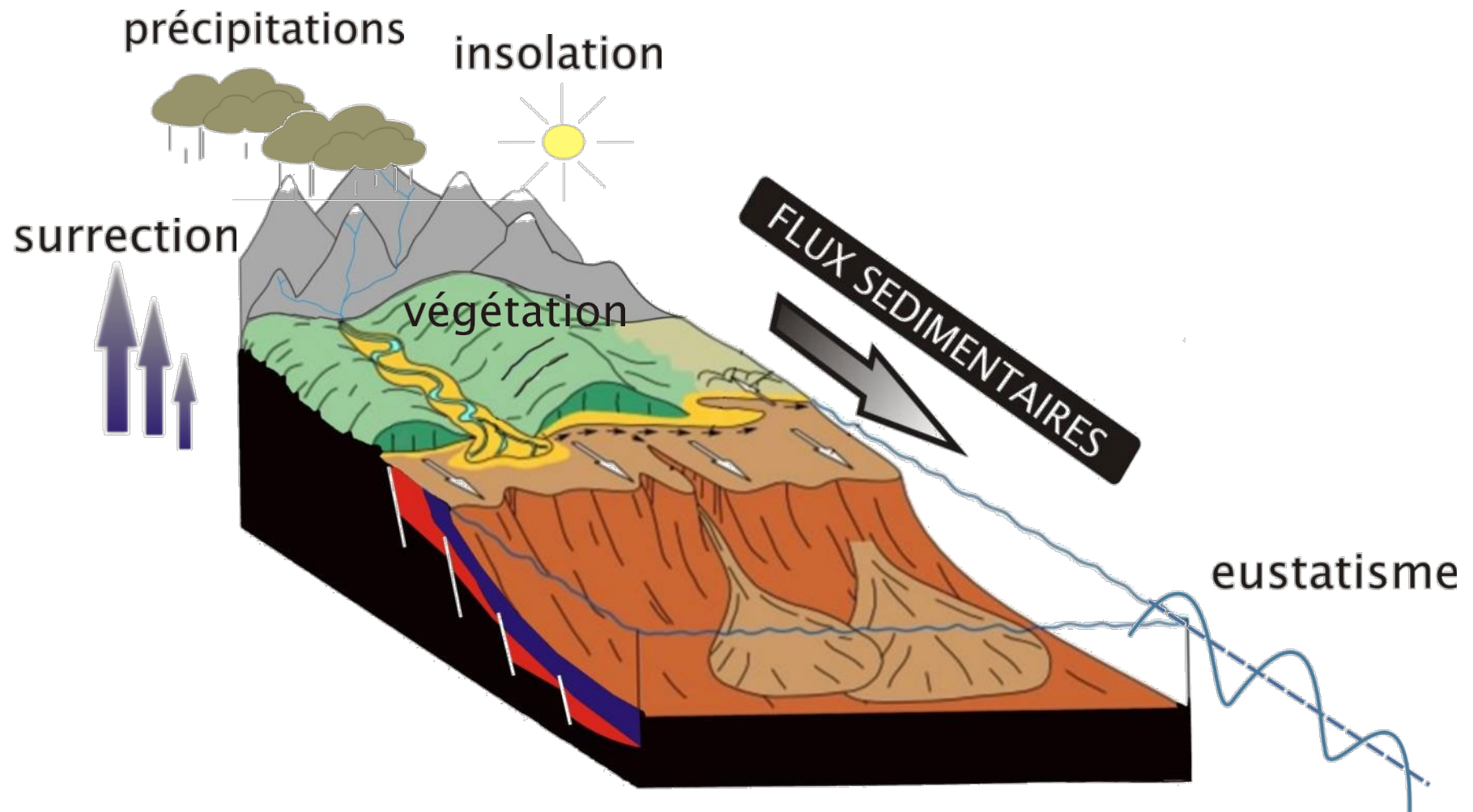
 [Devenir étudiants](#) [Modifier](#)

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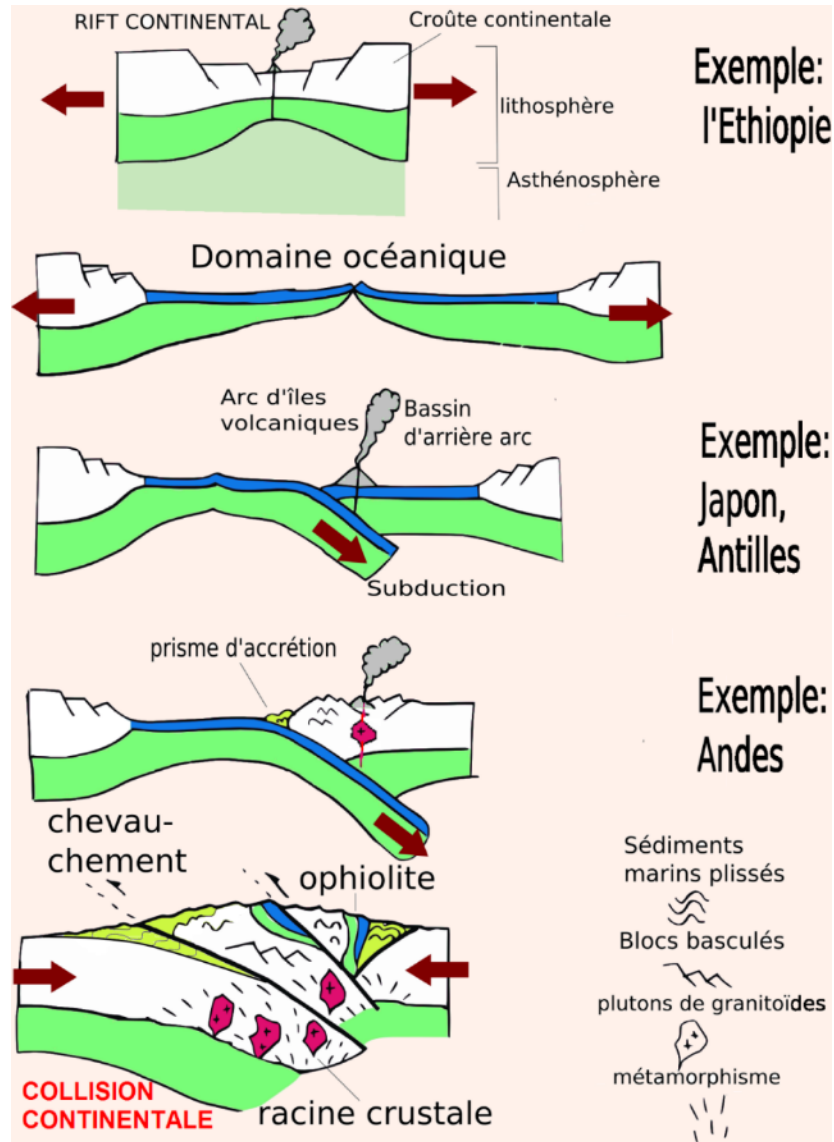
- ♦ [S1ST925T - SEDIMENTATION DES MILIEUX MARINS PROFONDS](#)
- ♦ [COURS](#)
- ♦ [DIVERS](#)



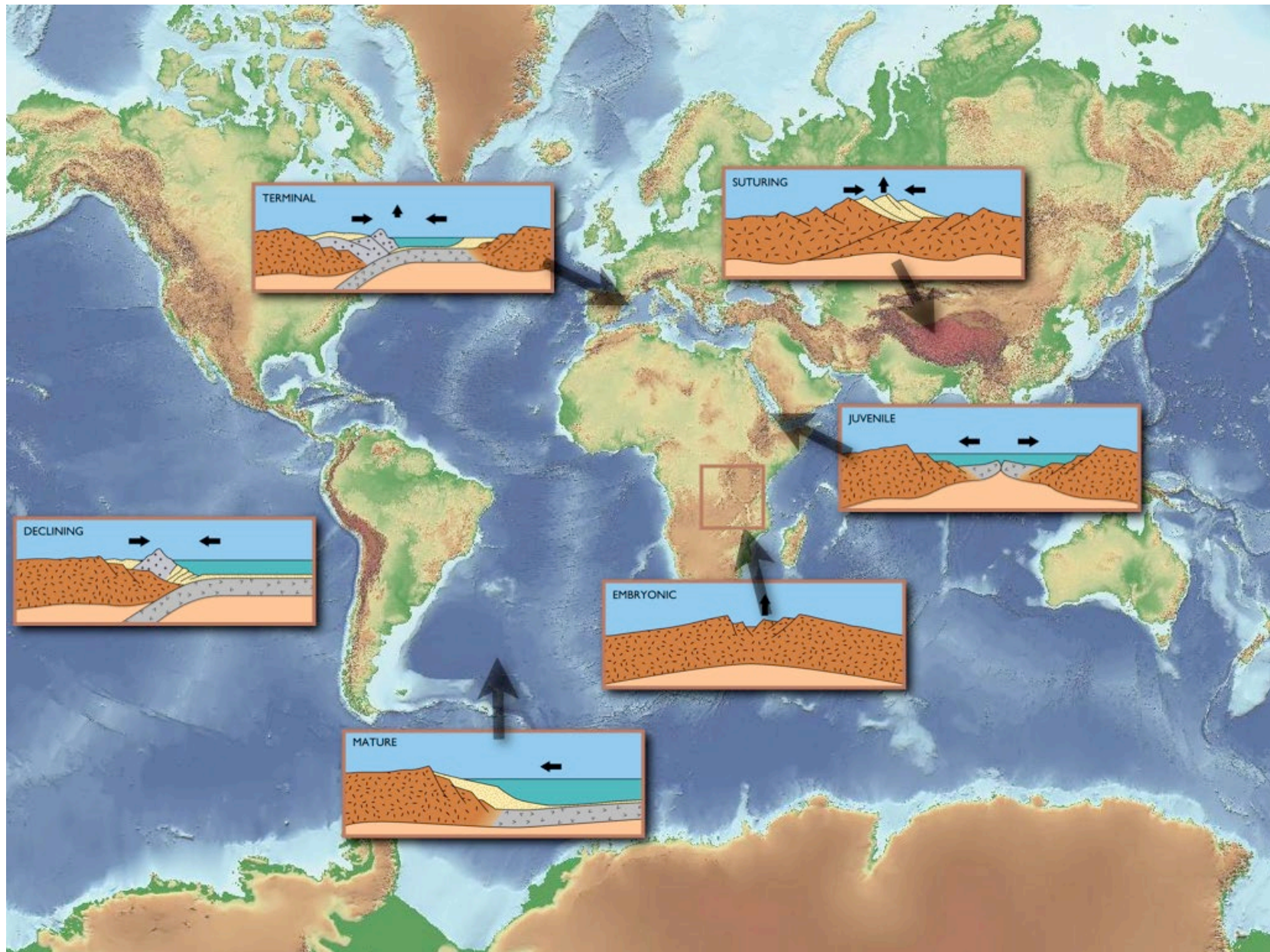








[http://fr.wikipedia.org/wiki/Cycle\\_de\\_Wilson](http://fr.wikipedia.org/wiki/Cycle_de_Wilson)

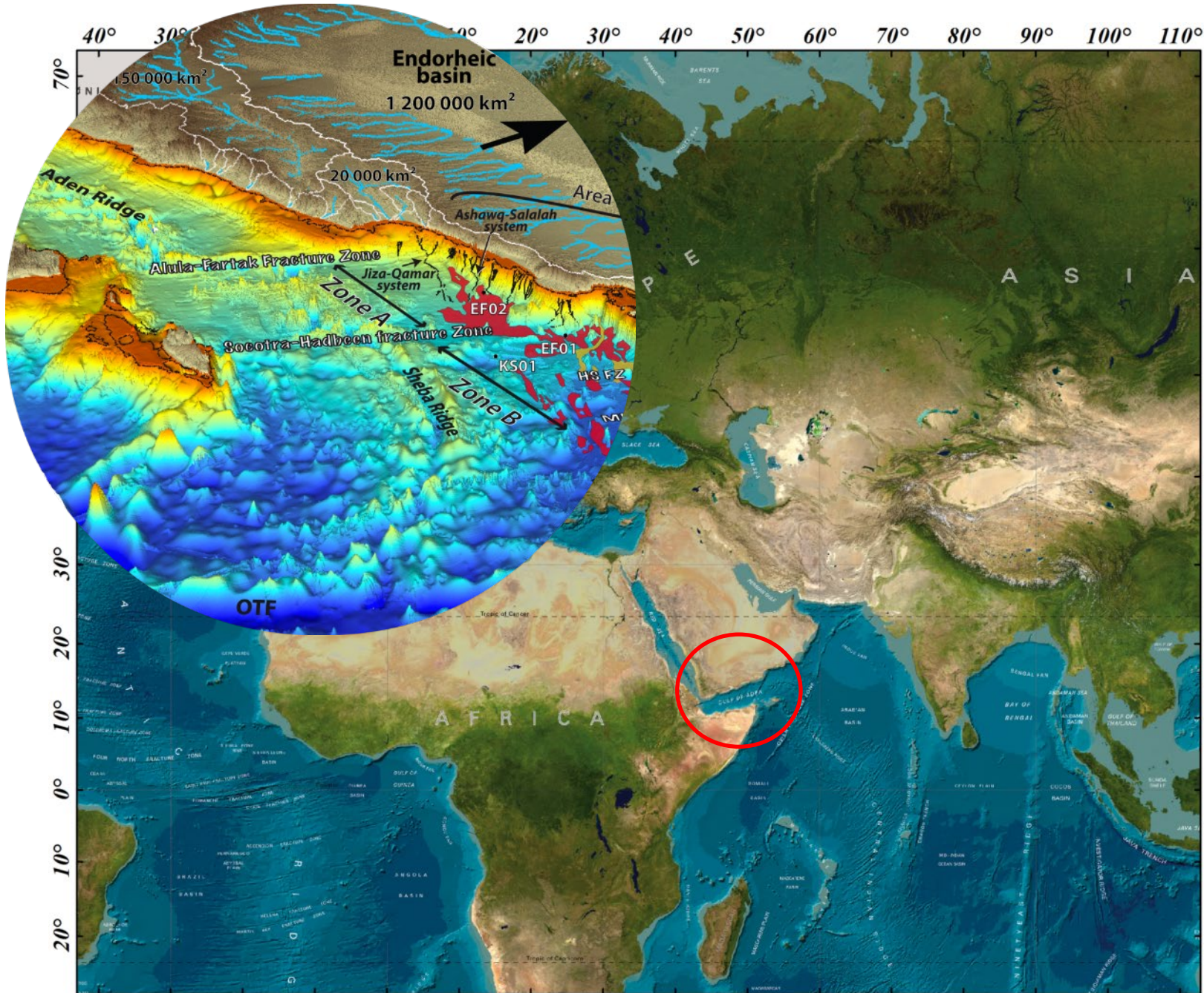


[http://commons.wikimedia.org/wiki/File:Wilson-stages\\_hg.png](http://commons.wikimedia.org/wiki/File:Wilson-stages_hg.png)





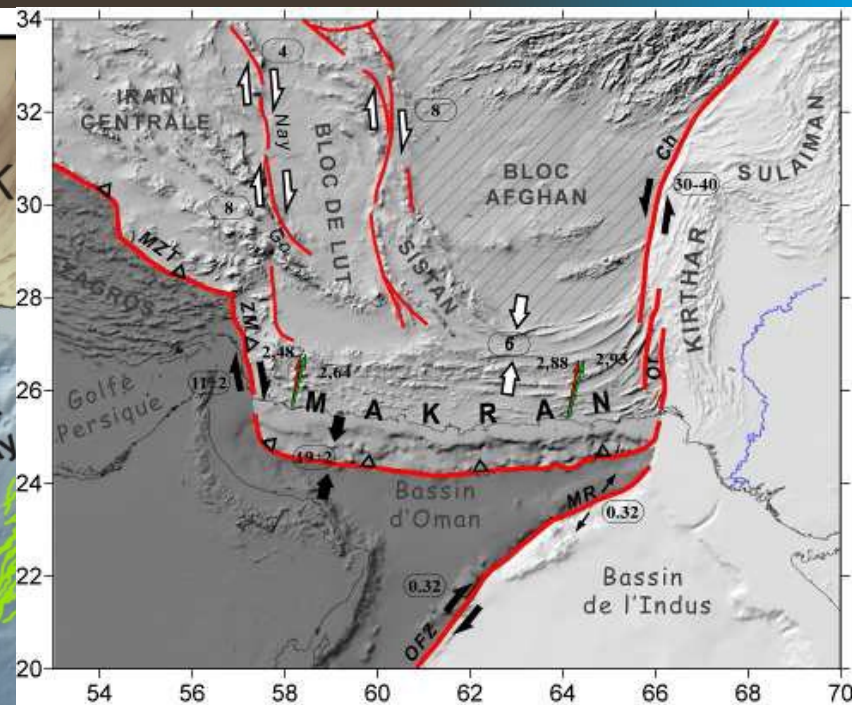
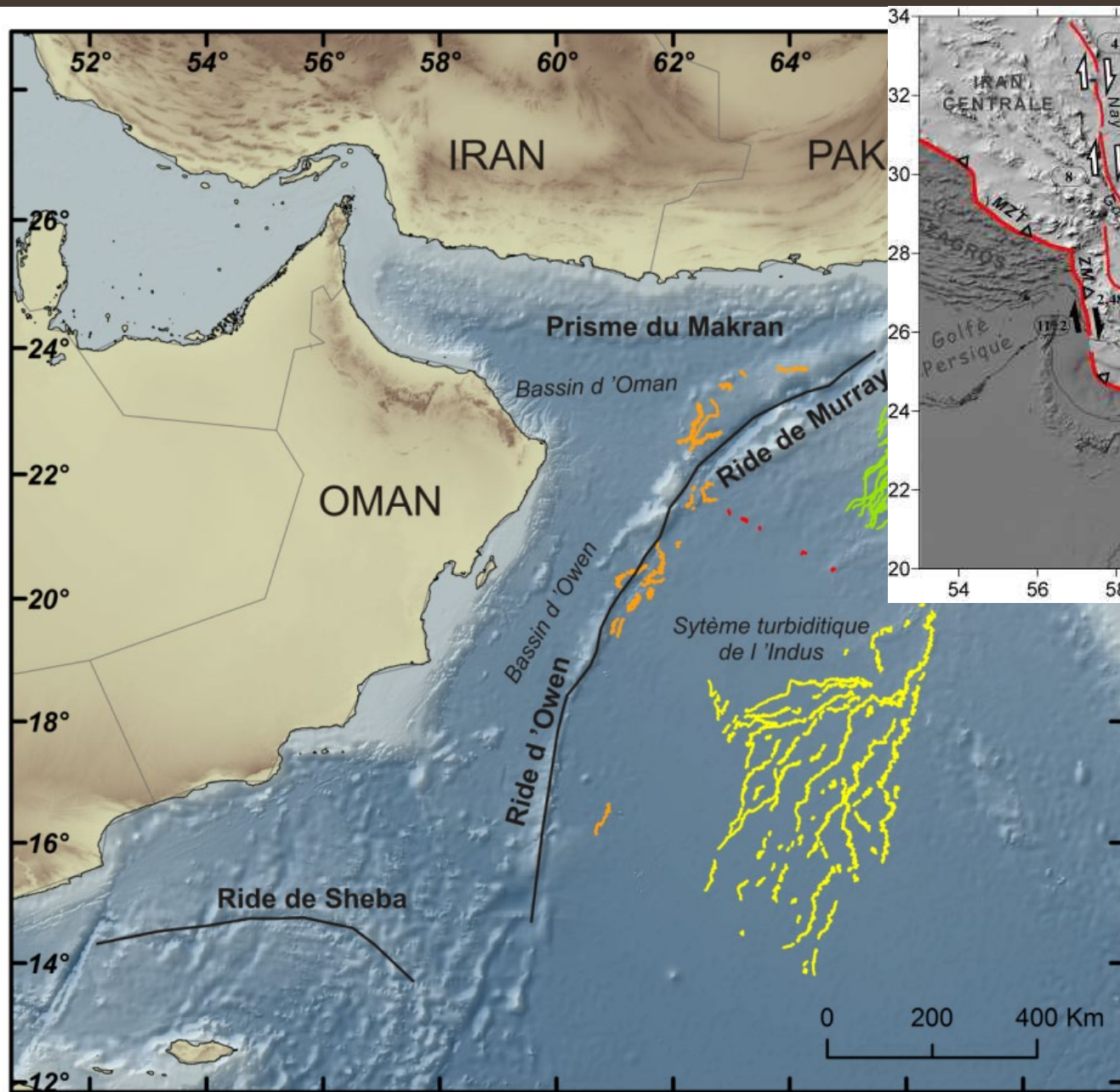












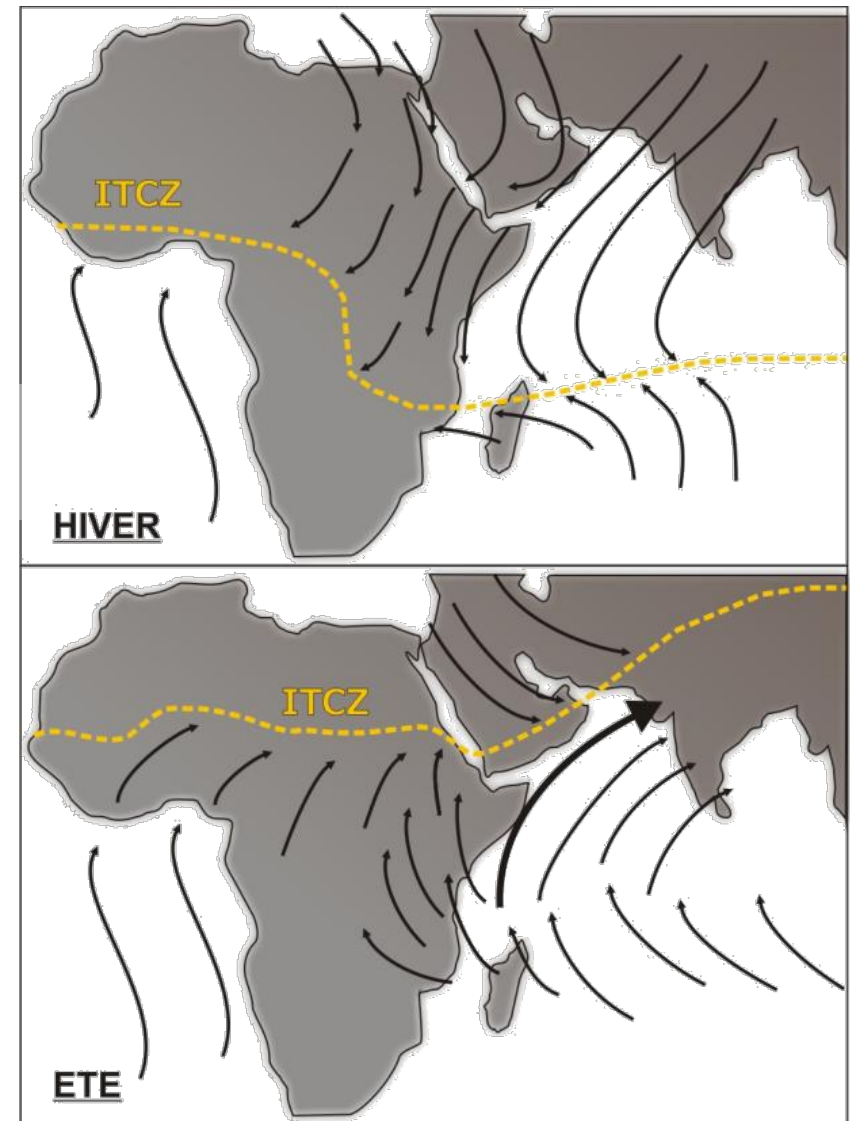
Bourget et al. 2013

- Climat aride
- Précipitations saisonnières (mousson indienne)

Variation d'intensité de la mousson  
(cycle de précession ~ 23 ka)



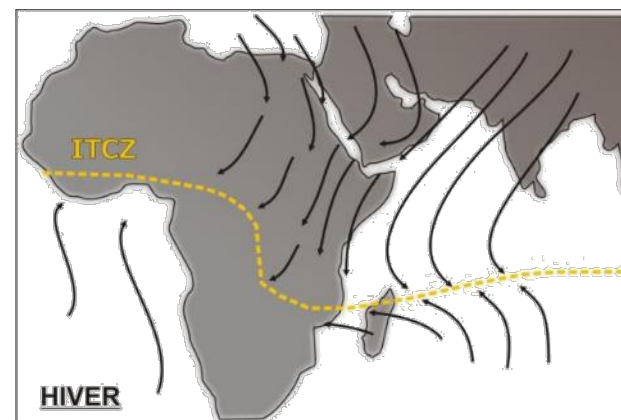
Alternance de phases arides /  
humides au cours des derniers  
25 000 ans BP



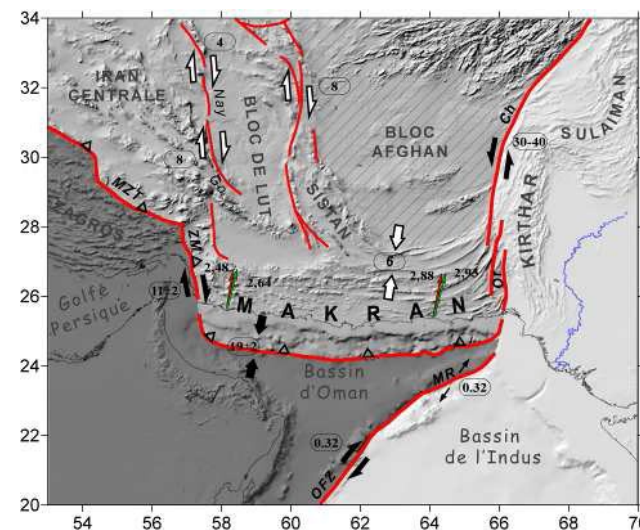
Fleitmann et al. 2007



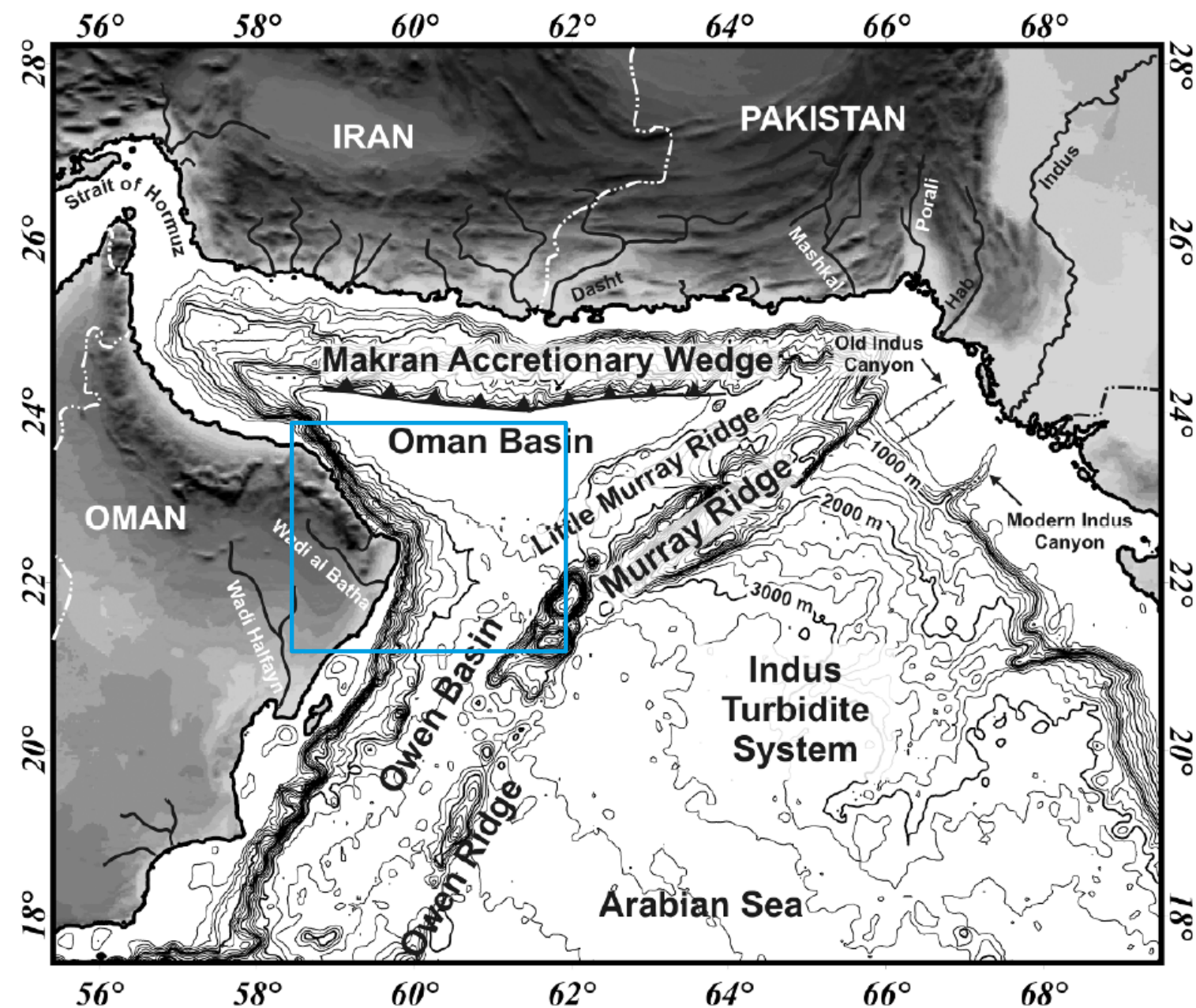
Un contexte climatique riche



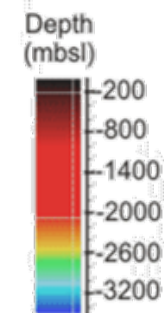
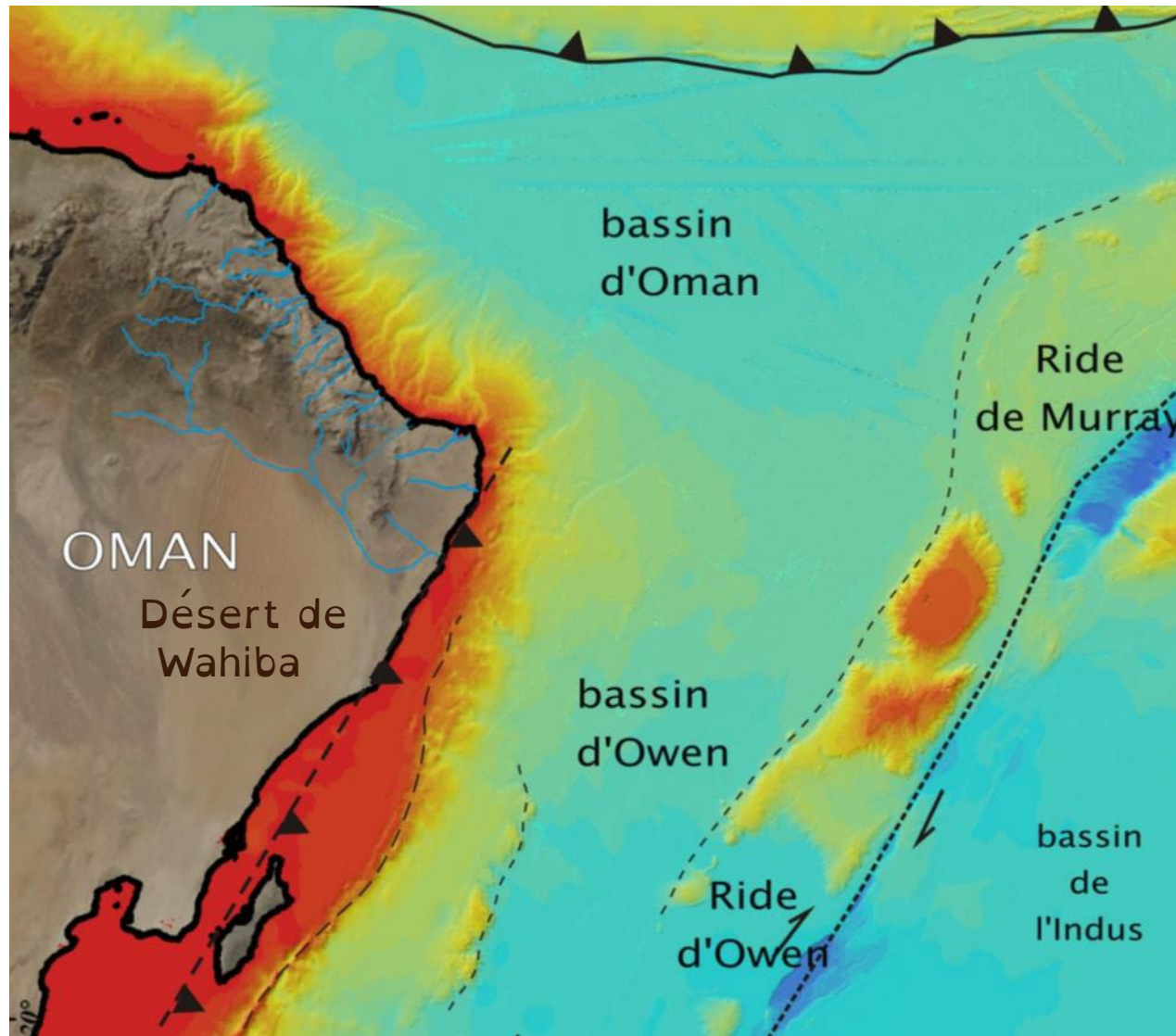
Une histoire tectonique riche



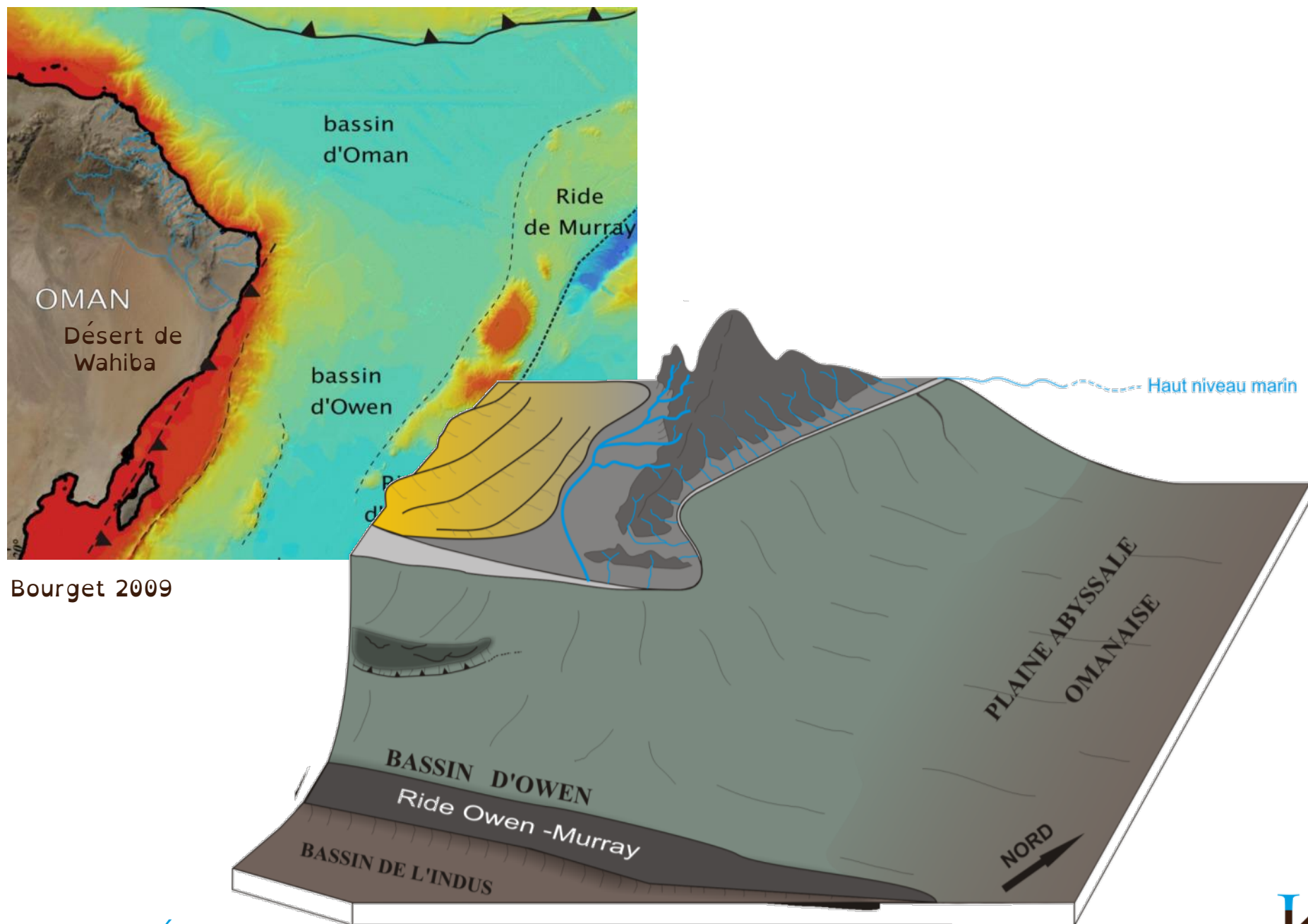
Influences de ces forçages sur la sédimentation profonde ?





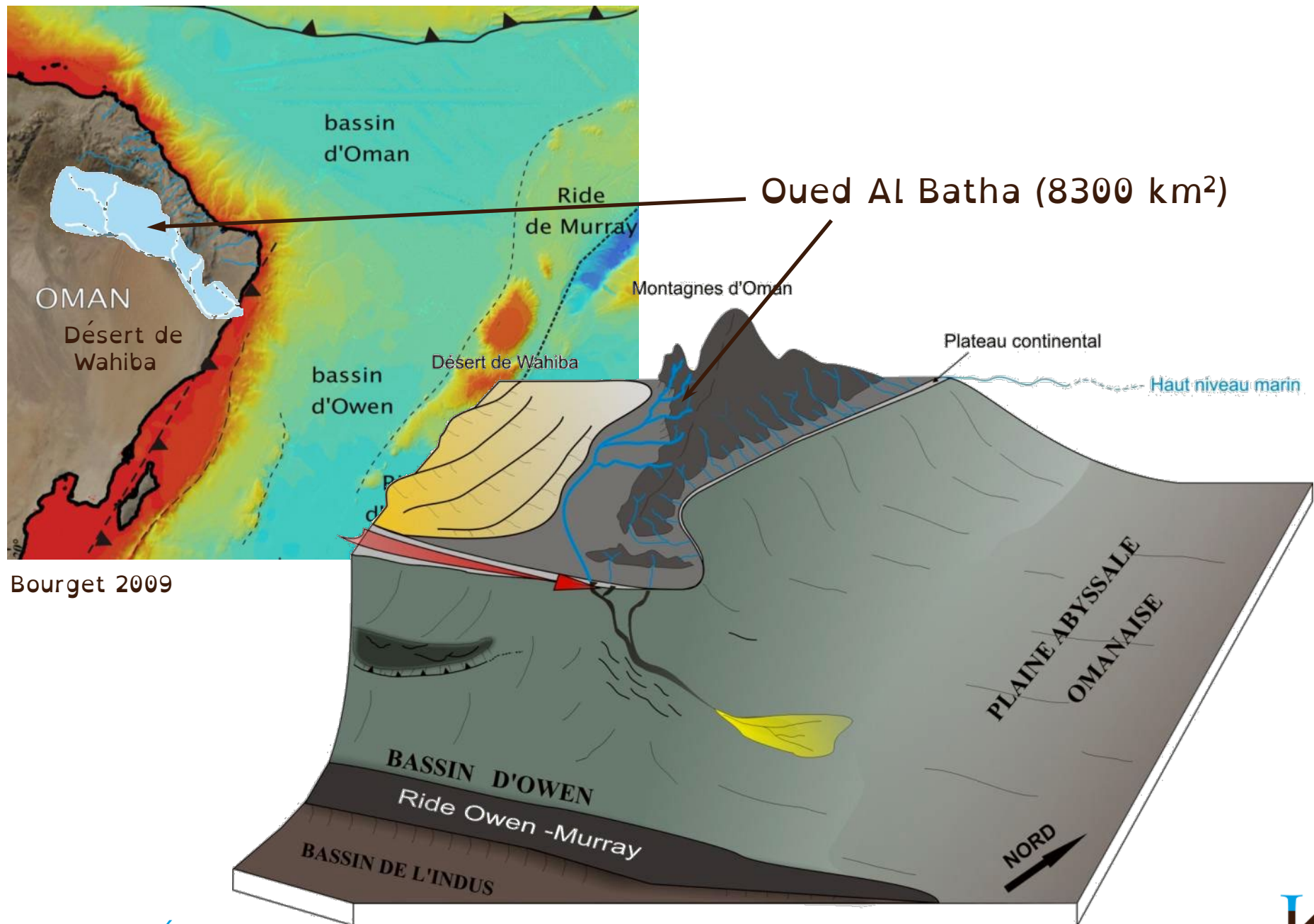


Bourget 2009

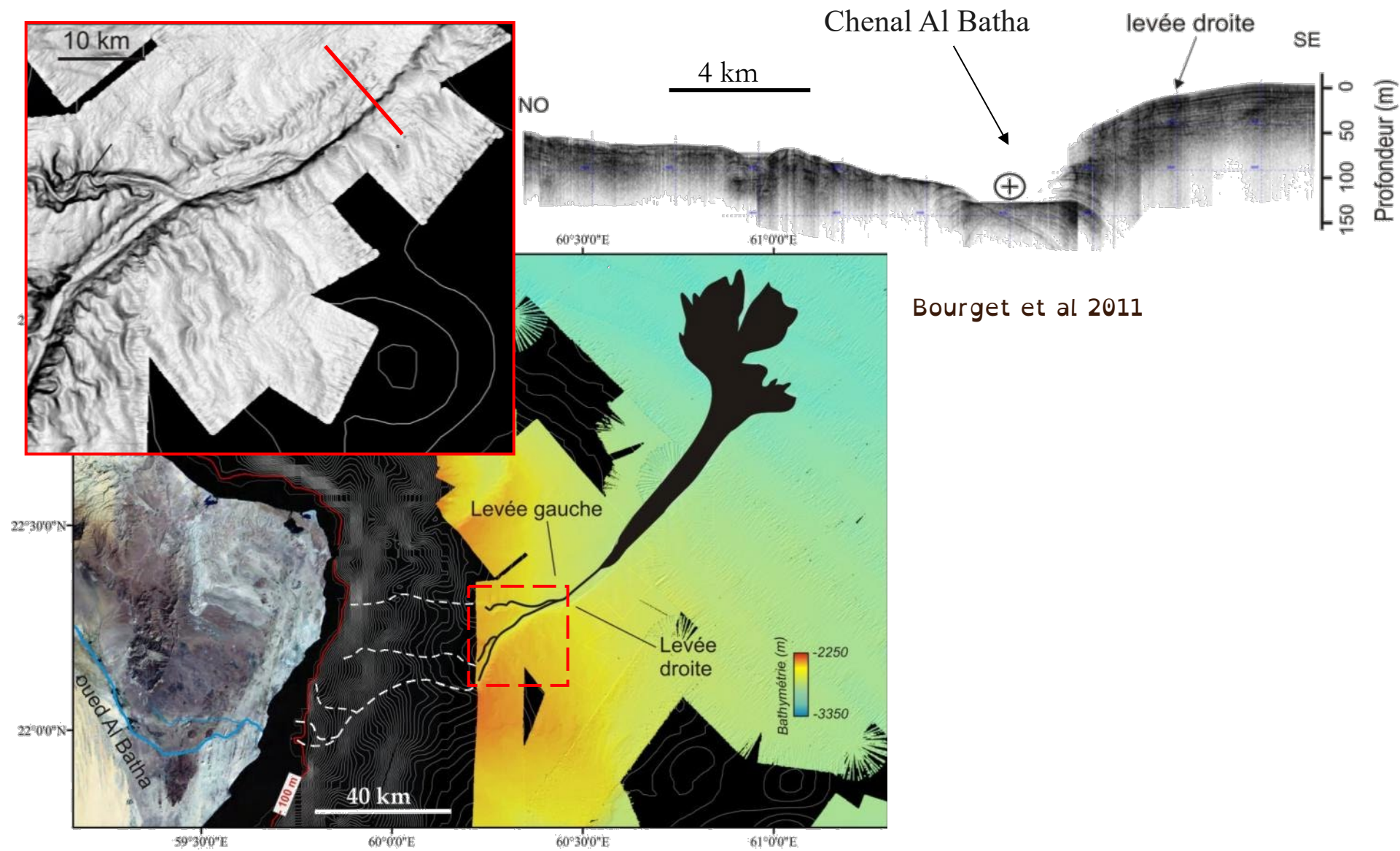


Bourget 2009

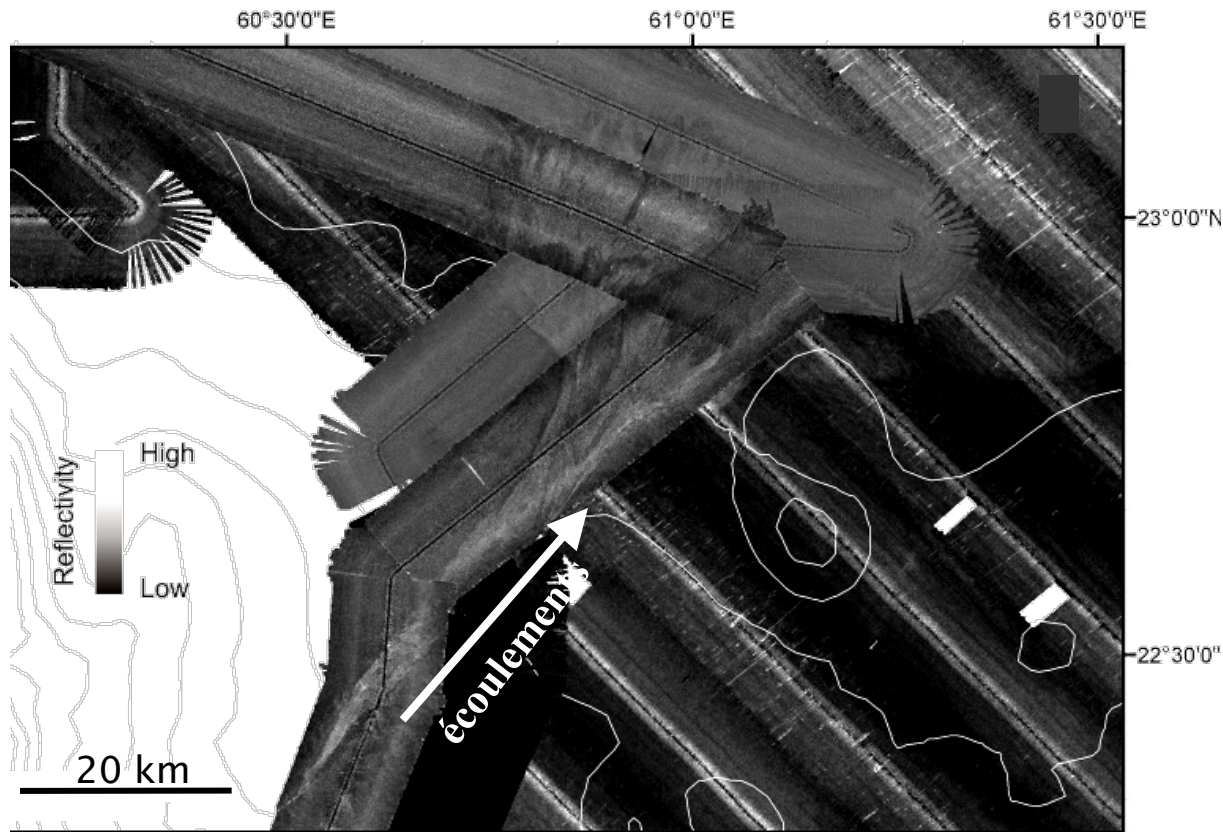




Bourget 2009



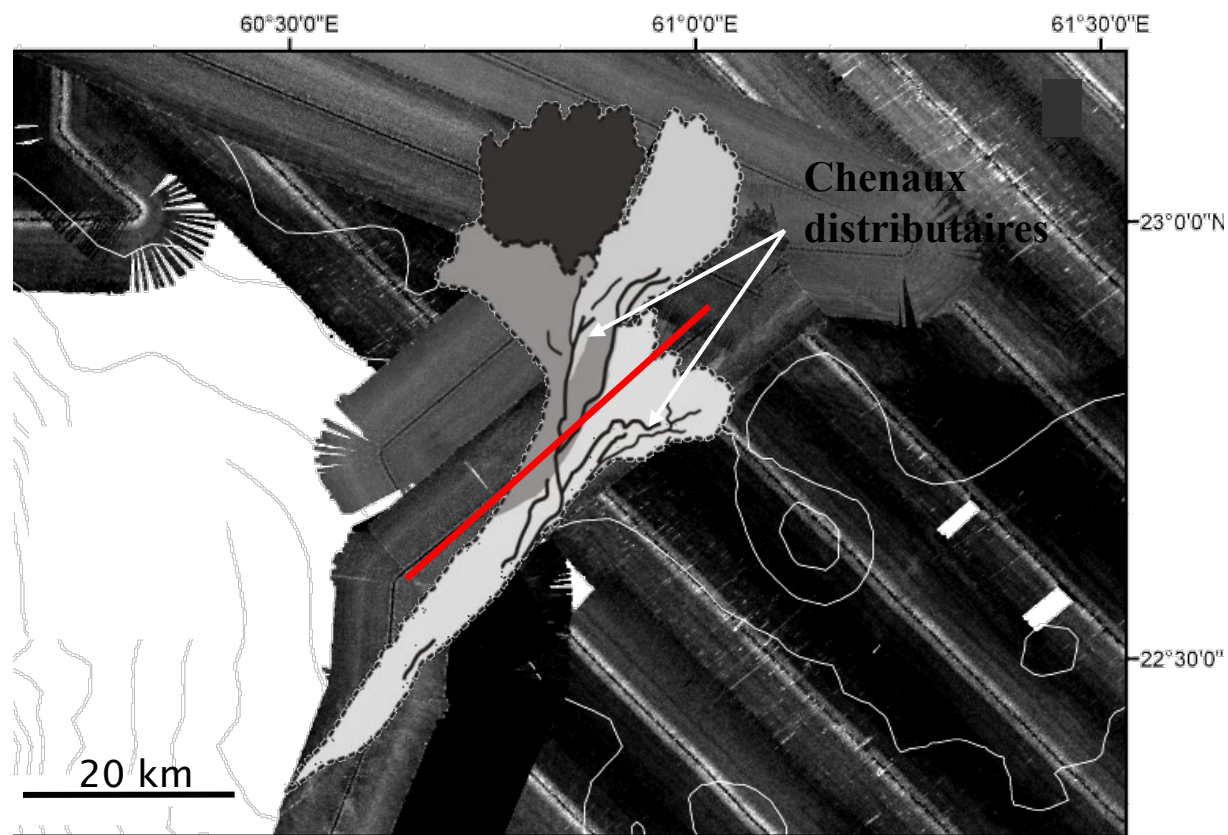




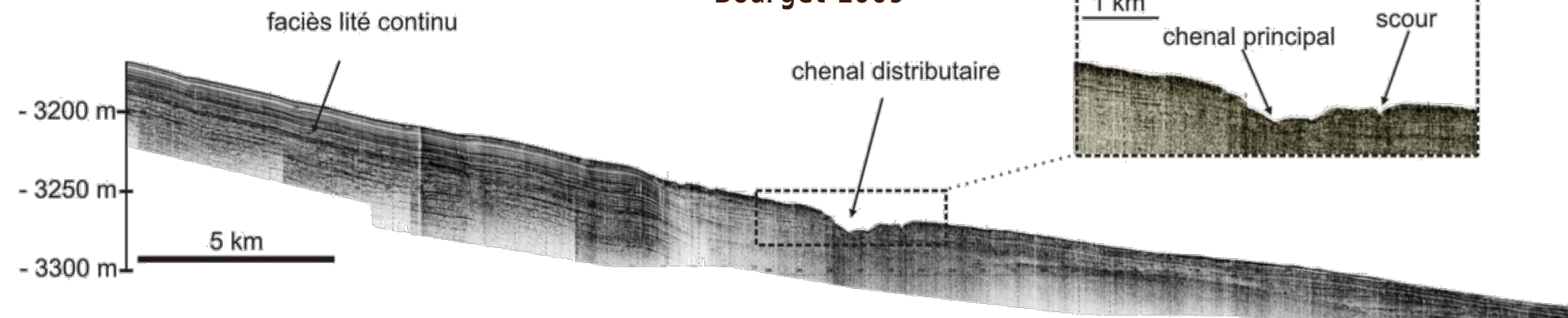
Bourget 2009

## Lobe Al Batha (~ 1000 km<sup>2</sup>)

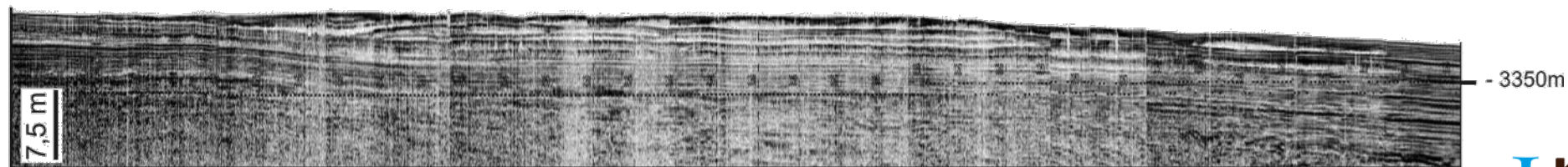
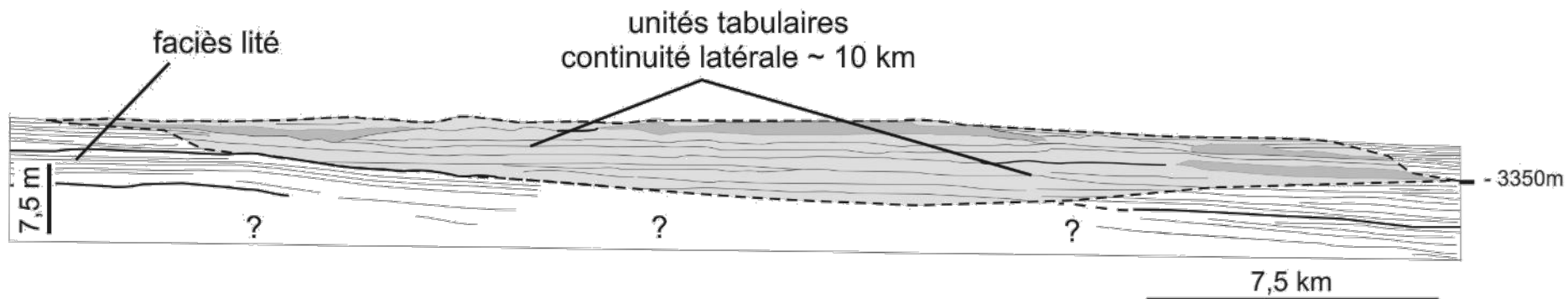
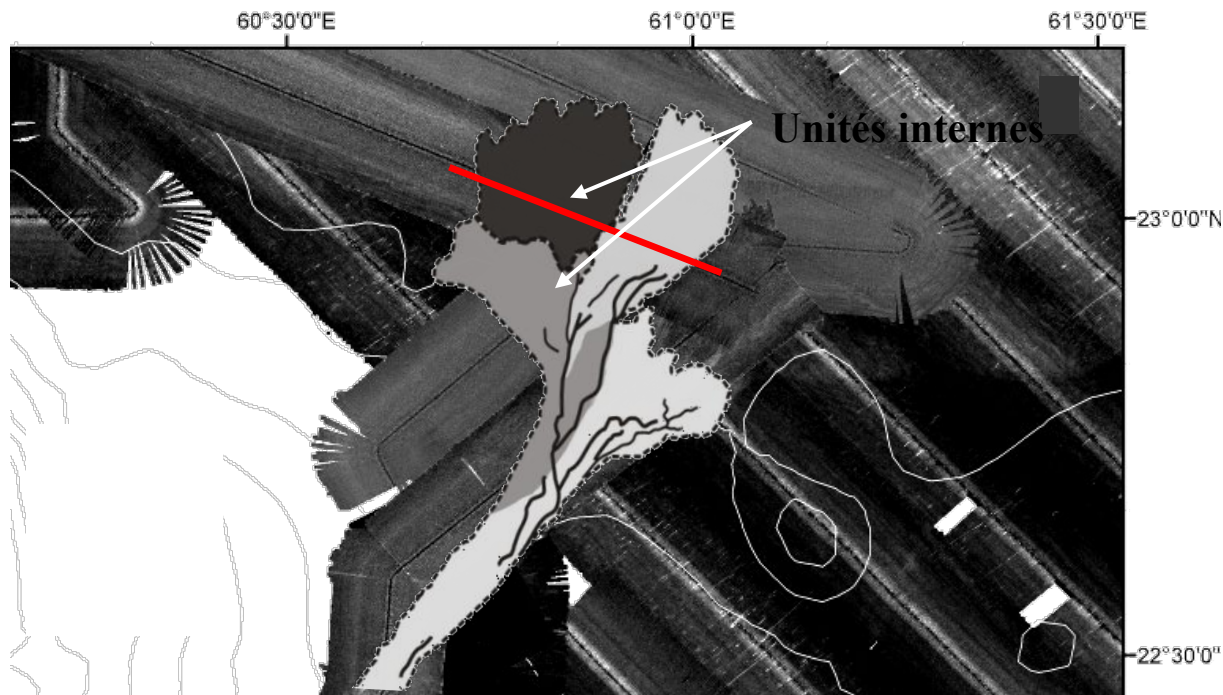
J. Bourget, S. Zaragosi, T. Mulder, J.- L. Schneider, T. Garlan, A. Van Toer, V. Mas, N. Ellouz- Zimmermann. (2010) Hyperpycnal- fed turbidite lobe architecture and recent sedimentary processes: A case study from the Al Batha turbidite system, Oman margin **Sedimentary Geology** 229(3), 144-159.

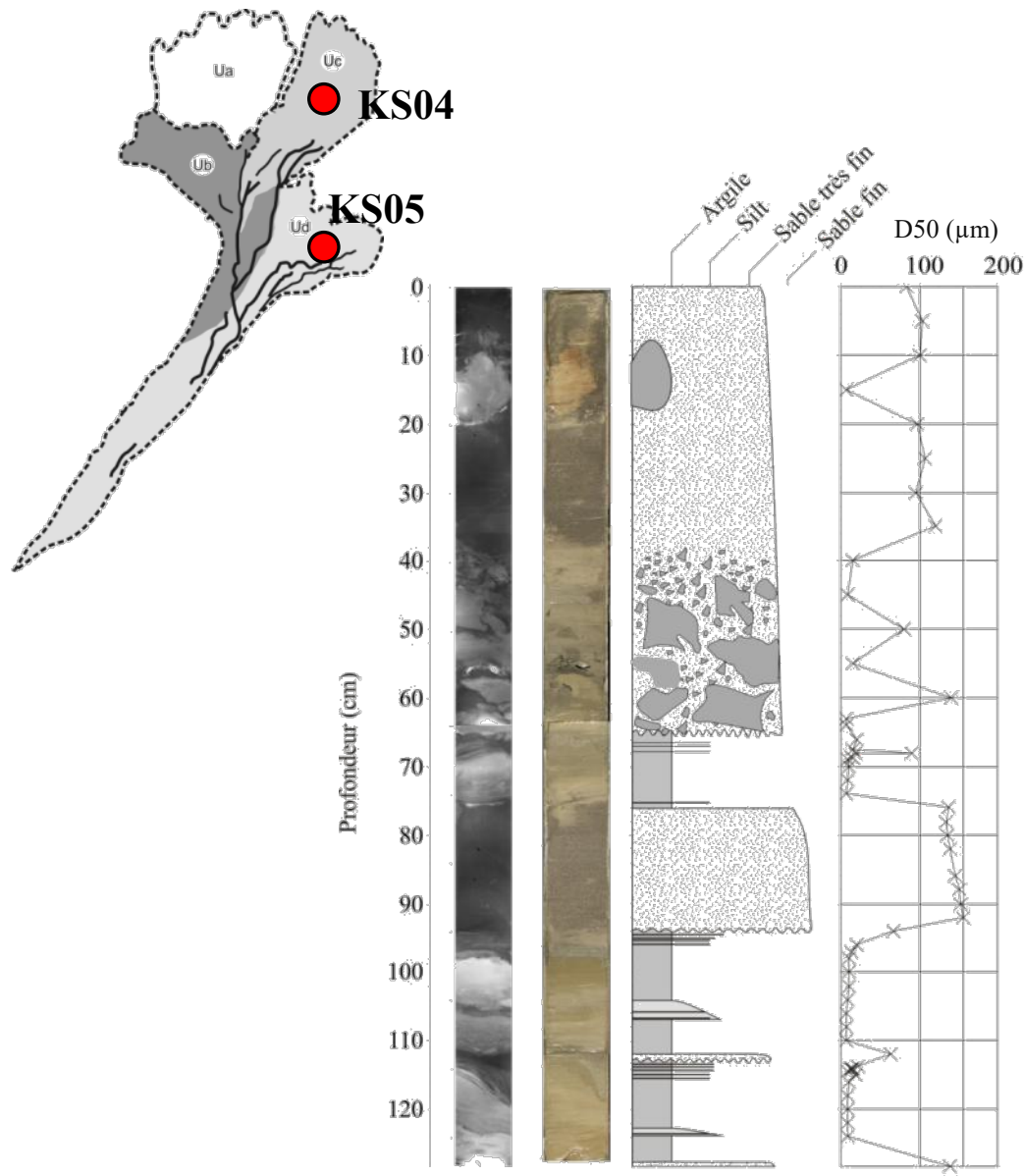


Bourget 2009

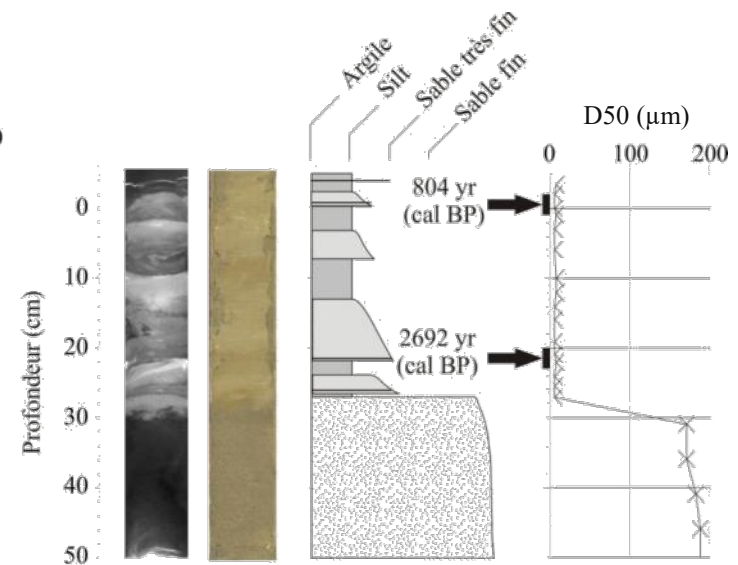








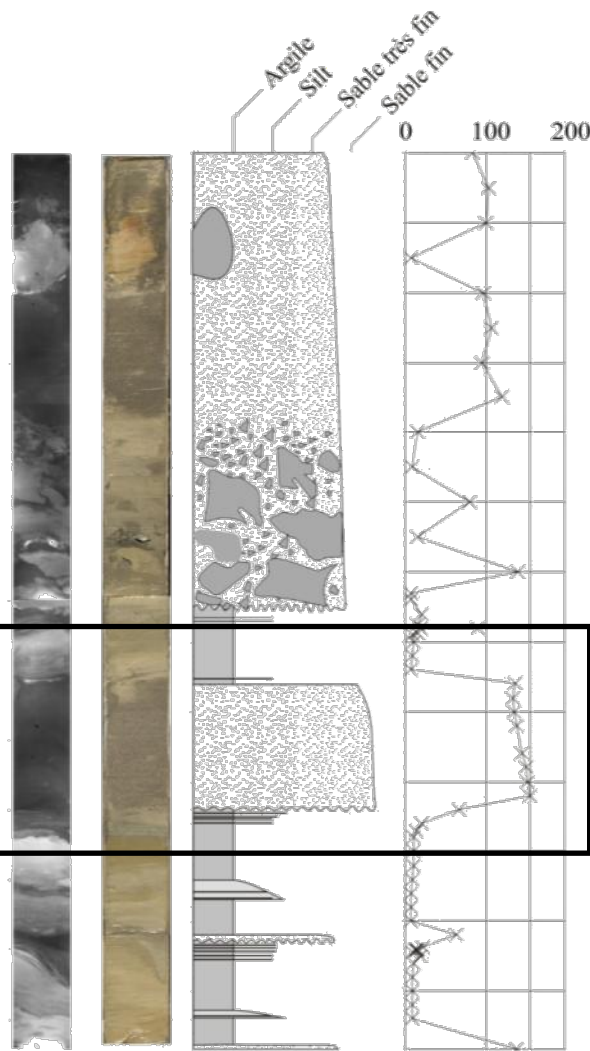
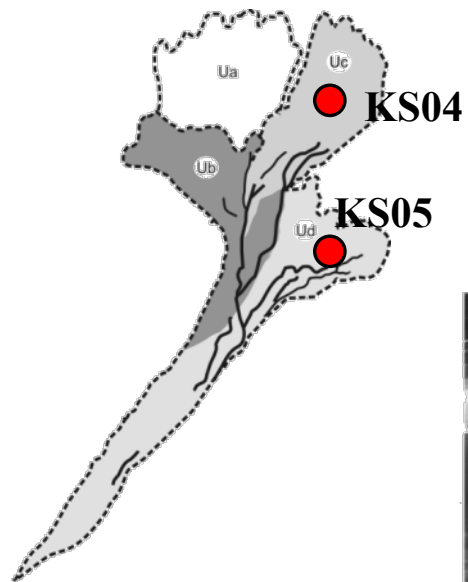
KS04



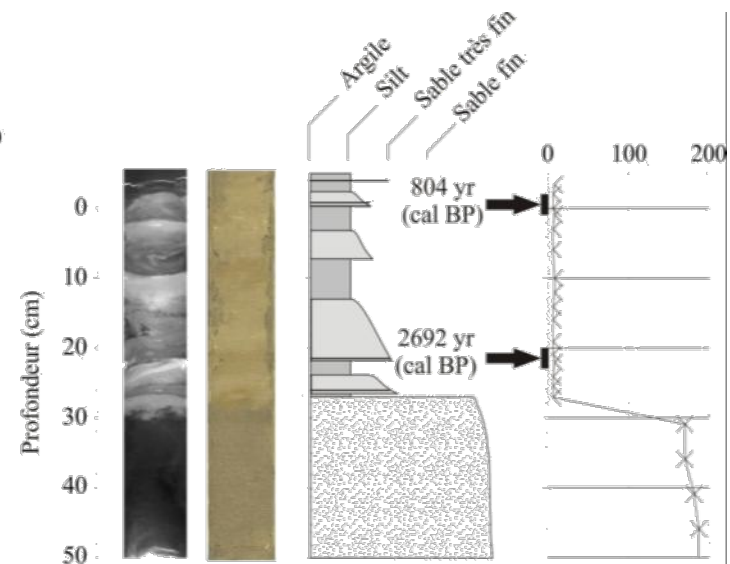
KS05

Bourget et al. 2011



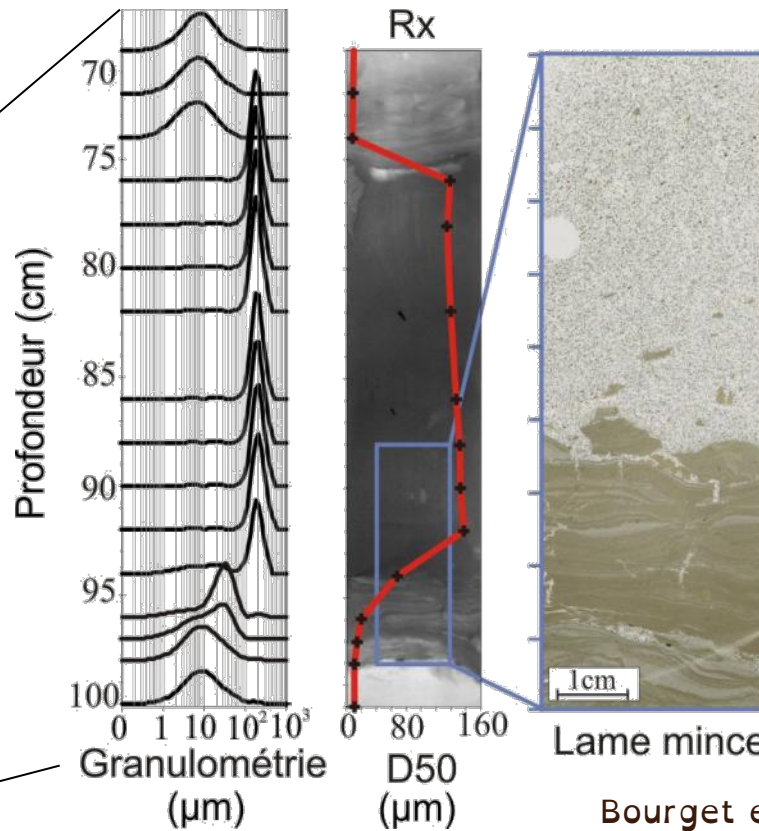
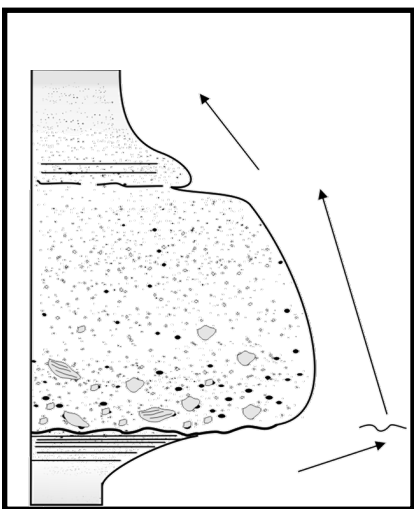
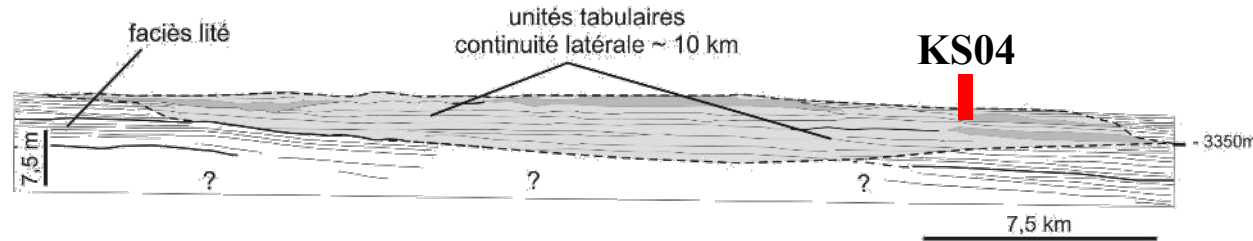
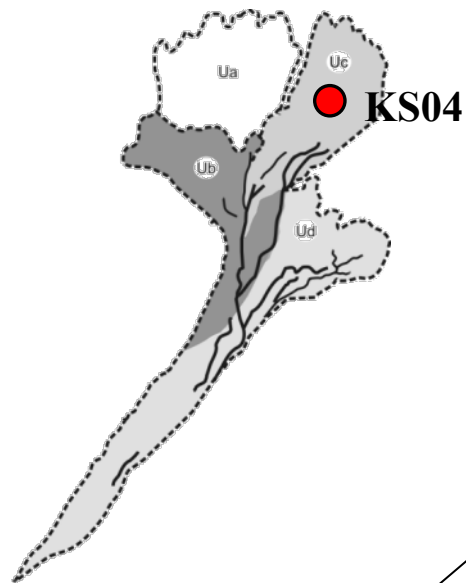


KS04



KS05

Bourget et al. 2011

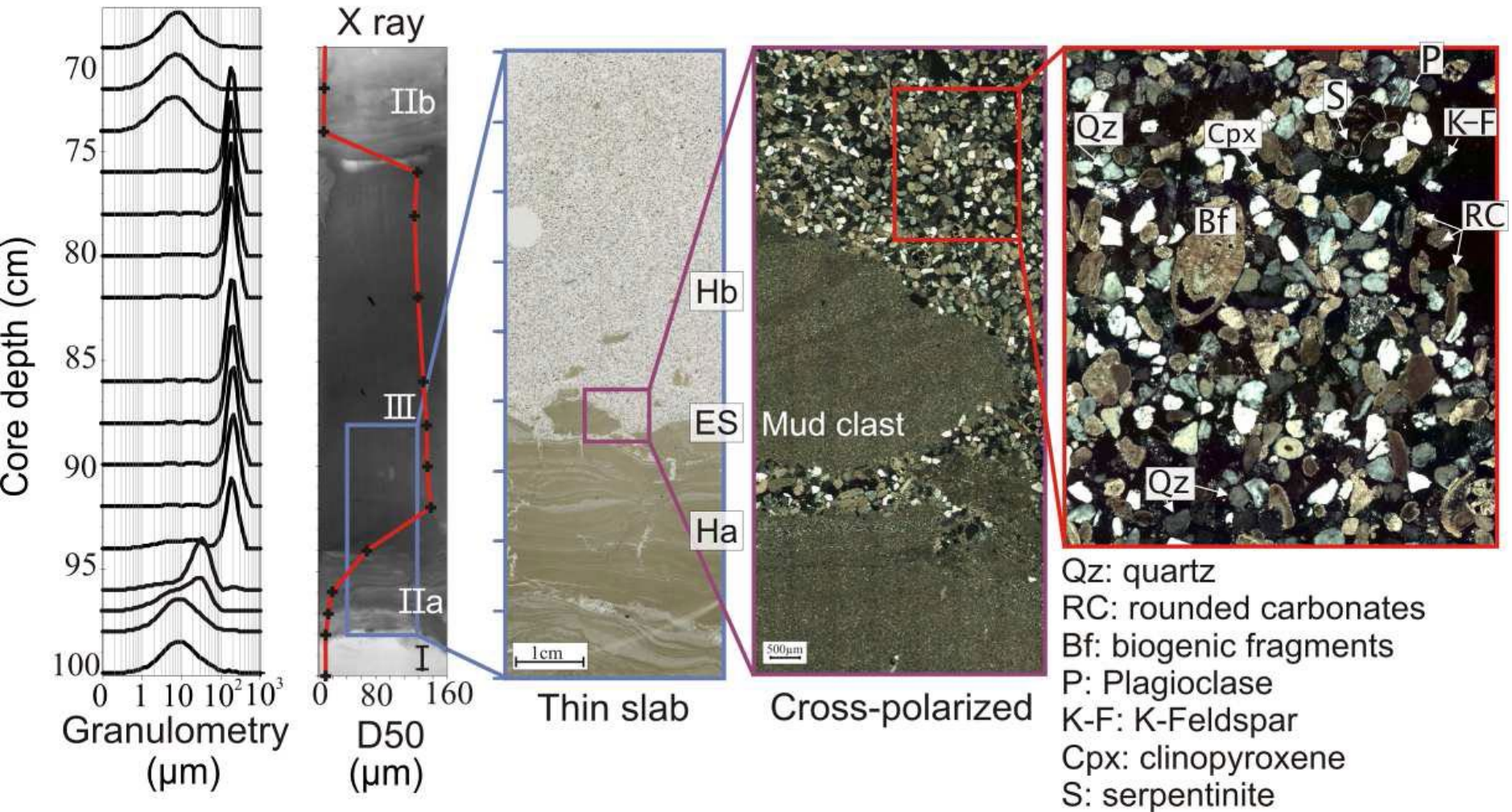


Bourget et al. 2011

**Hyperpycnites: alimentation du lobe lors des crues de l'oued Al Batha**



## MARABIE KS04 89 - 99cm



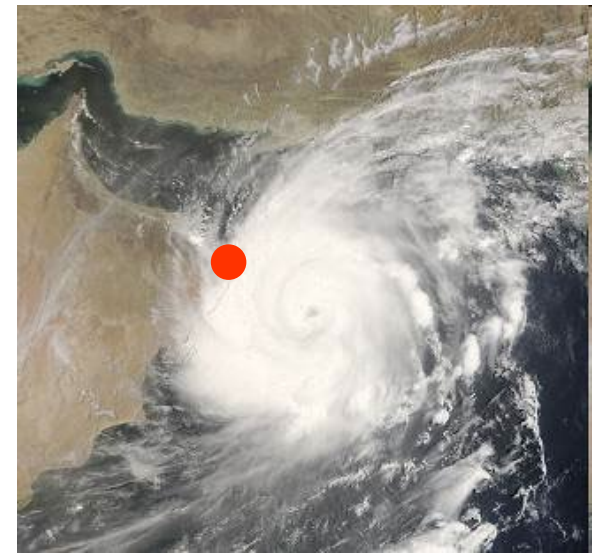
Bourget 2009



Bourget 2009

**Hyperpycnites : alimentation du lobe lors des crues de l'oued Al Batha**



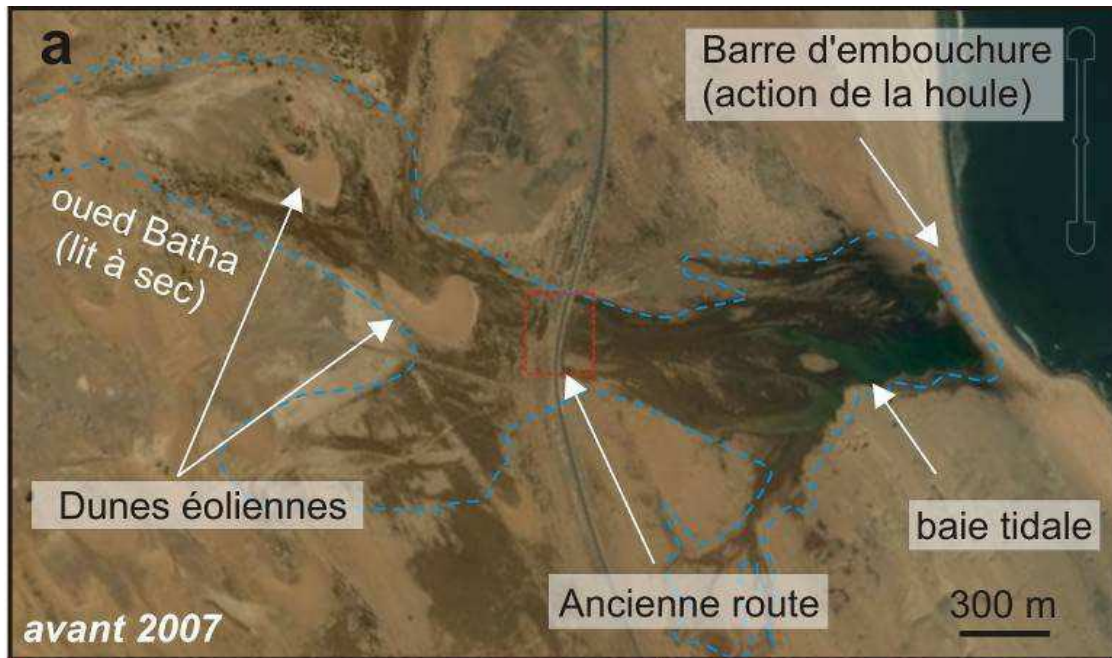


06/06/2007

Source – Nasa Visible Earth

## Le cyclone Gonu

**Alimentation du système profond lors d'événements climatiques majeurs (mousson) ?**



Bourget 2009

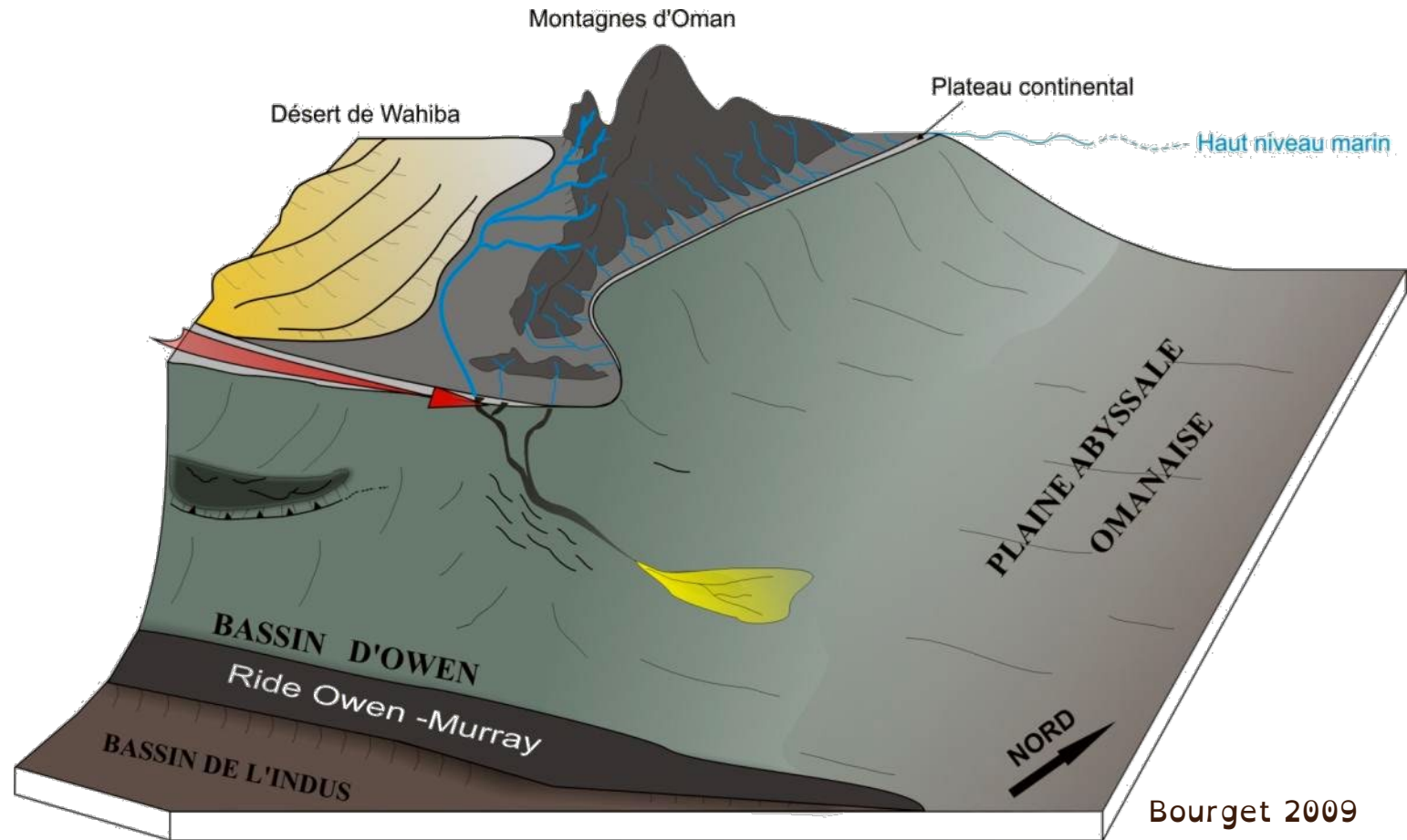


2022



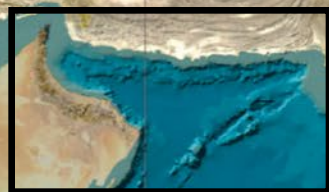
## CONTEXTE HYDROCLIMATIQUE LOCAL (MOUSSON)

## ARCHITECTURE CLASSIQUE - PROFIL TOPOGRAPHIQUE REGULIER



Bourget 2009

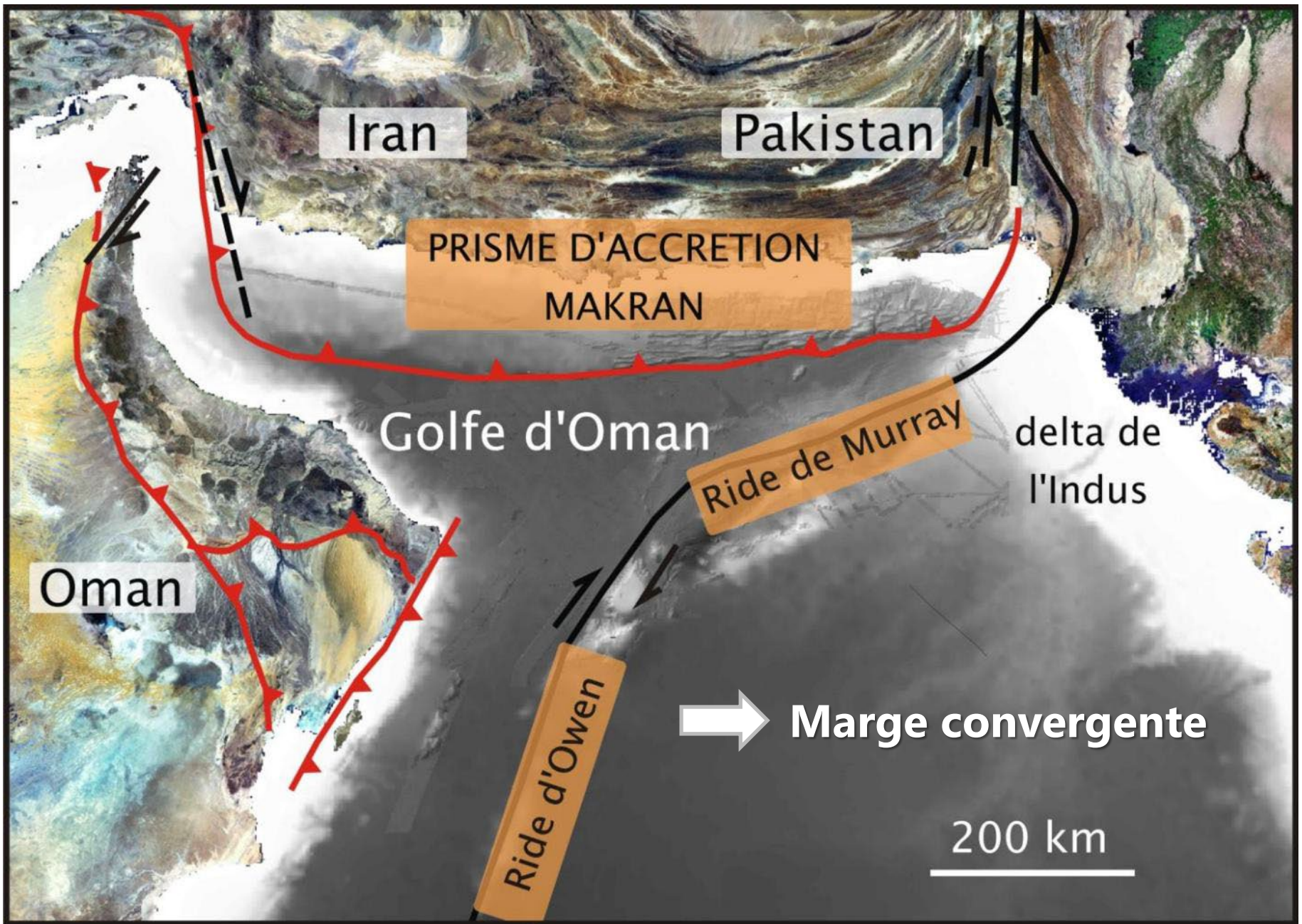




Le golfe d'Oman

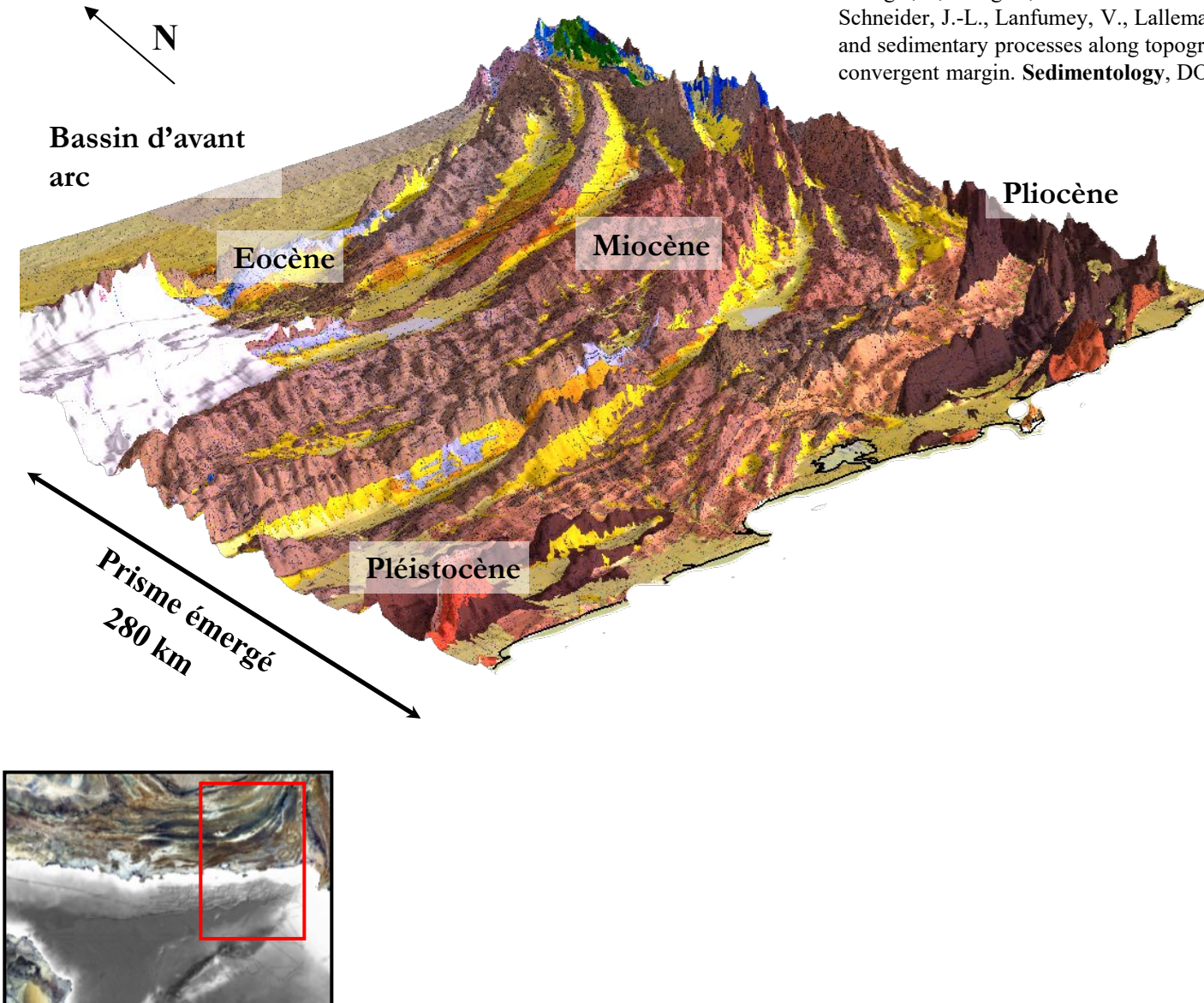
Océan Indien







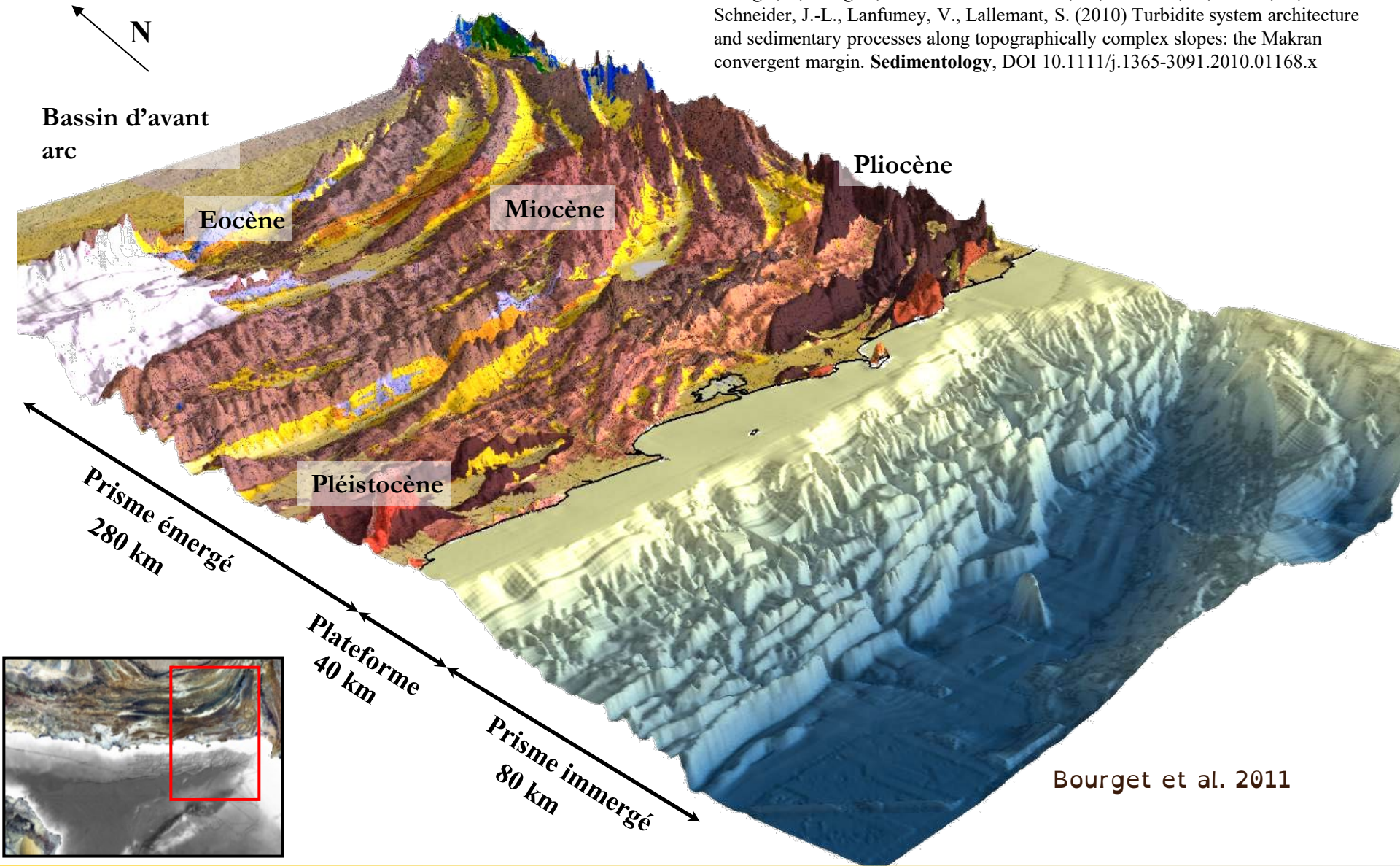
Bourget, J., Zaragosi, S. Ellouz-Zimmermann, N., Mouchot, N., Garlan, T., Schneider, J.-L., Lanfumey, V., Lallemand, S. (2011) Turbidite system architecture and sedimentary processes along topographically complex slopes: the Makran convergent margin. *Sedimentology*, DOI 10.1111/j.1365-3091.2010.01168.x



Bourget et al. 2011

**Prisme d'accrétion : domaine continental**

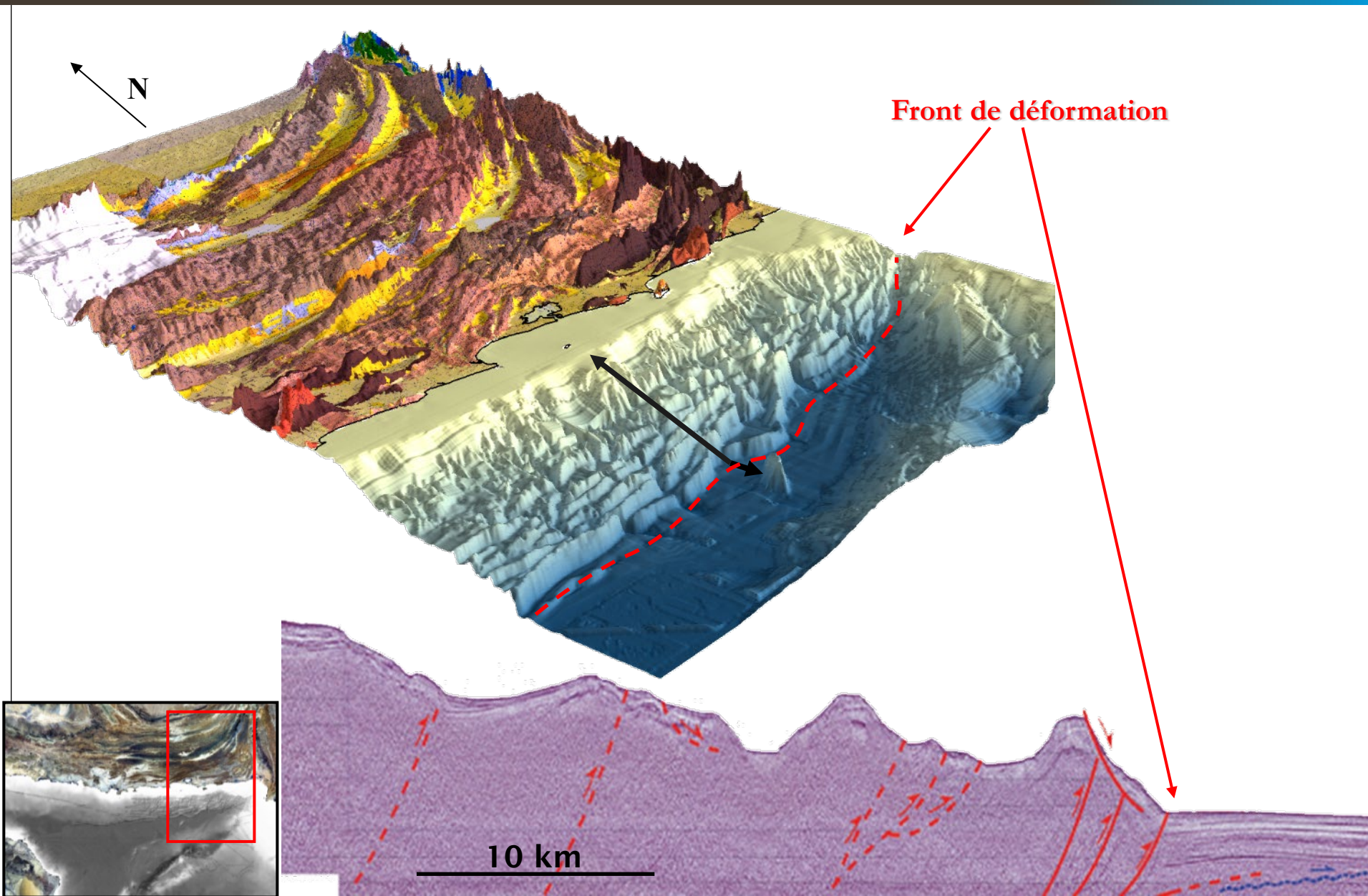
Bourget, J., Zaragosi, S. Ellouz-Zimmermann, N., Mouchot, N., Garlan, T., Schneider, J.-L., Lanfumey, V., Lallemand, S. (2010) Turbidite system architecture and sedimentary processes along topographically complex slopes: the Makran convergent margin. *Sedimentology*, DOI 10.1111/j.1365-3091.2010.01168.x



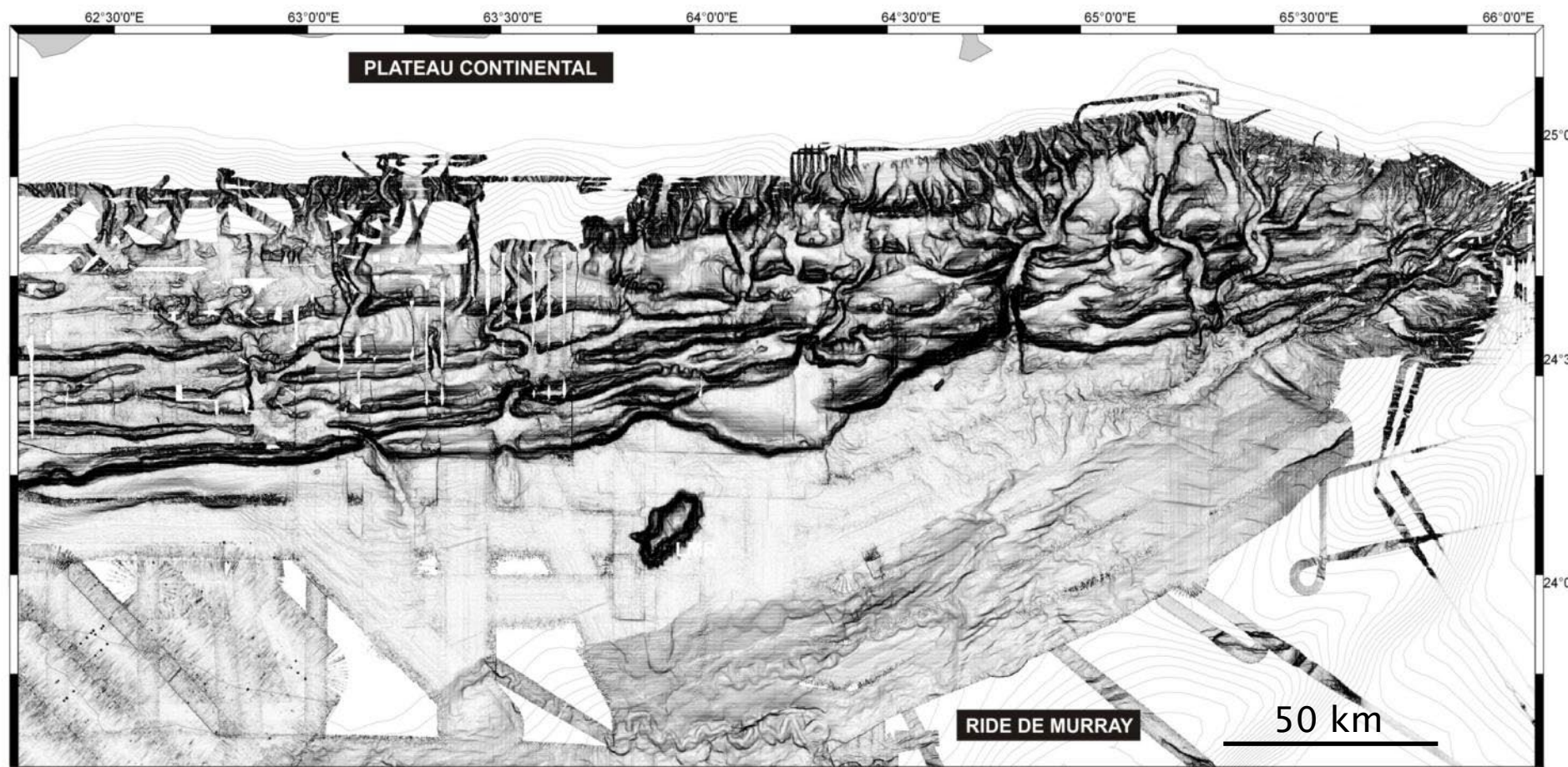
Bourget et al. 2011

Prisme d'accrétion : domaine continental / sous-marin





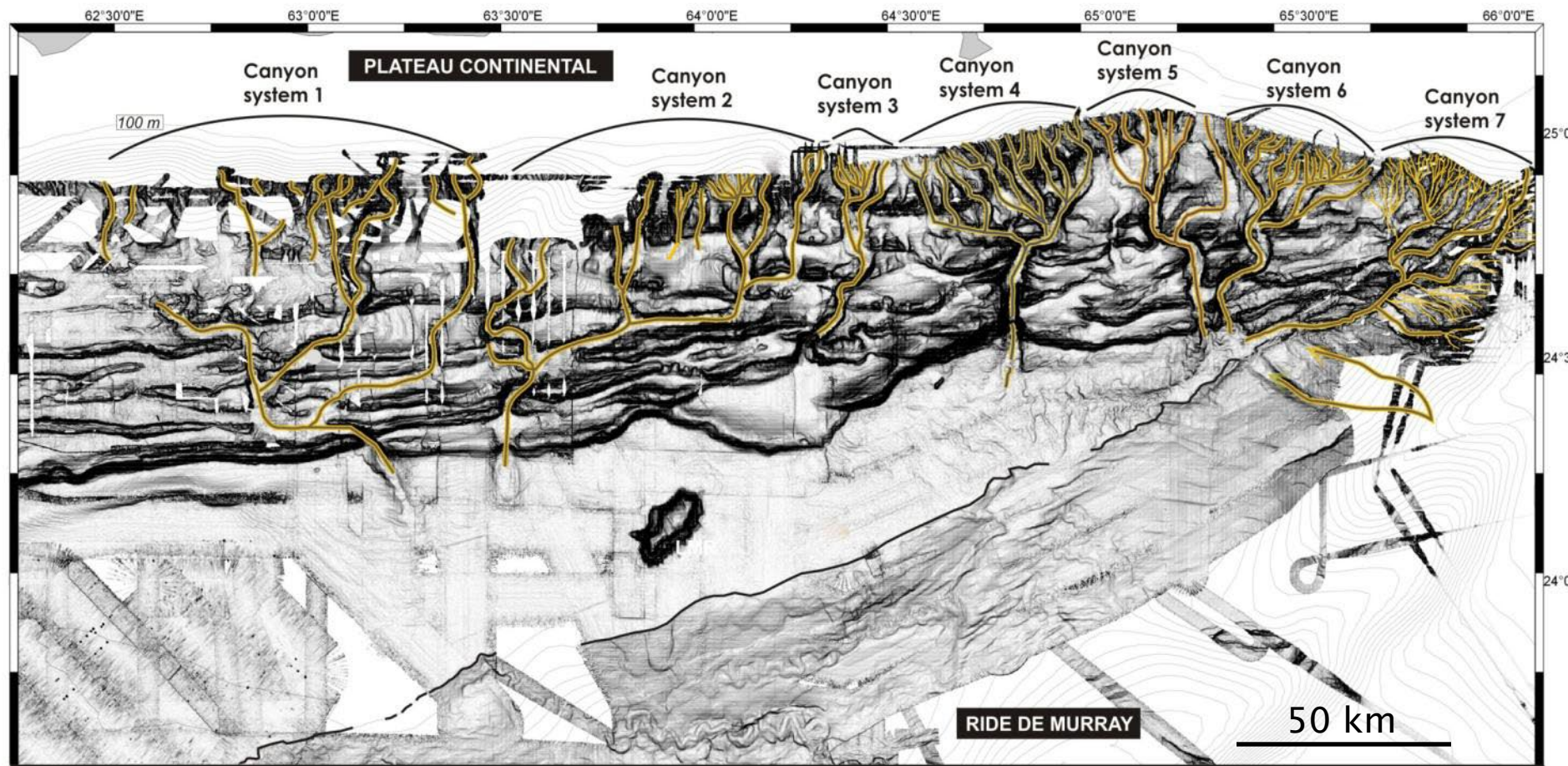
Rides d'accrétion – bassins intrapentes (piggy-back)



Bourget et al. 2011

carte des pentes

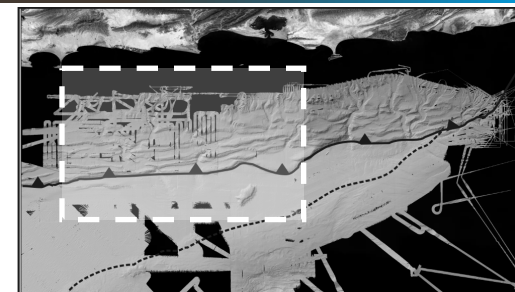
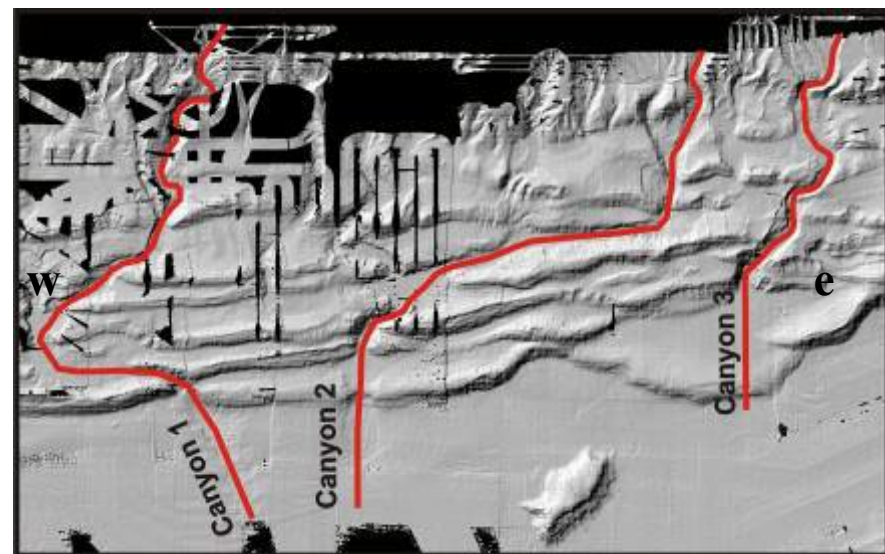




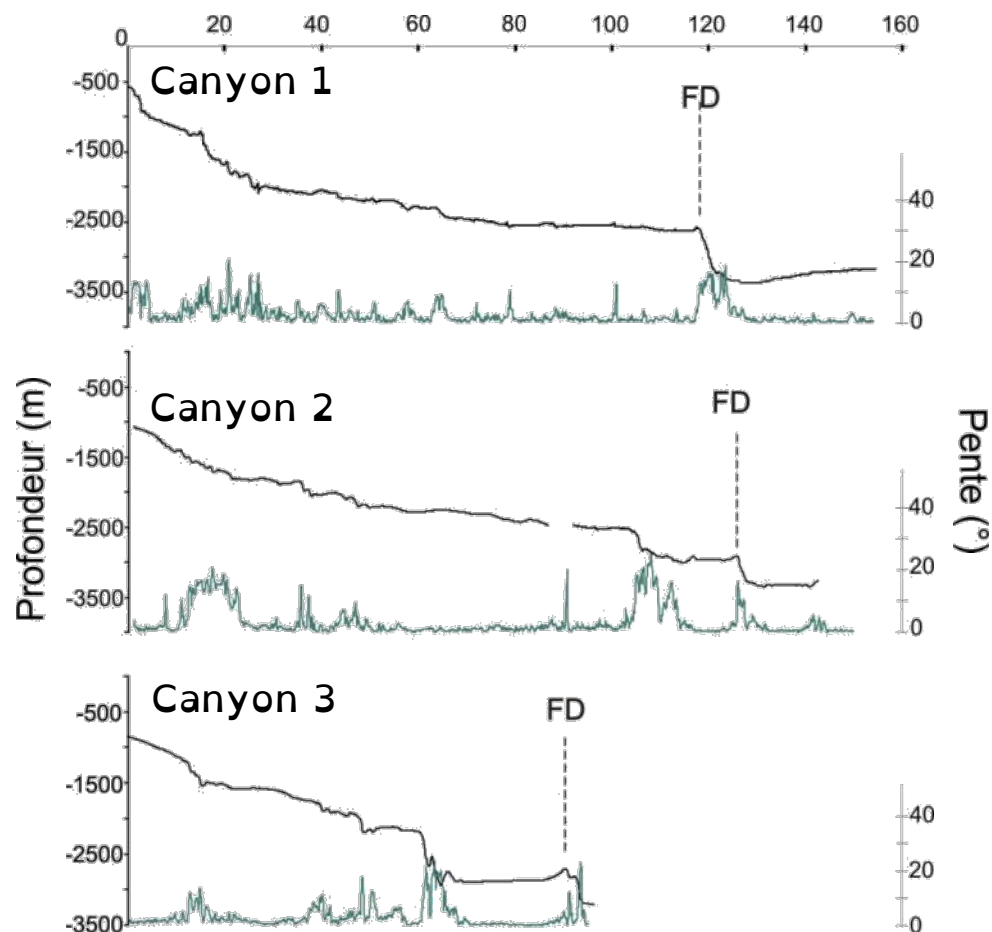
Bourget et al. 2011

carte des pentes

## MAKRAN OCCIDENTAL



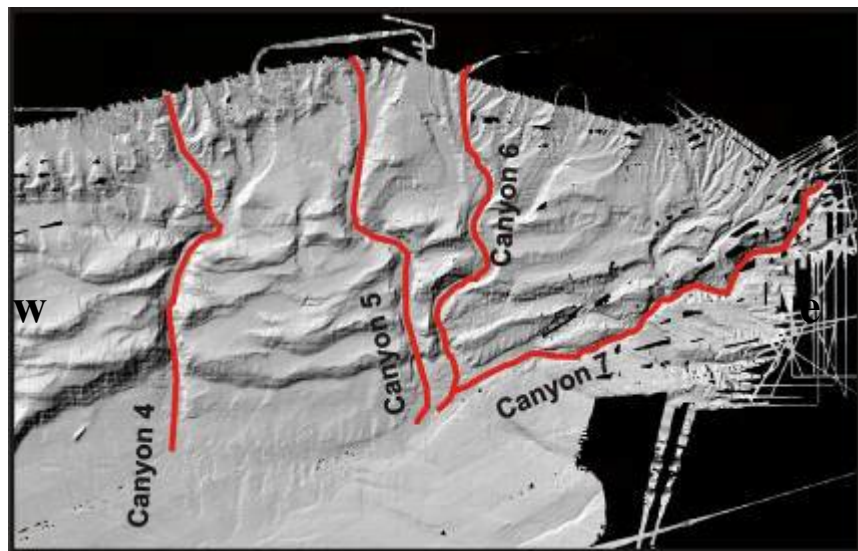
FD: front de déformation



Bourget et al. 2011

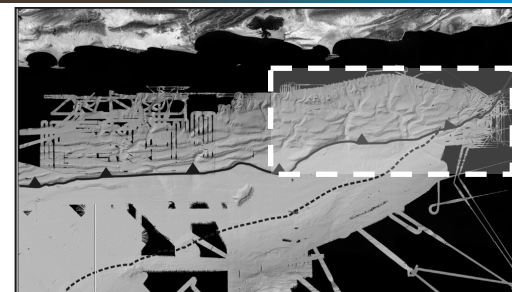
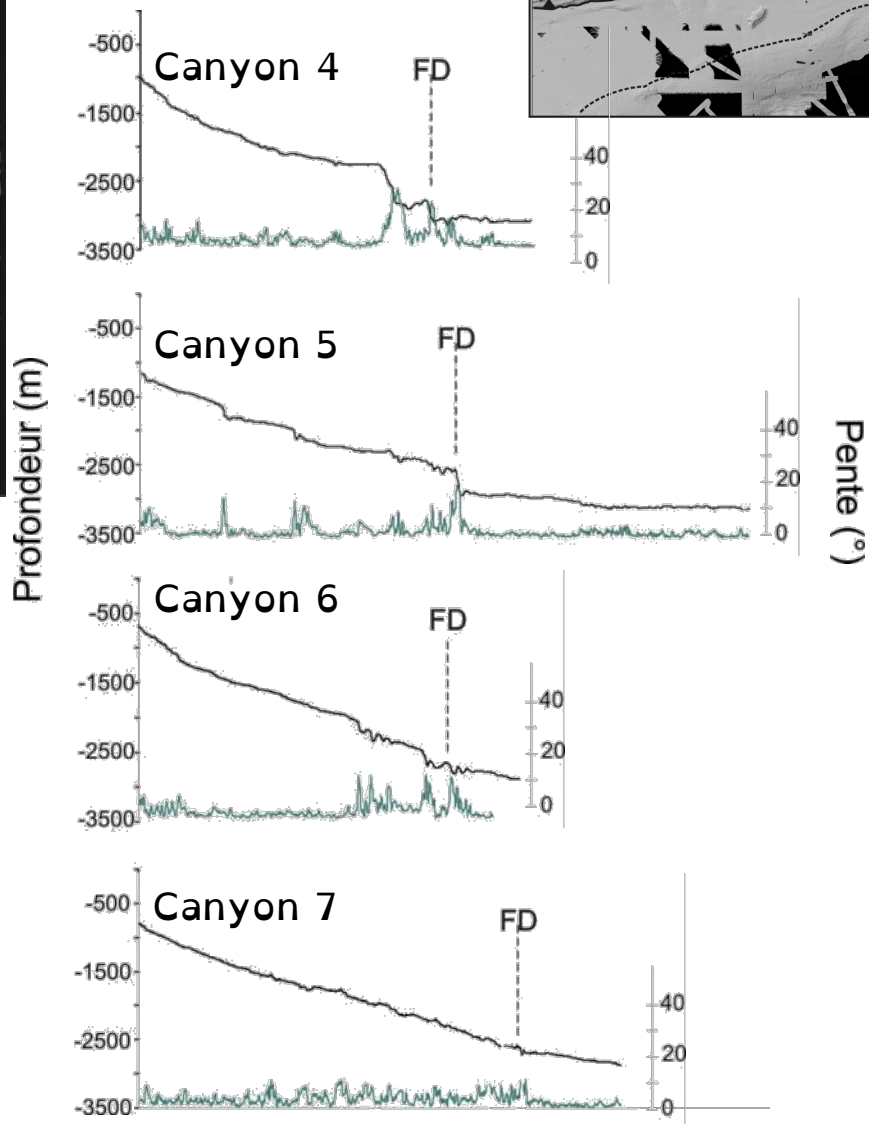


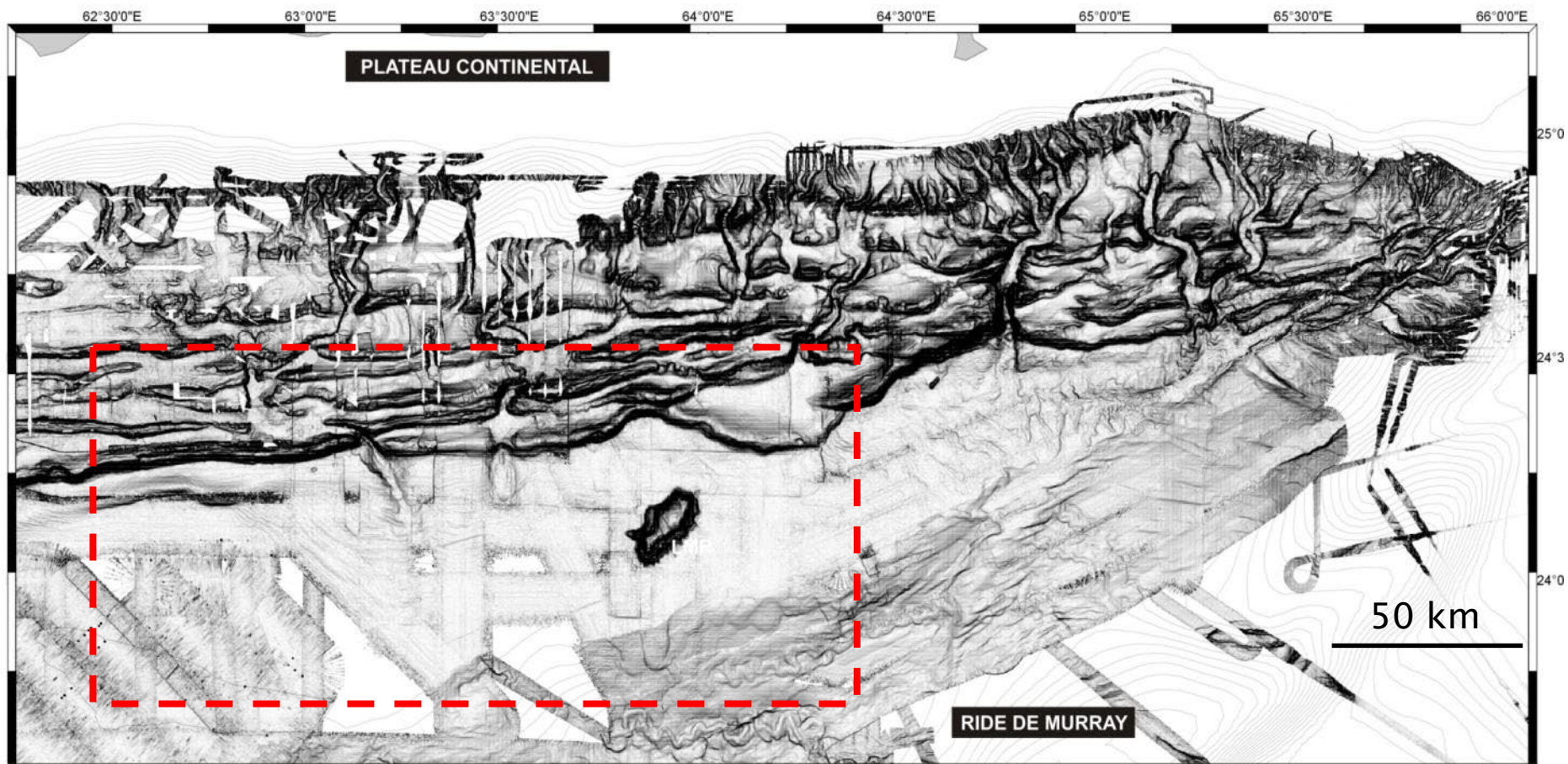
## MAKRAN ORIENTAL



Bourget et al. 2011

FD: front de déformation

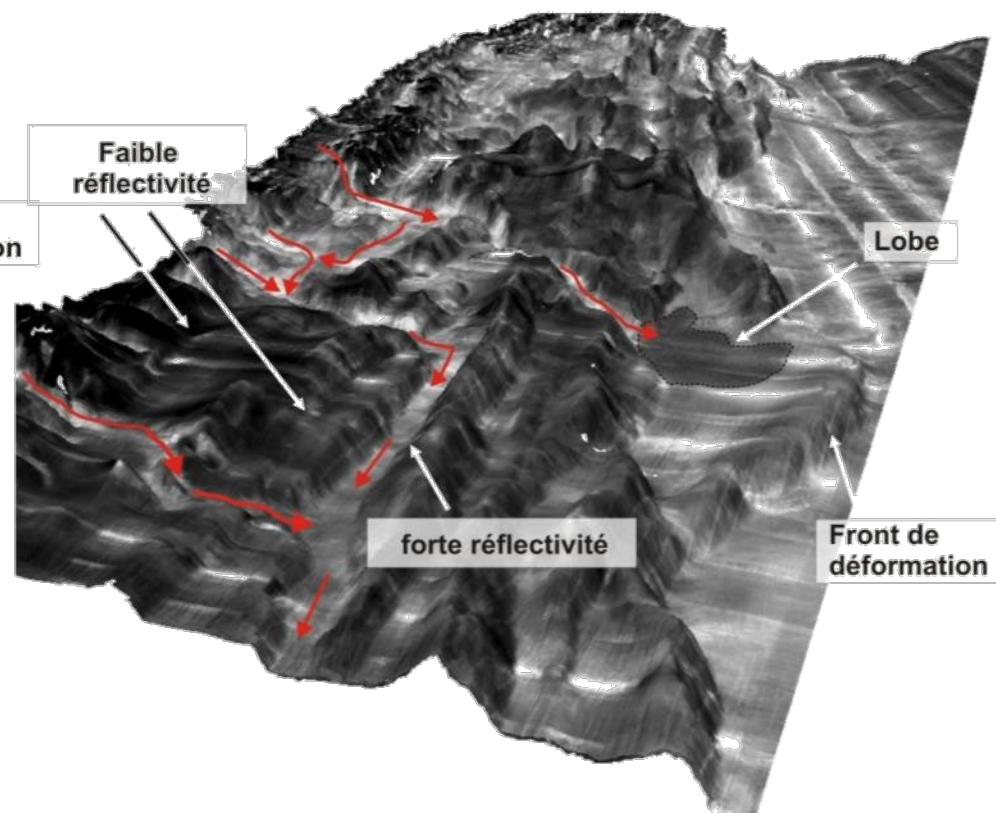
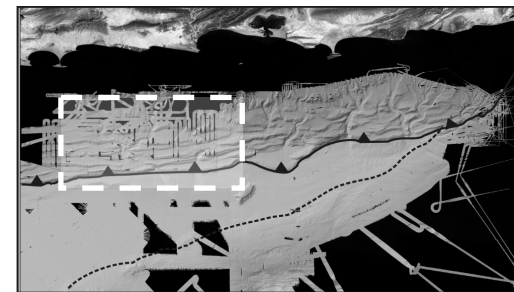
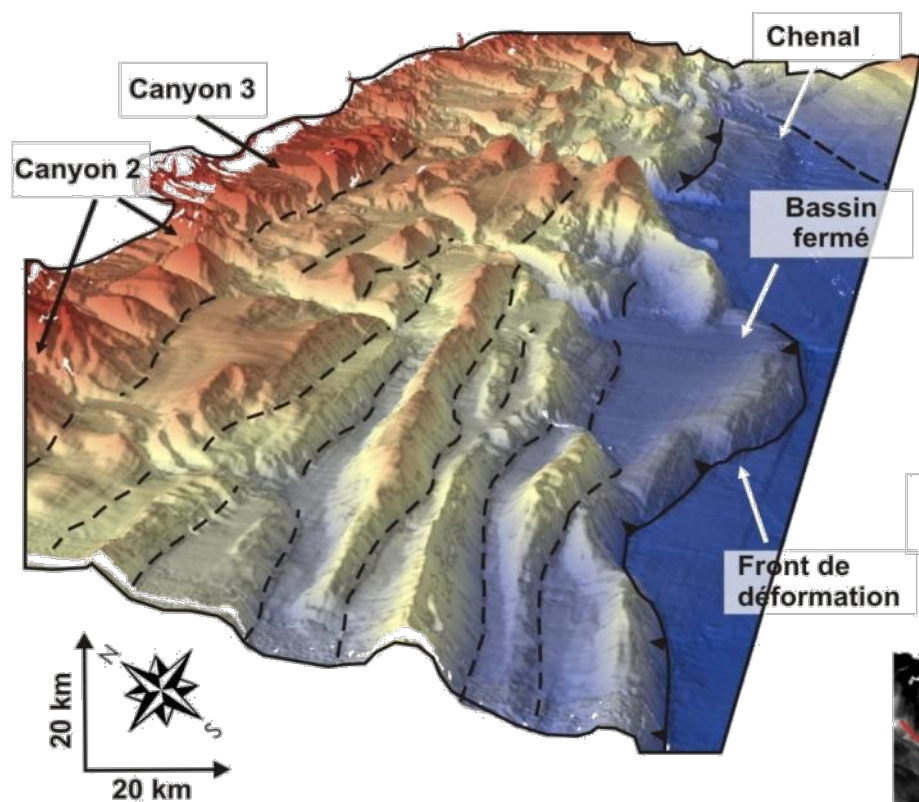




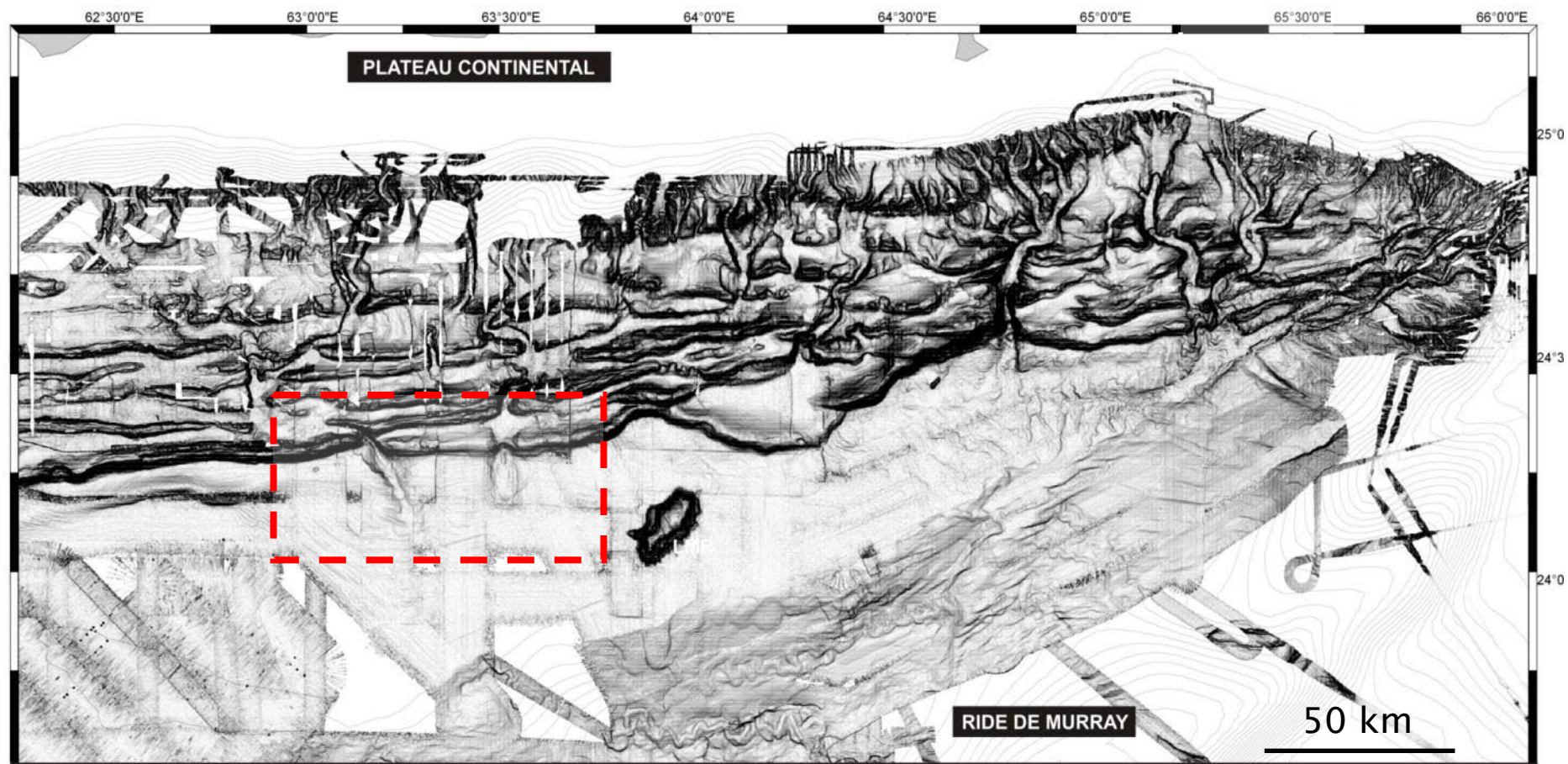
← Variabilité ouest / est →

Bourget et al. 2011





Bourget et al. 2011

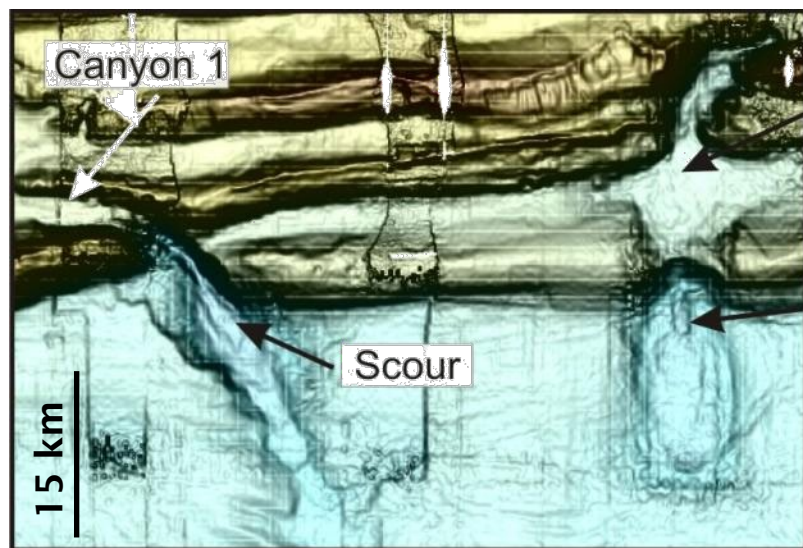


← Variabilité ouest / est →

Bourget et al. 2011



## MAKRAN OCCIDENTAL



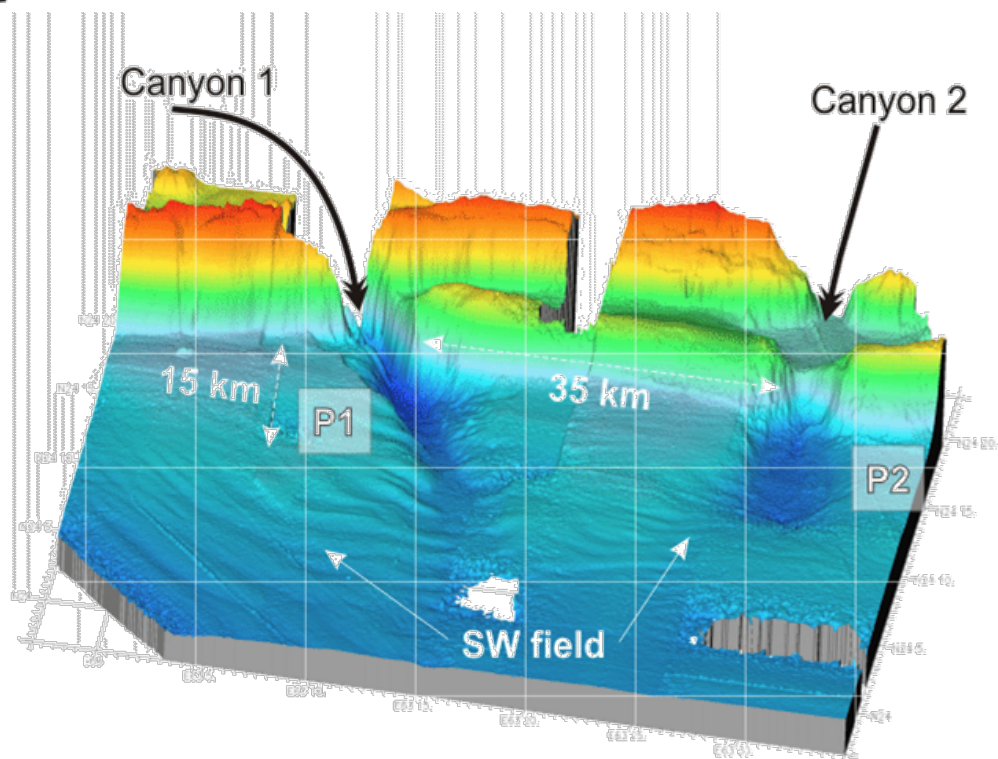
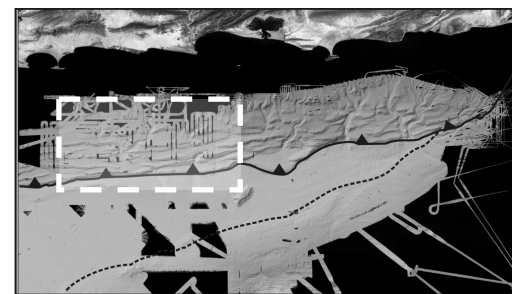
Canyon 2

Scour

Scour

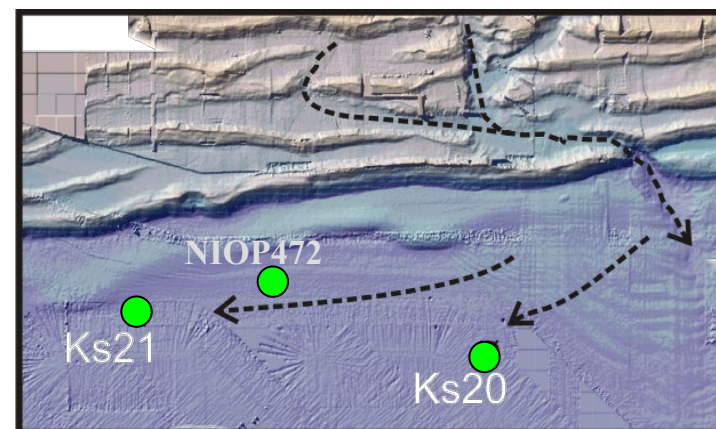
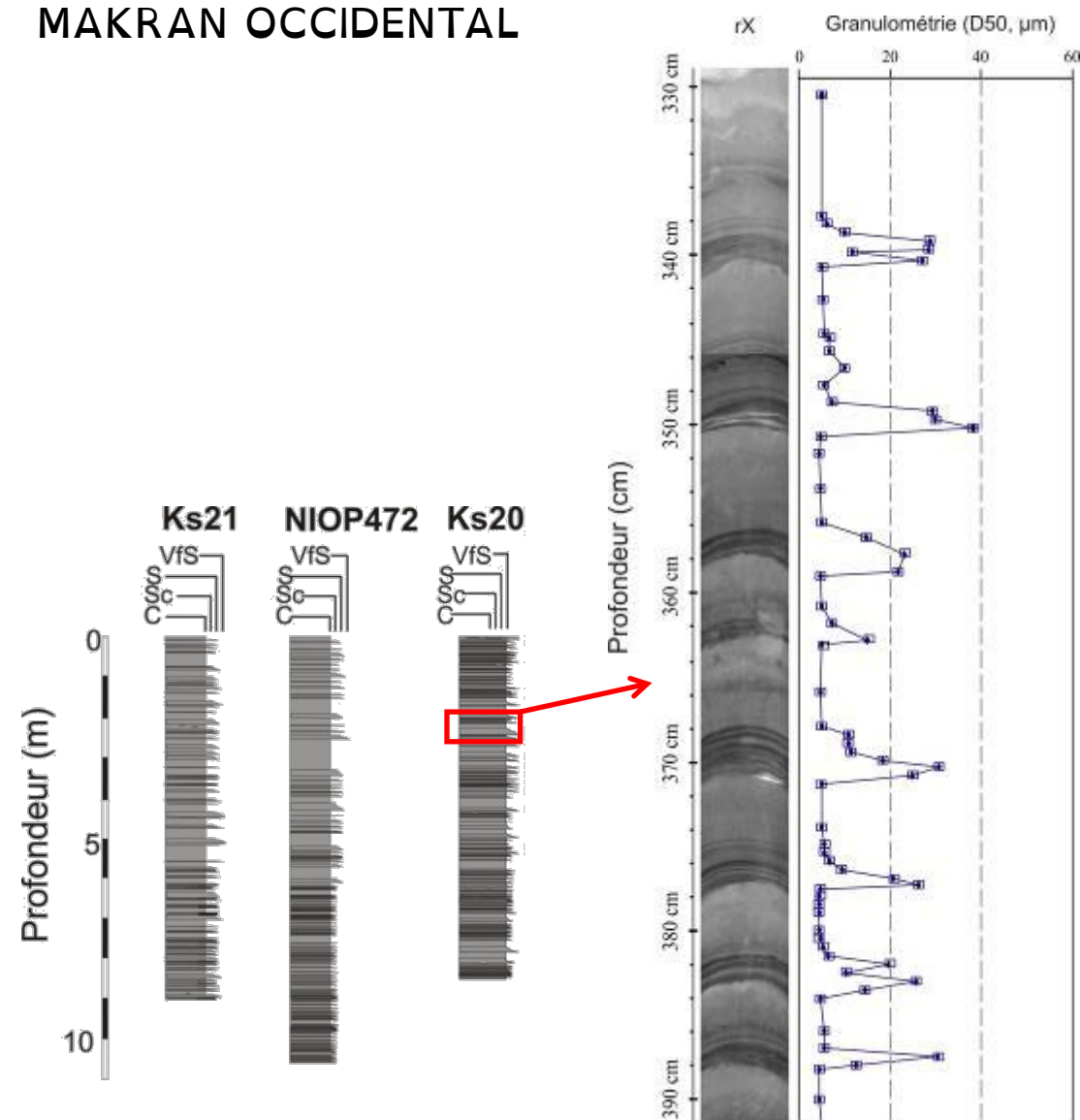
15 km

Bourget et al. 2011



Débouché des canyons occidentaux : piscines d'érosion pluri-kilométriques

## MAKRAN OCCIDENTAL

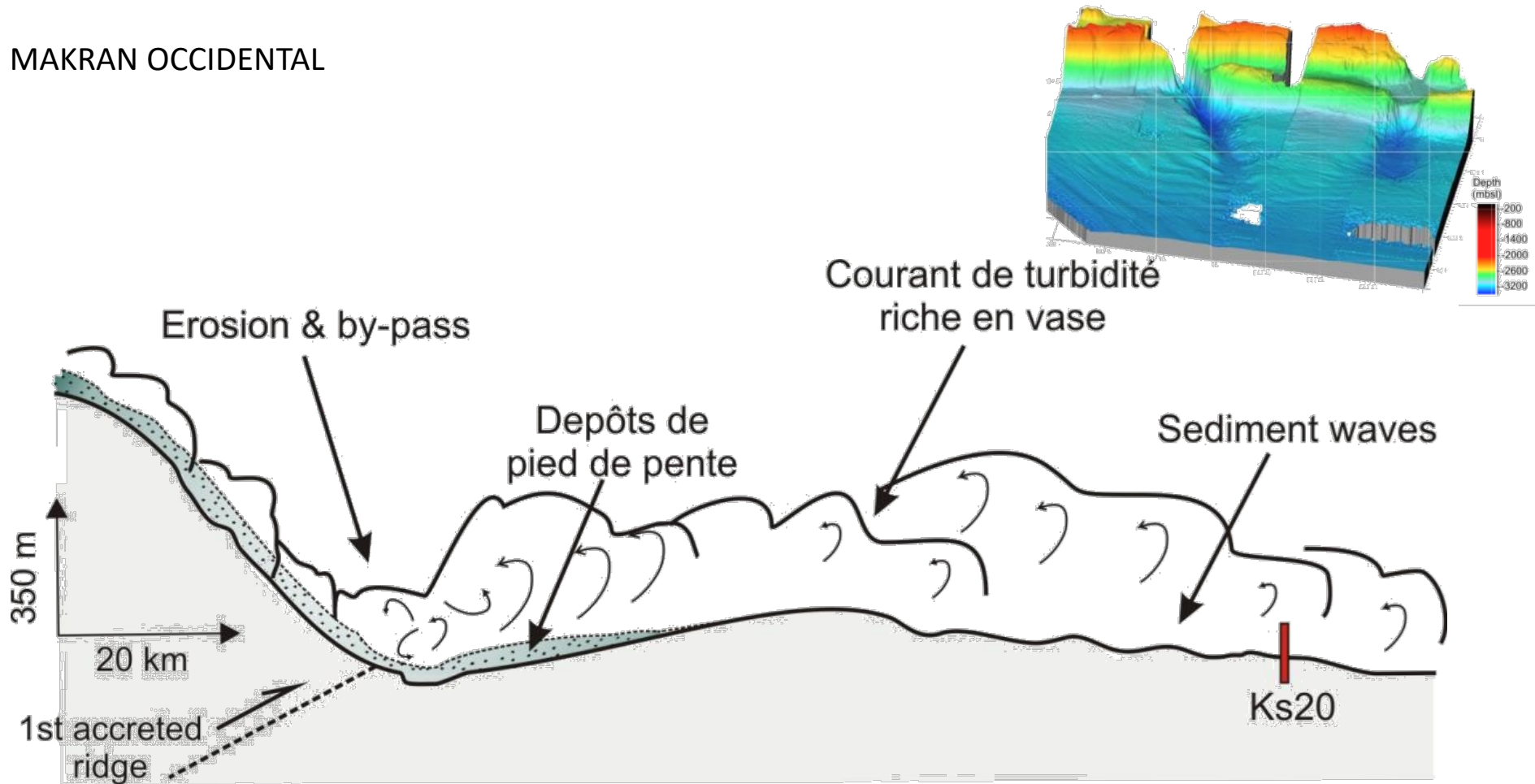


Bourget et al. 2011

Plaine abyssale : turbidites argilo-silteuses / écoulements non chenalisés

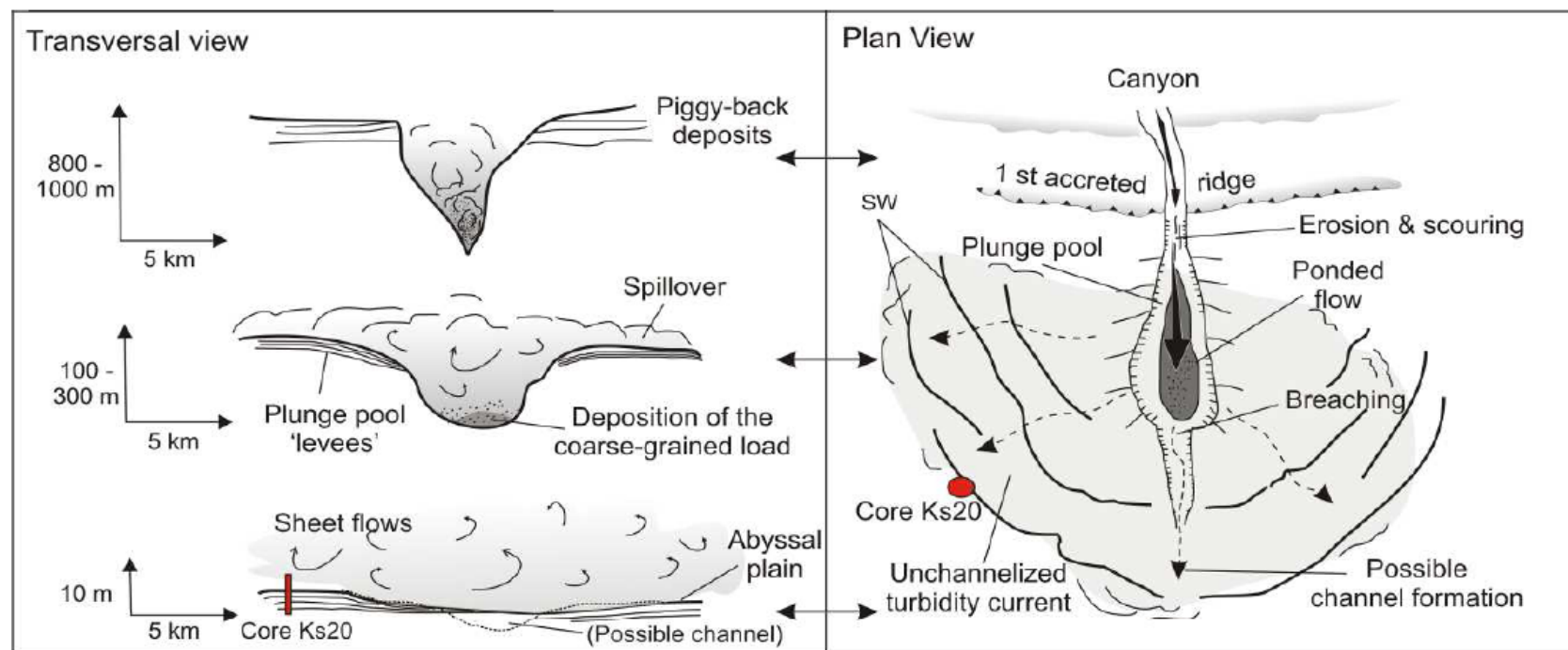


## MAKRAN OCCIDENTAL

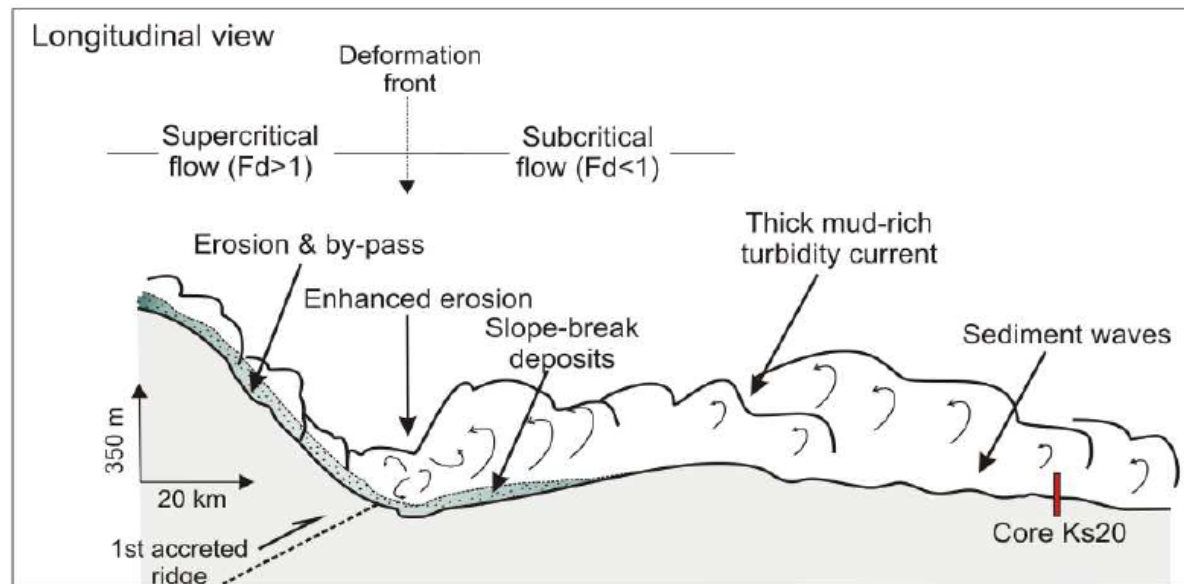


Bourget et al. 2011

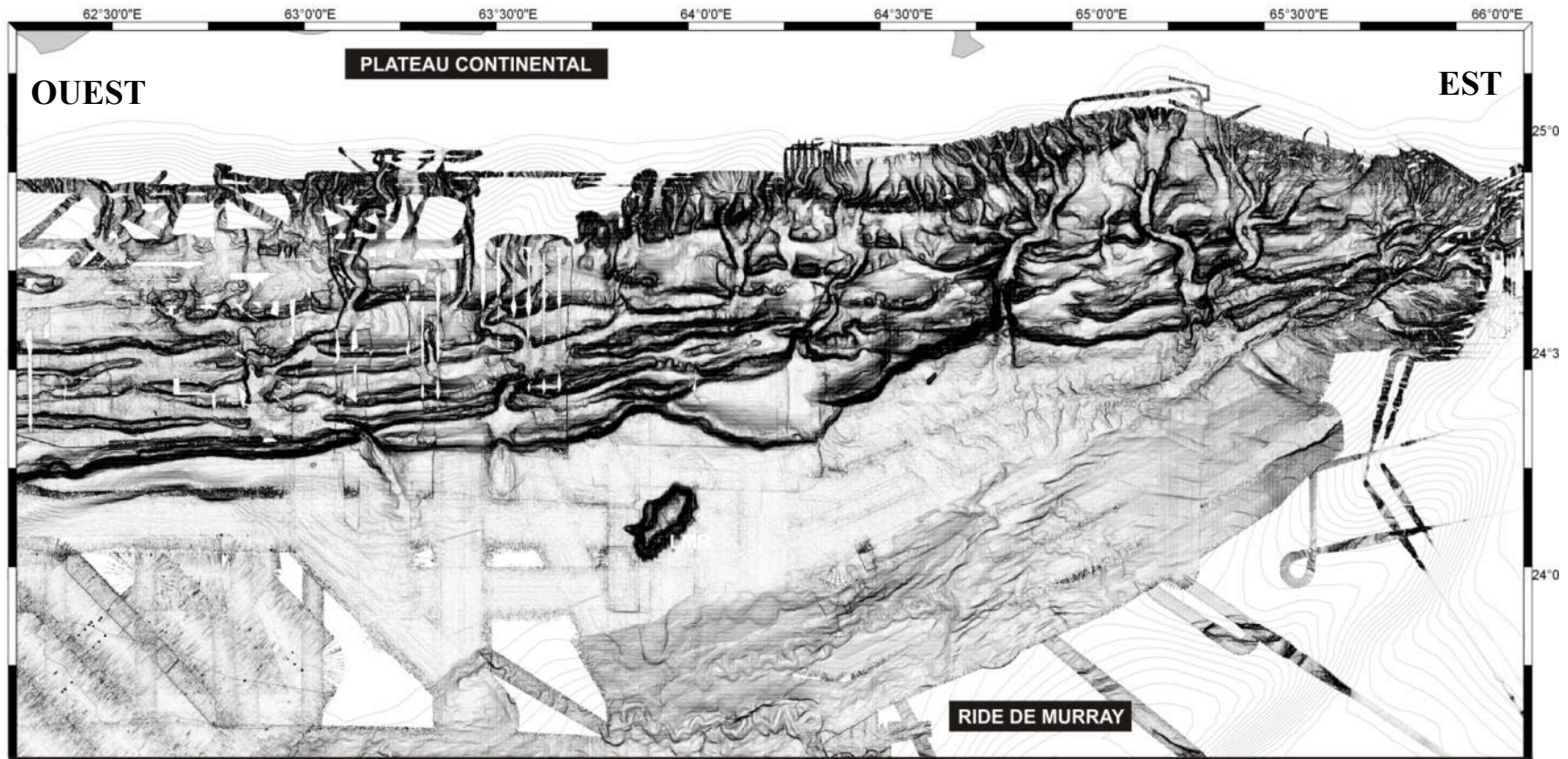
**Piscines d'érosion : impact de la topographie sur la dynamique sédimentaire**



Bourget et al. 2011

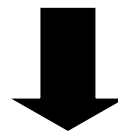






Variabilité EST-OUEST

Bourget et al. 2011



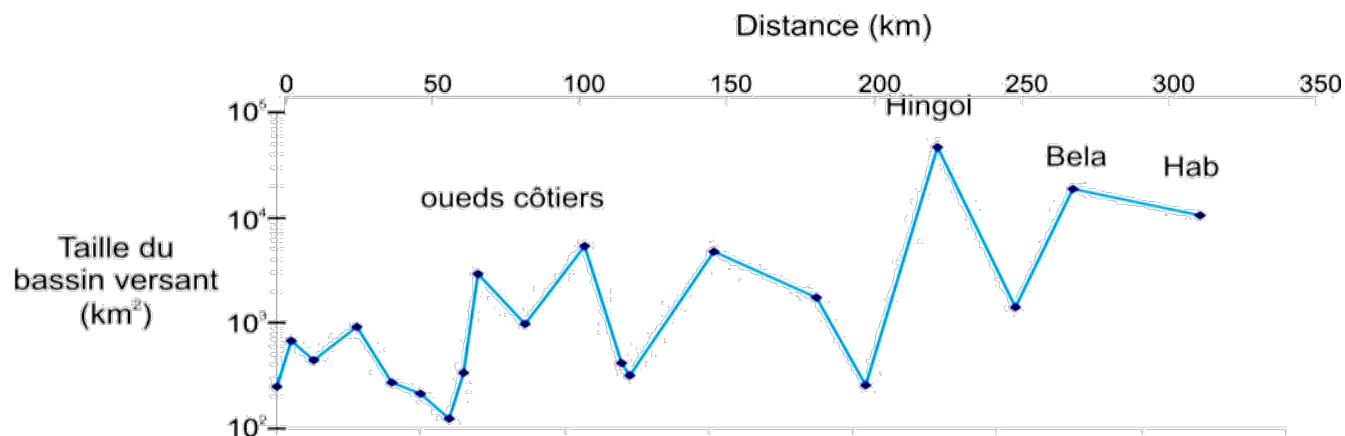
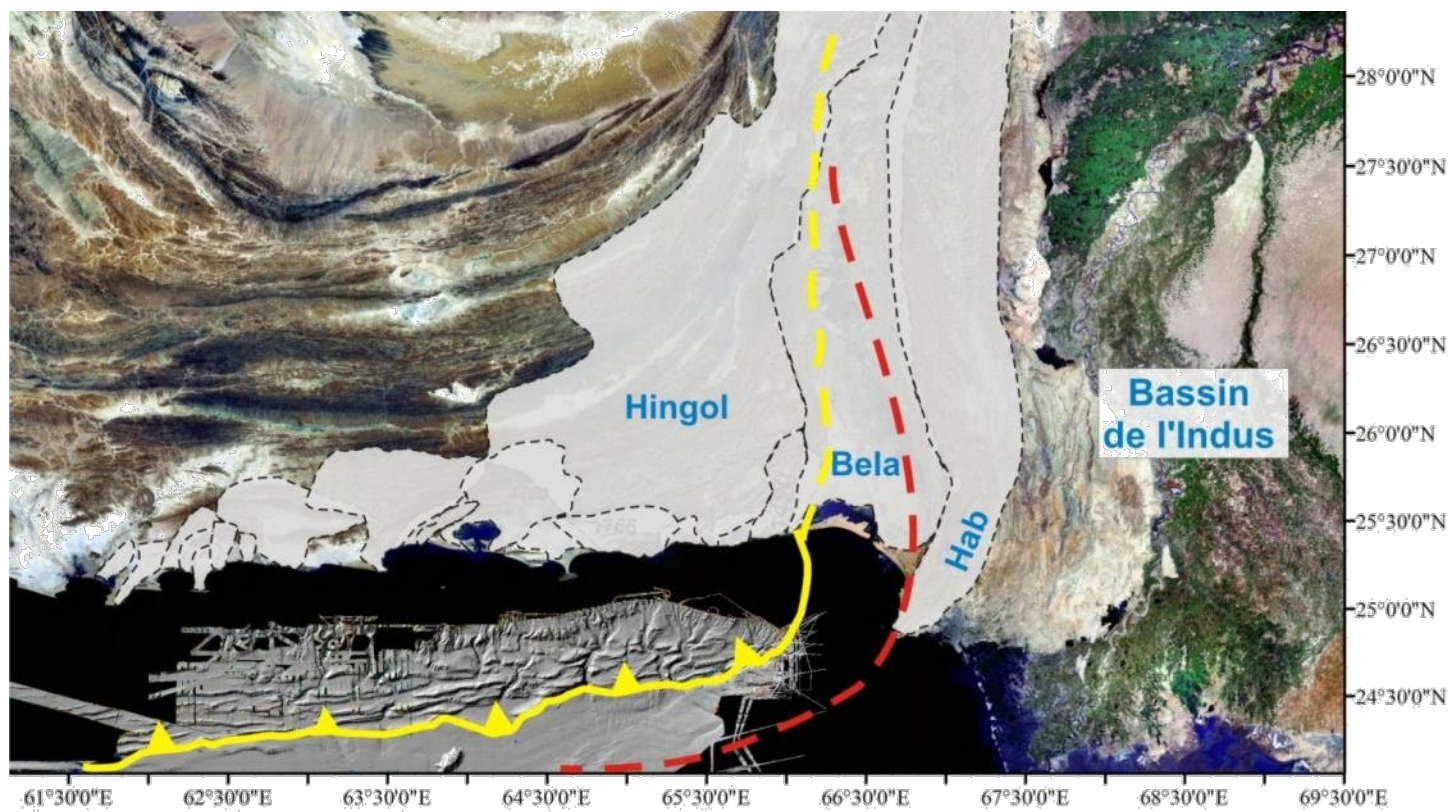
DEFORMATION

**VS**

FLUX SEDIMENTAIRES

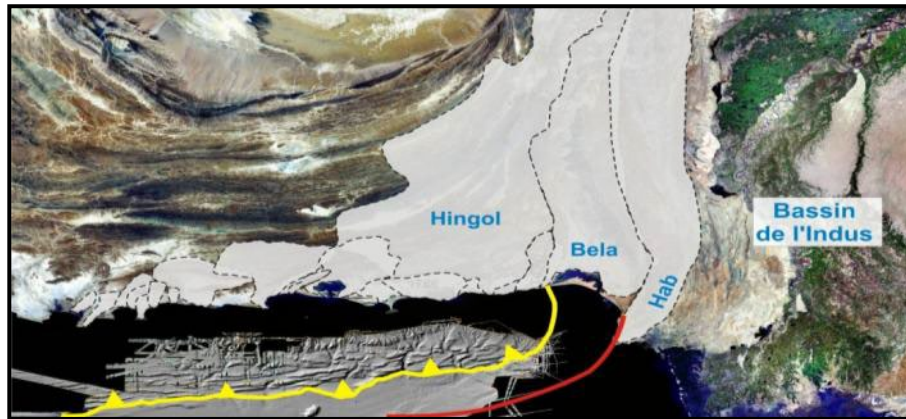
OUEST

EST

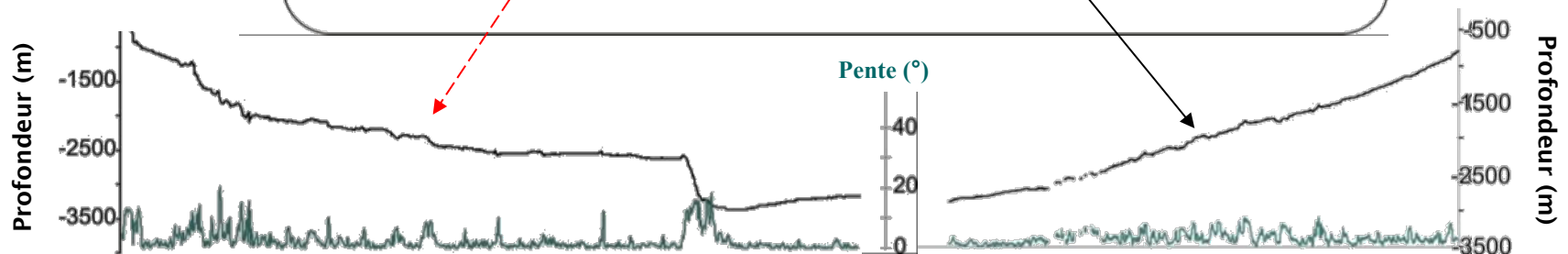
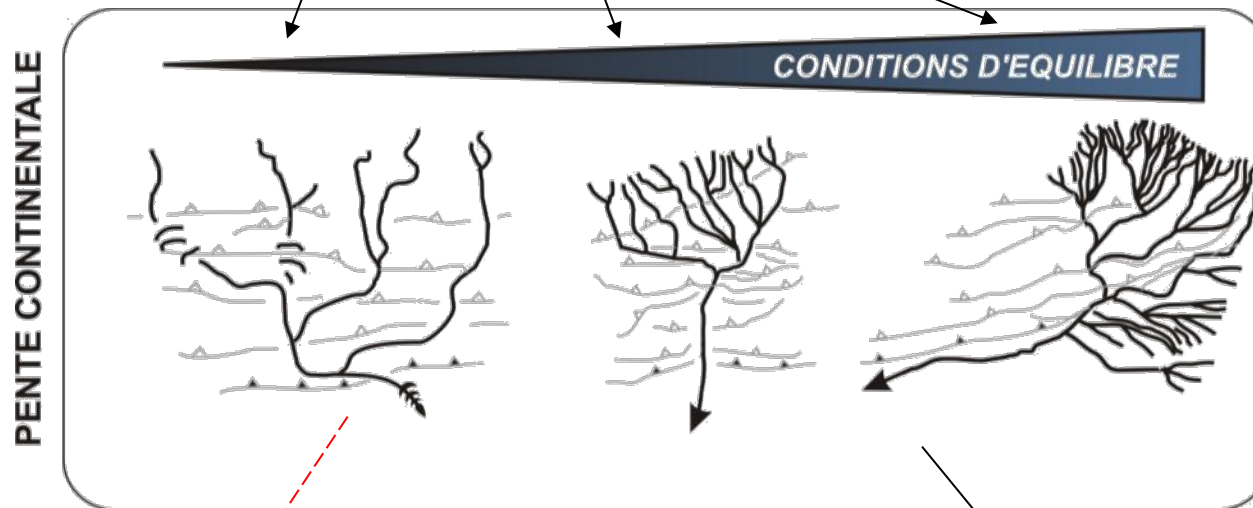


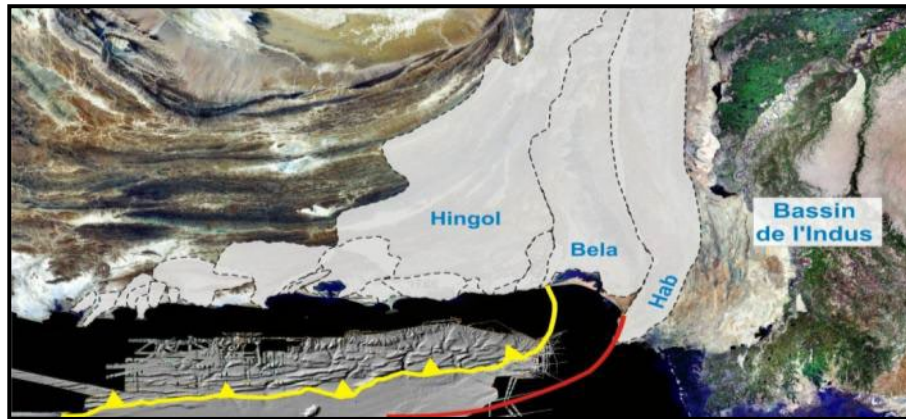
Bourget 2009



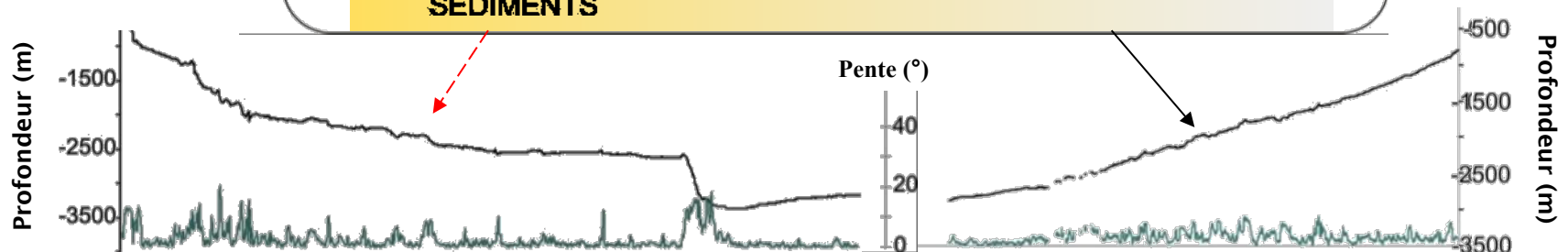
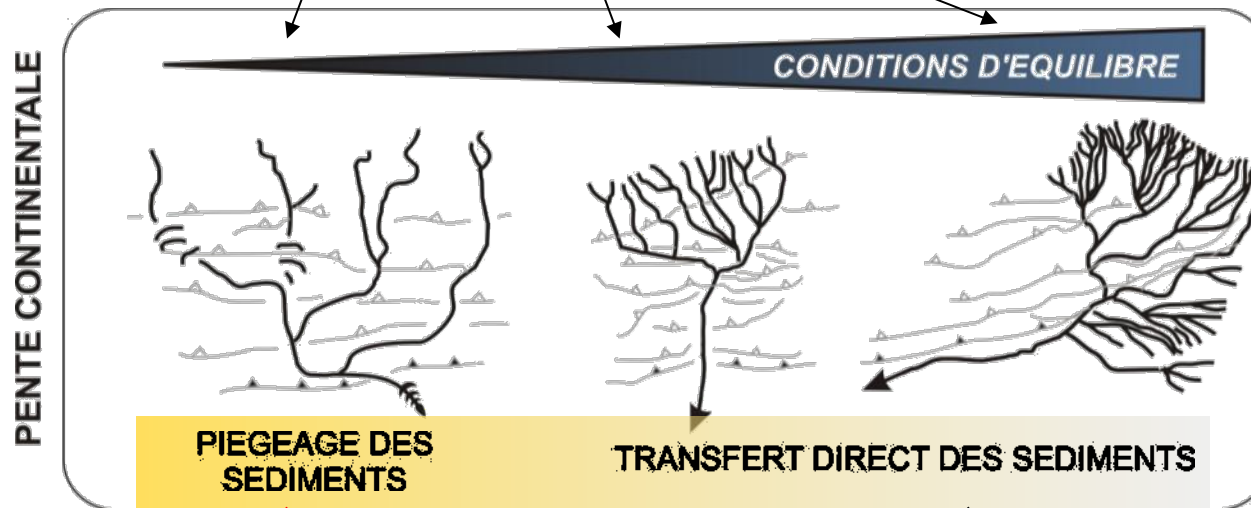


Bourget 2009

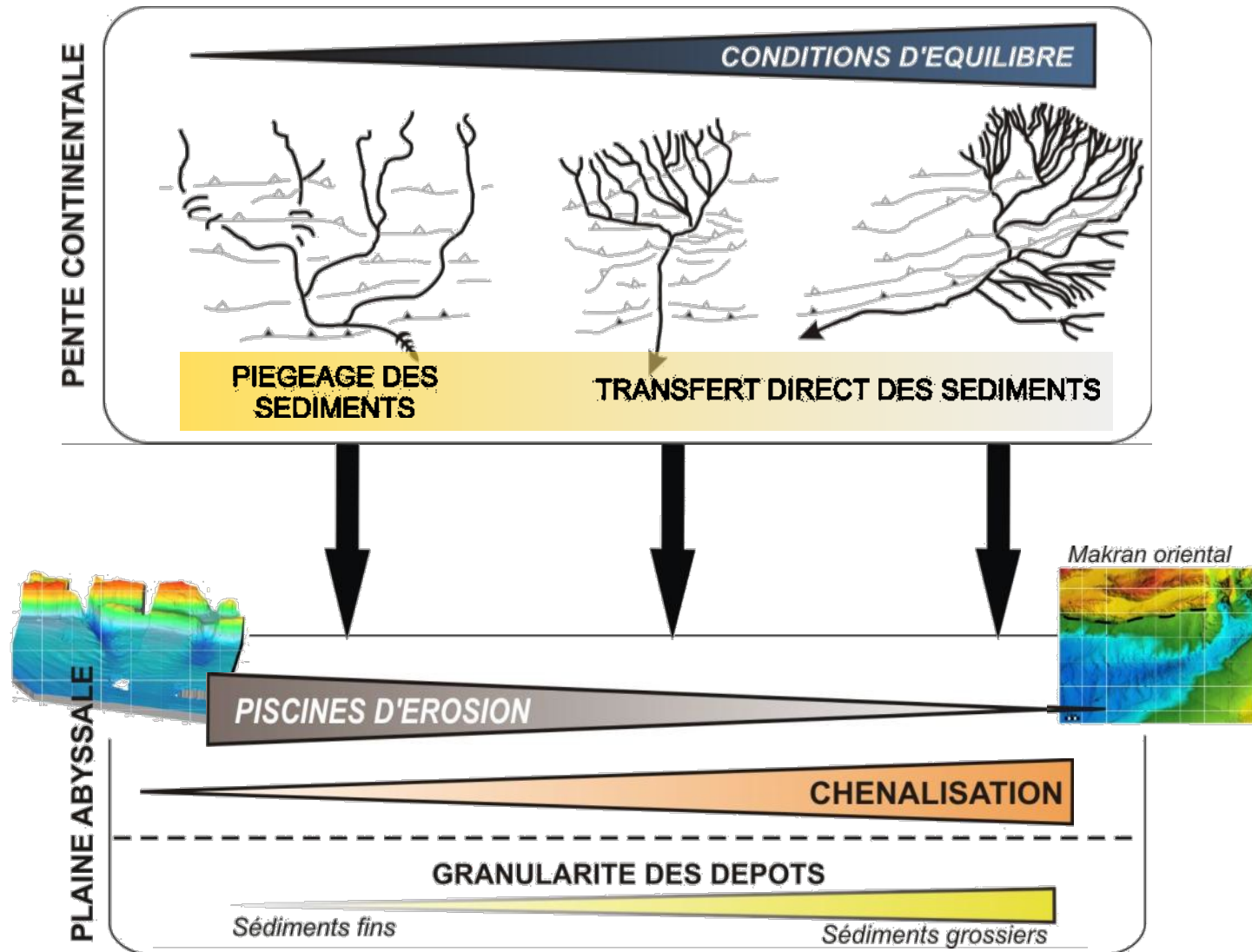




Bourget 2009



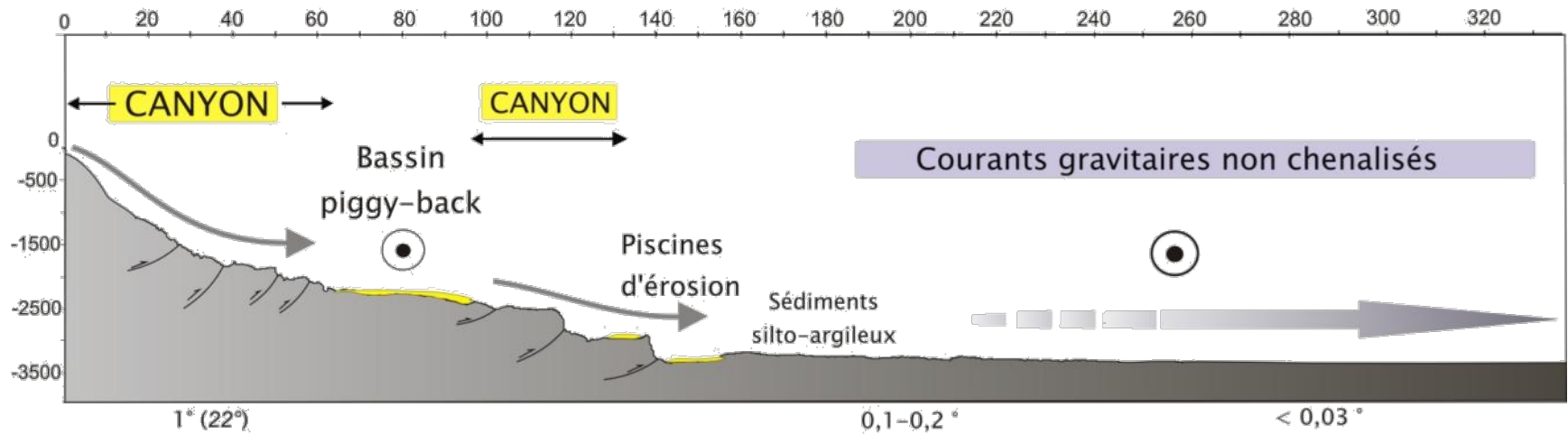




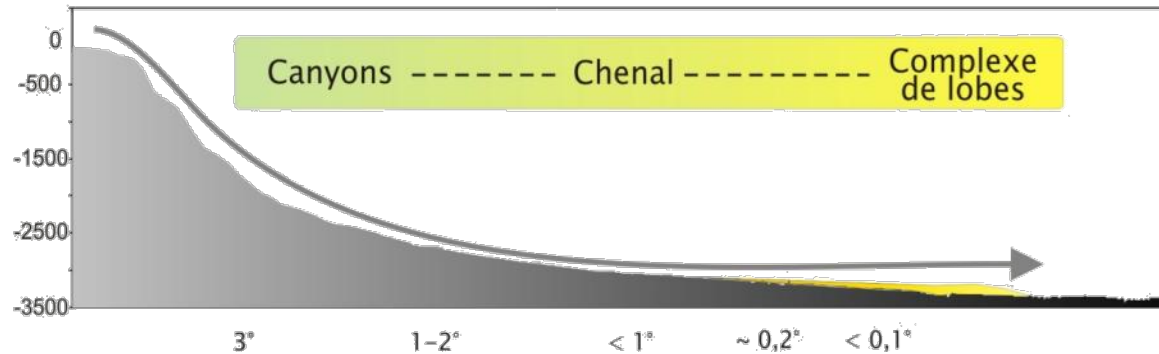
Bourget 2009

## MAKRAN (déformation active)

Distance du rebord de plateforme continentale (km)

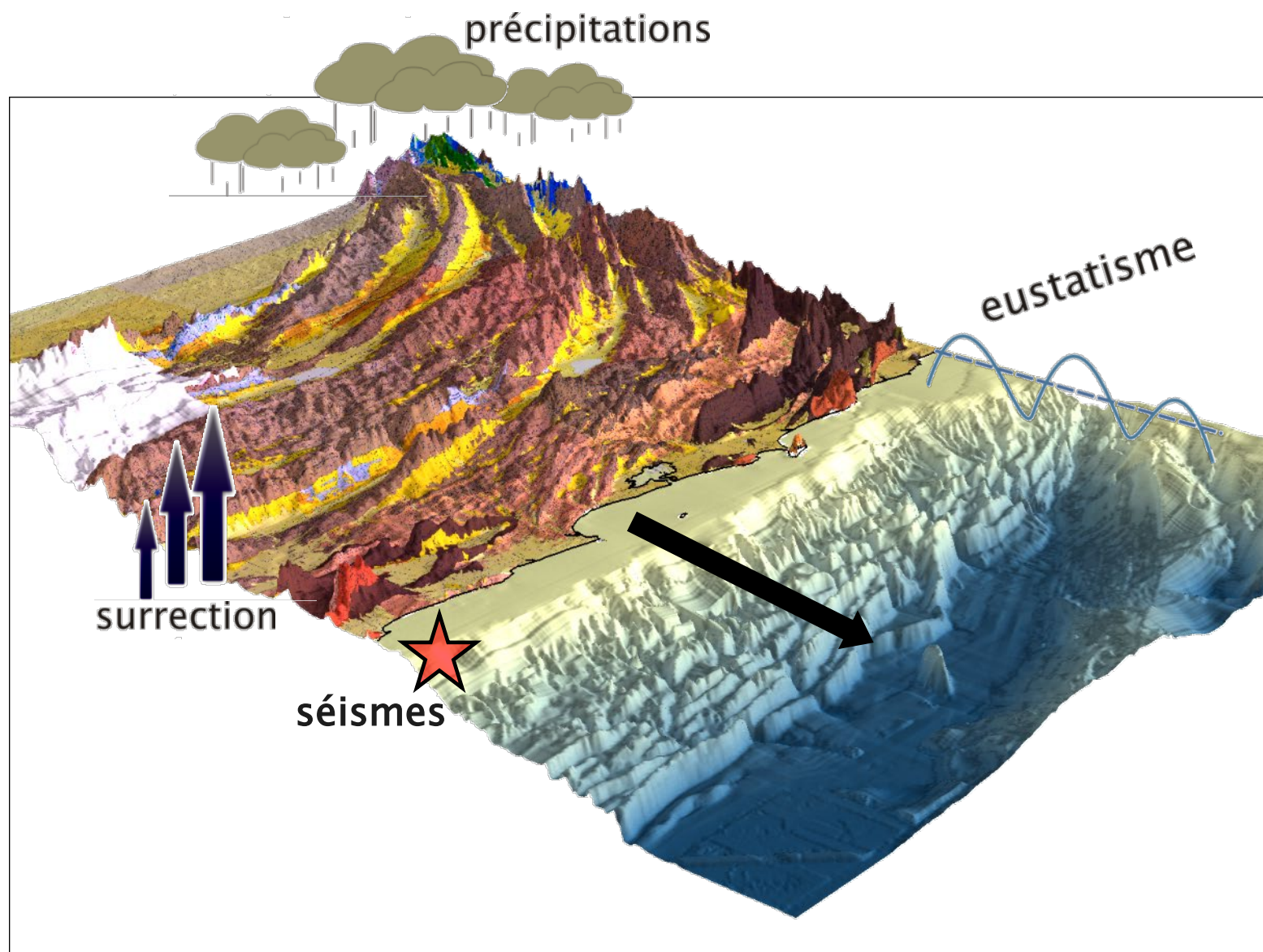


## OMAN (absence de déformation récente)

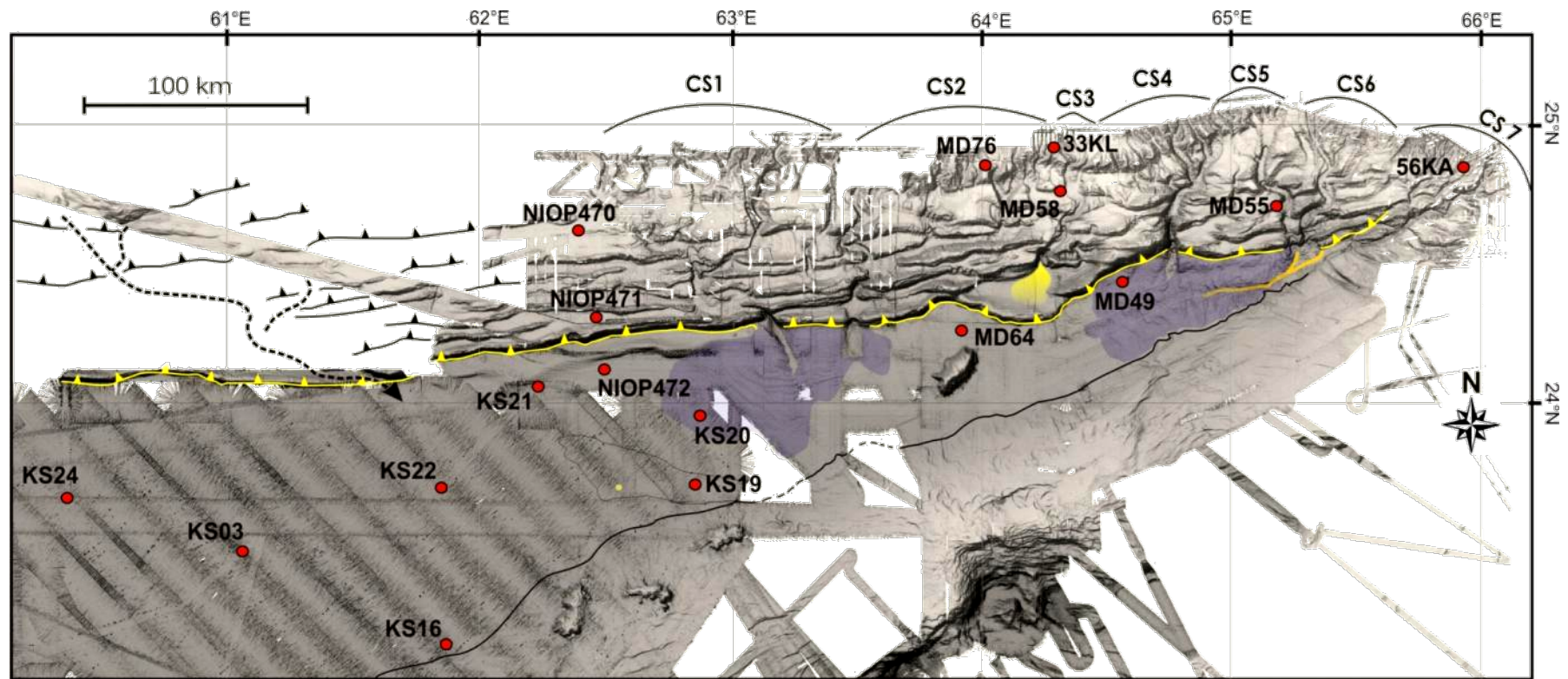


Bourget 2009





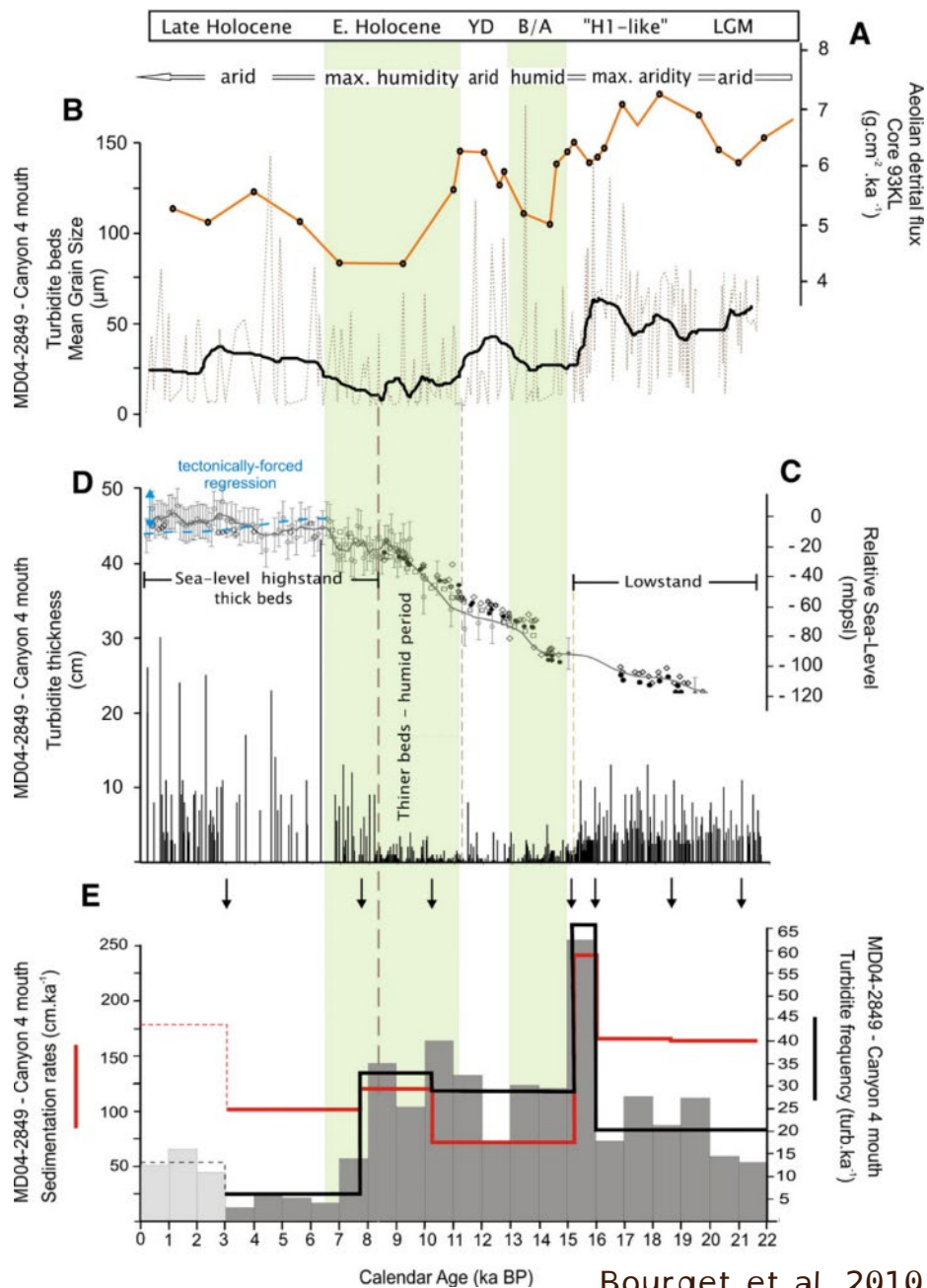
Bourget 2009



Bourget, J., Zaragosi, S., Ellouz-Zimmermann, S., Ducassou, E., Prins, M. A., Garlan, T., et al. (2010). Highstand vs. lowstand turbidite system growth in the makran active margin: Imprints of high-frequency external controls on sediment delivery mechanisms to deep water systems. **Marine Geology**, 274(1-4), 187-208.

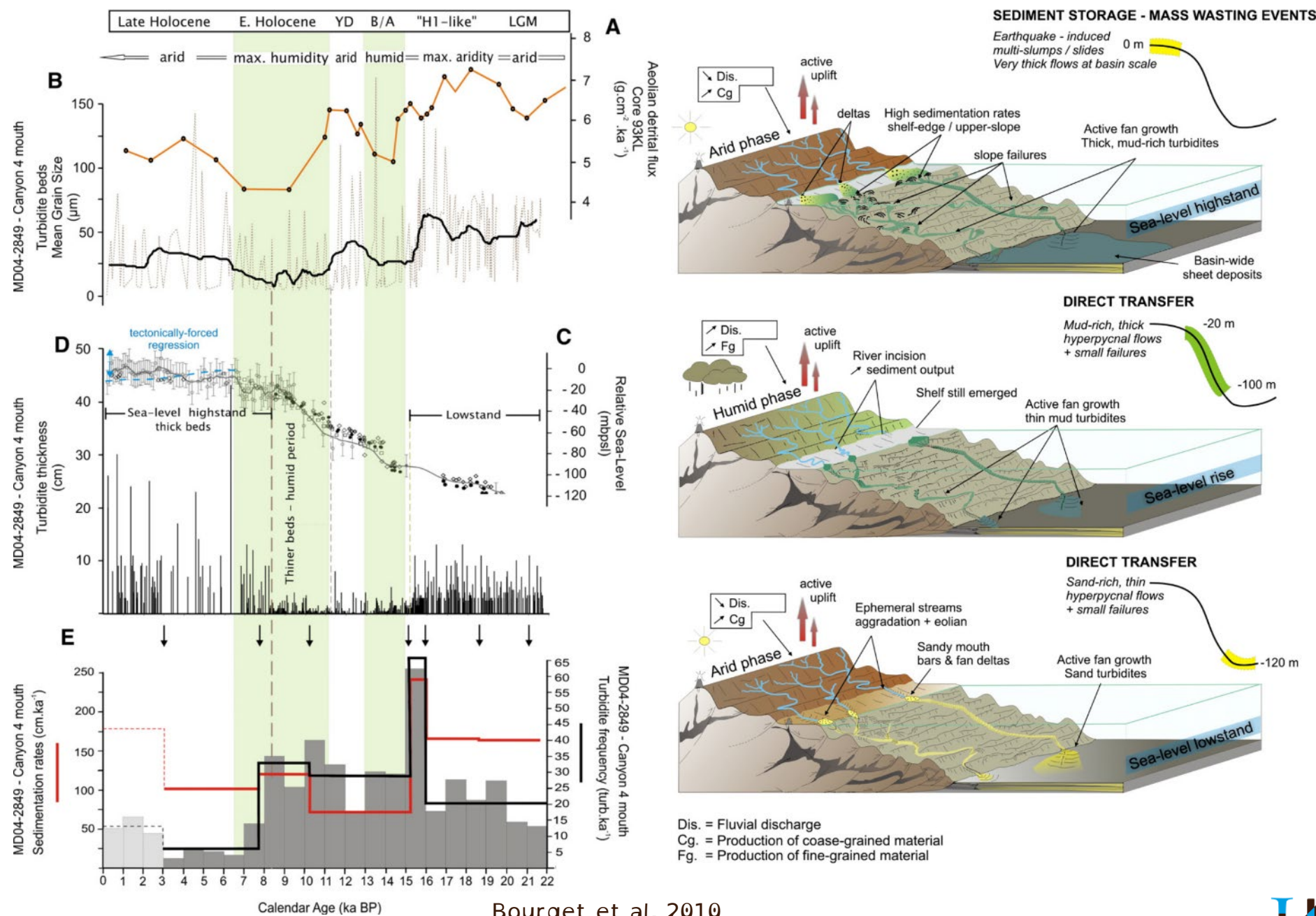






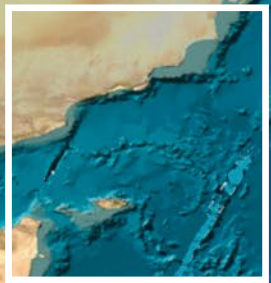
Bourget et al. 2010





Bourget et al. 2010

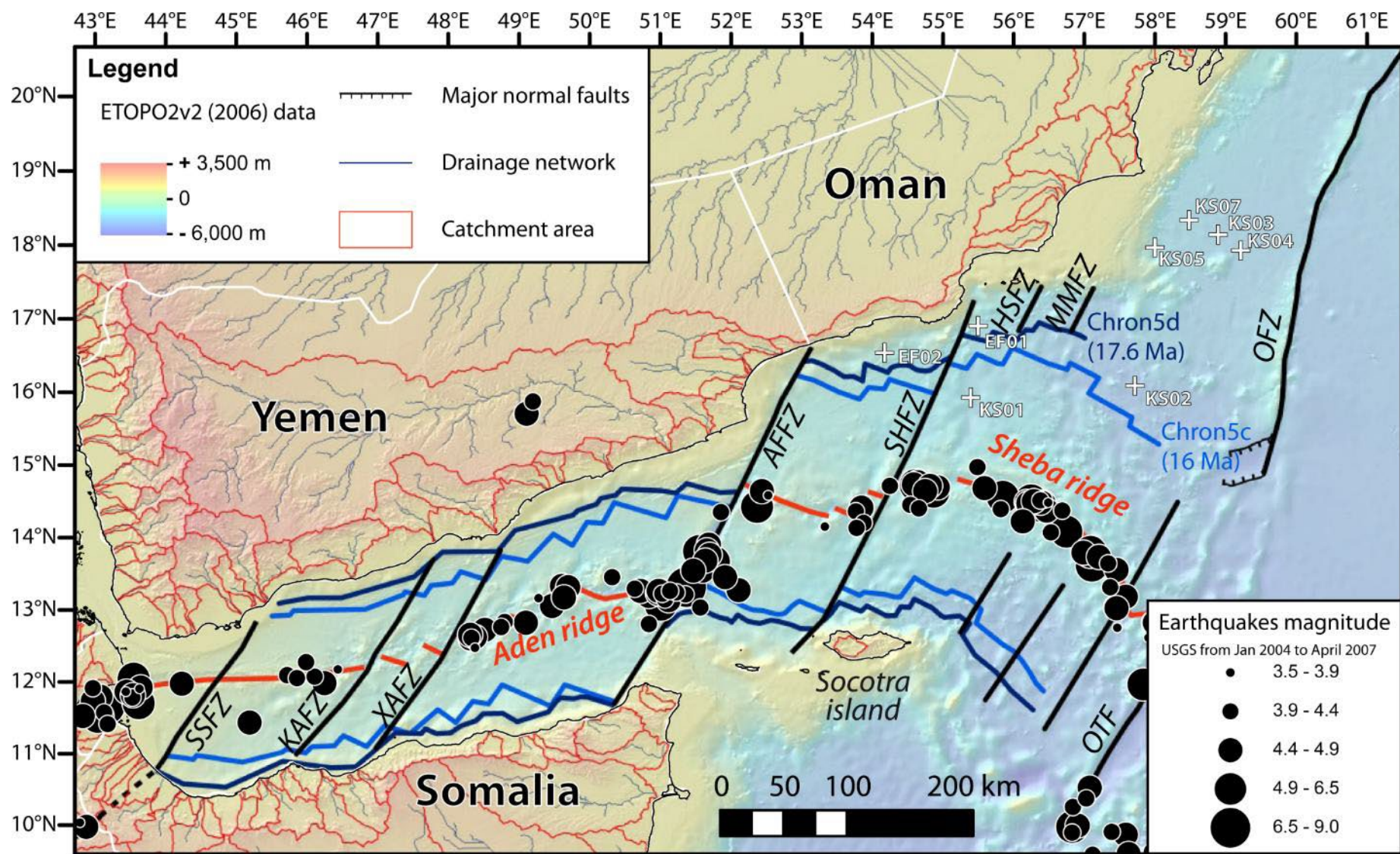




Le golfe d'Aden

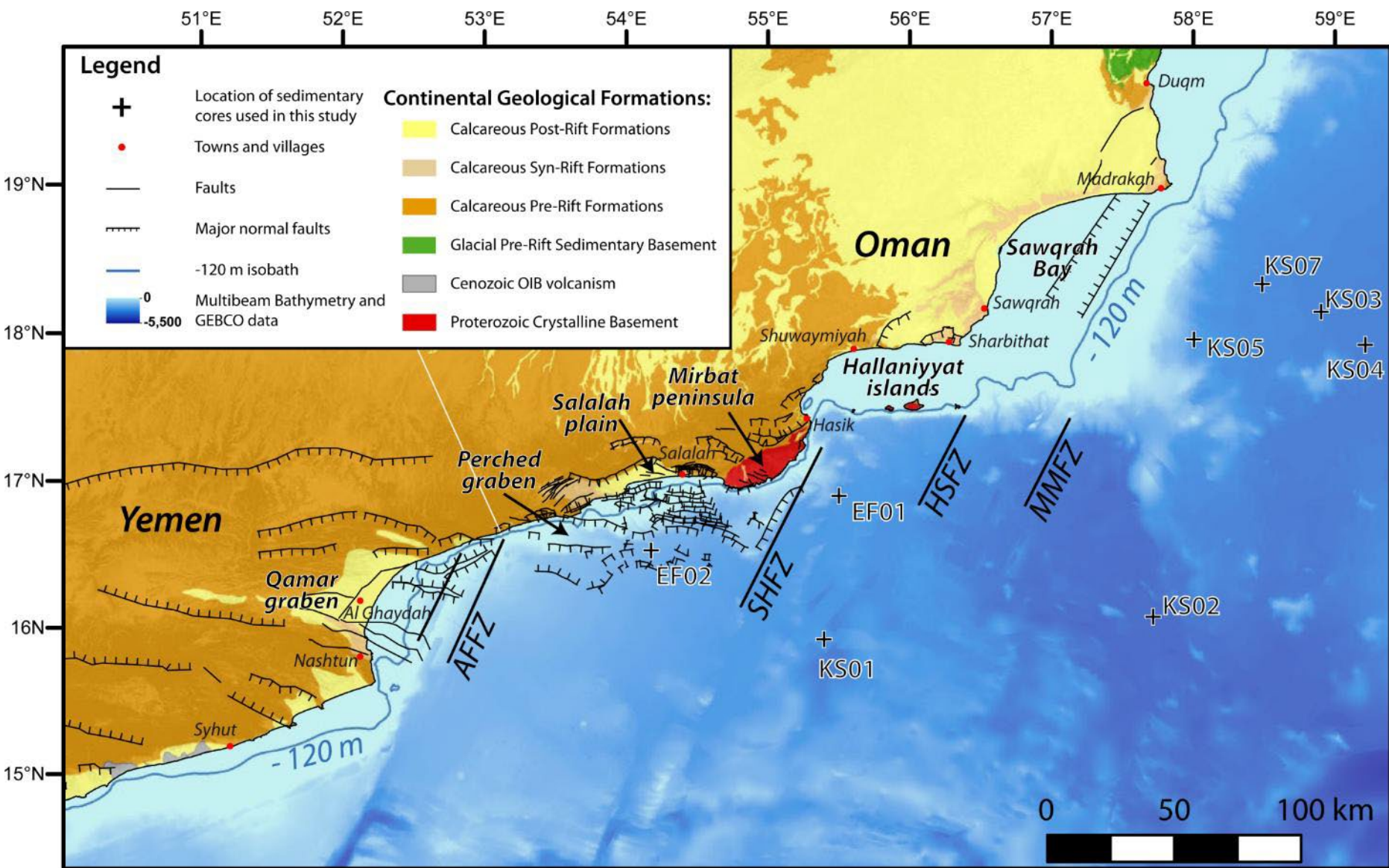
Océan Indien





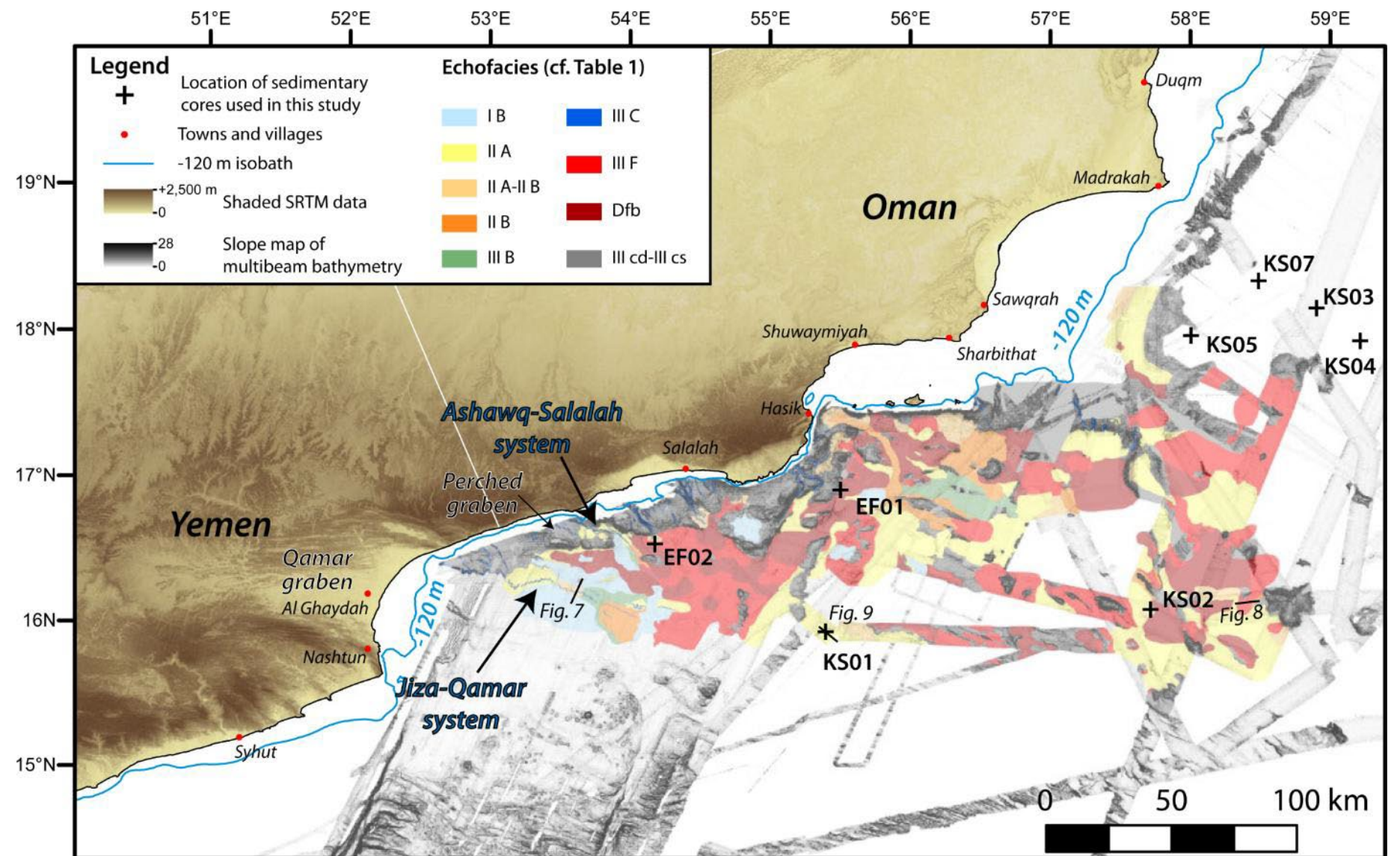
Baurion 2012



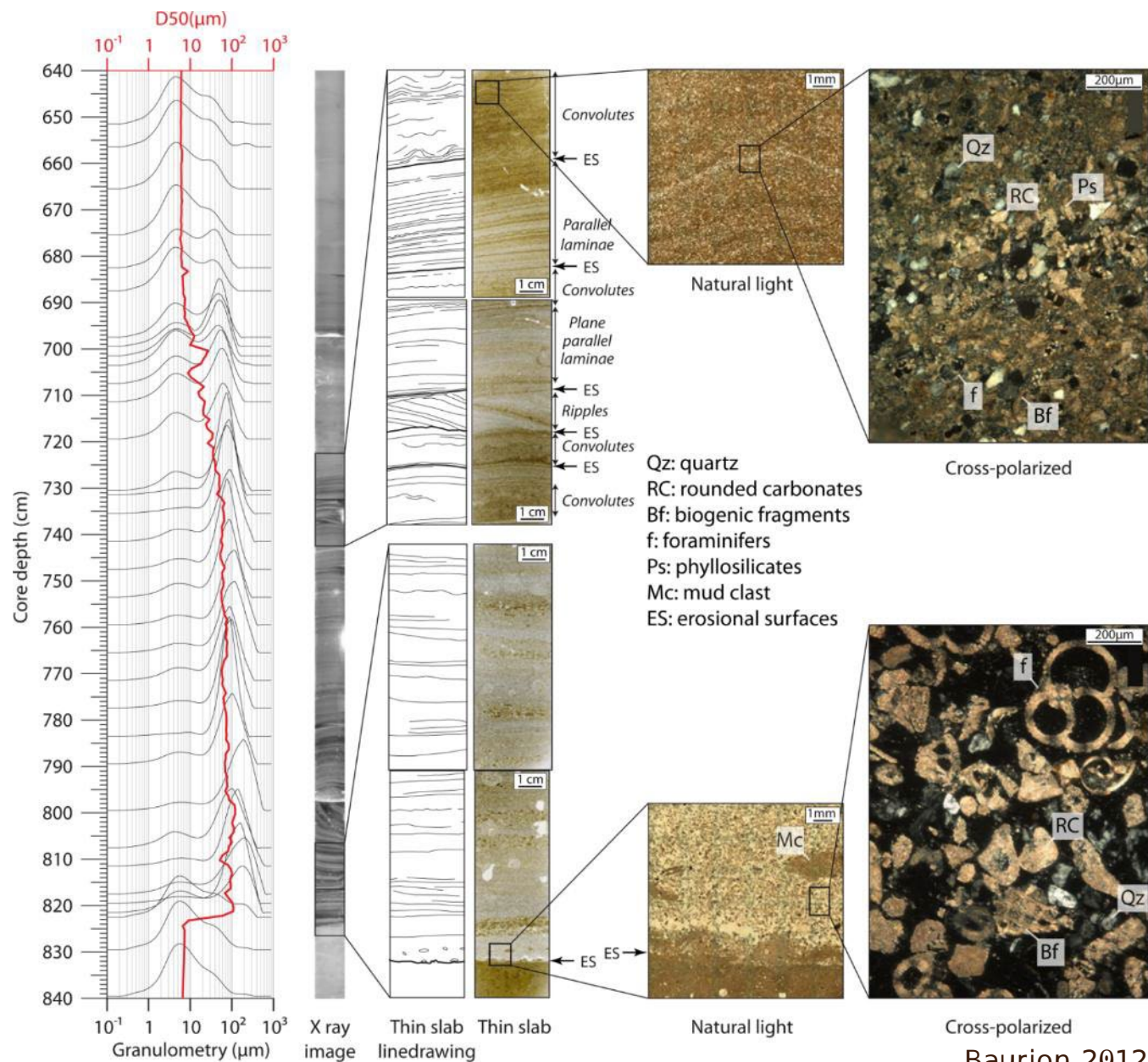


Baurion 2012



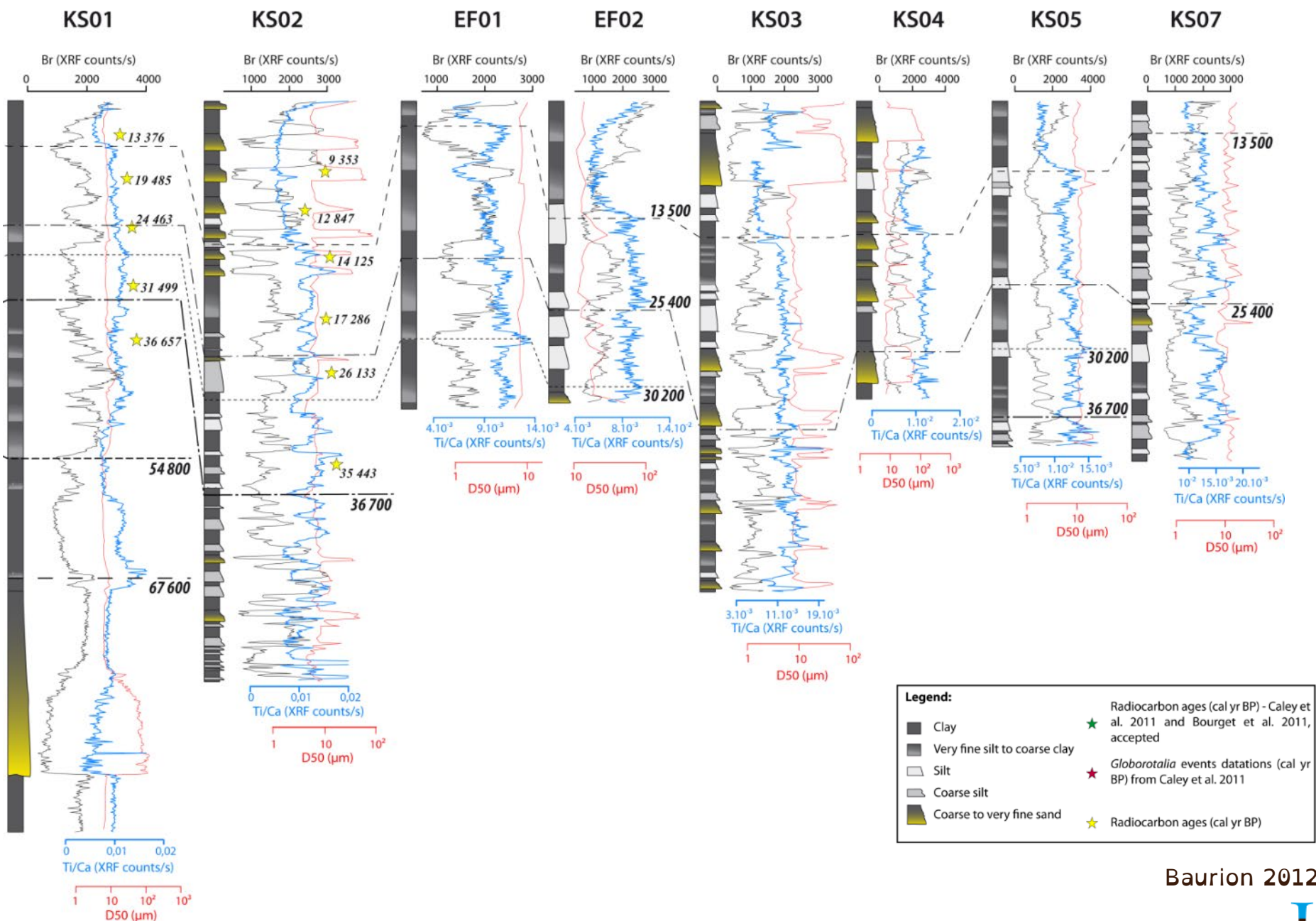


Baurion 2012

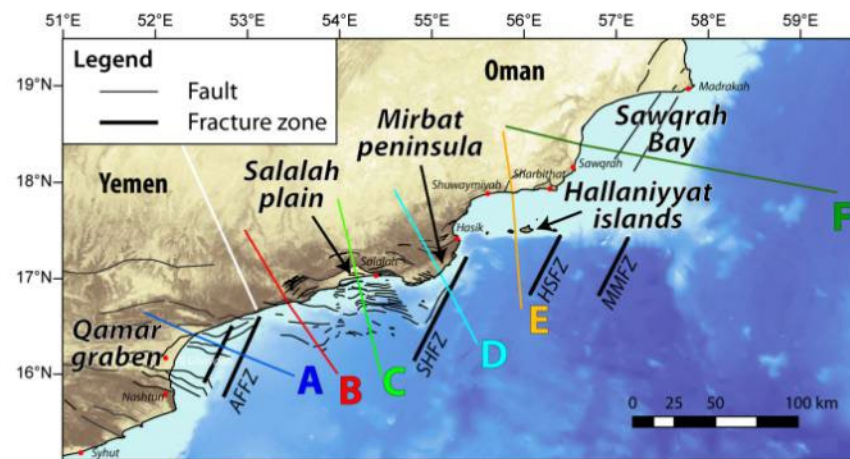
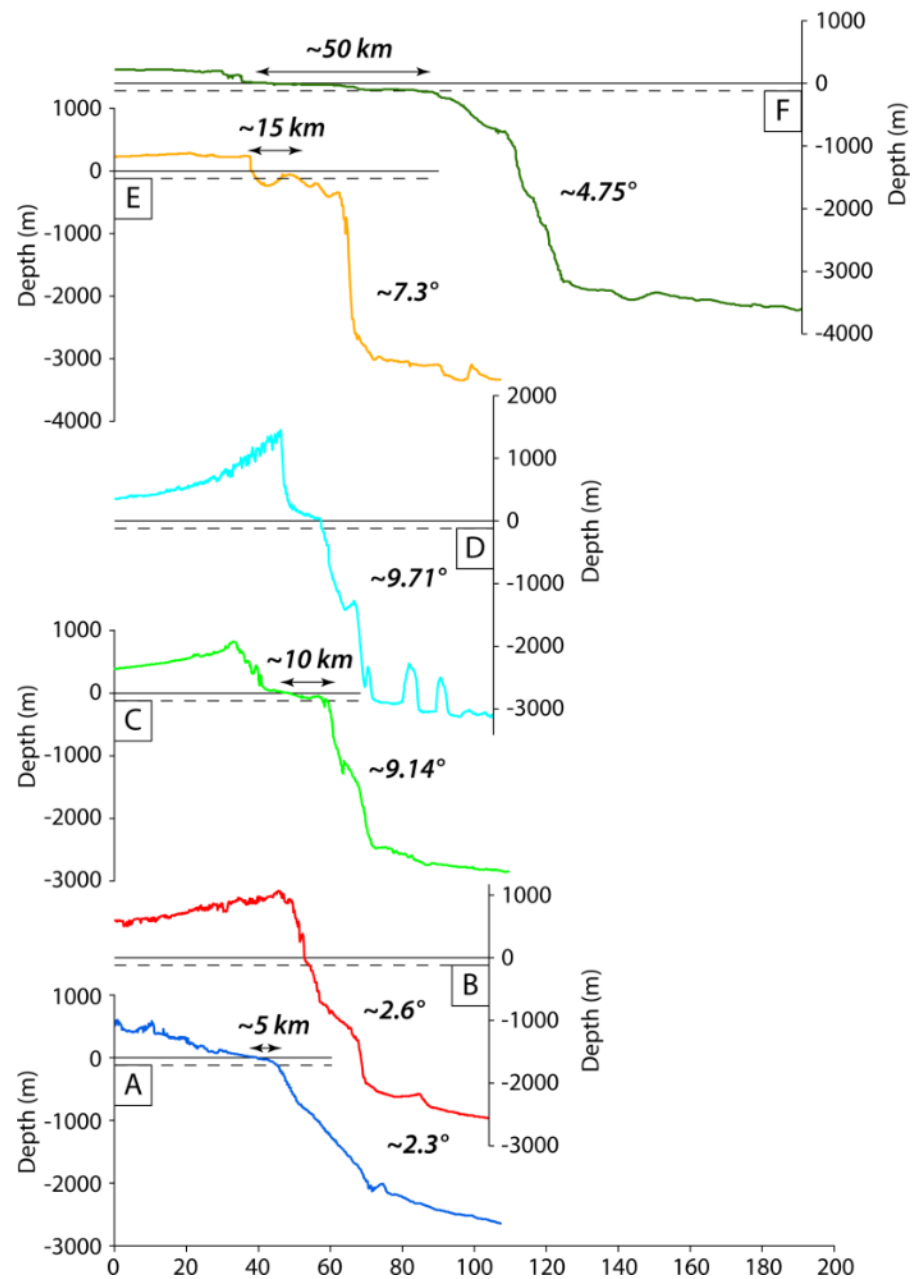


Baurion 2012



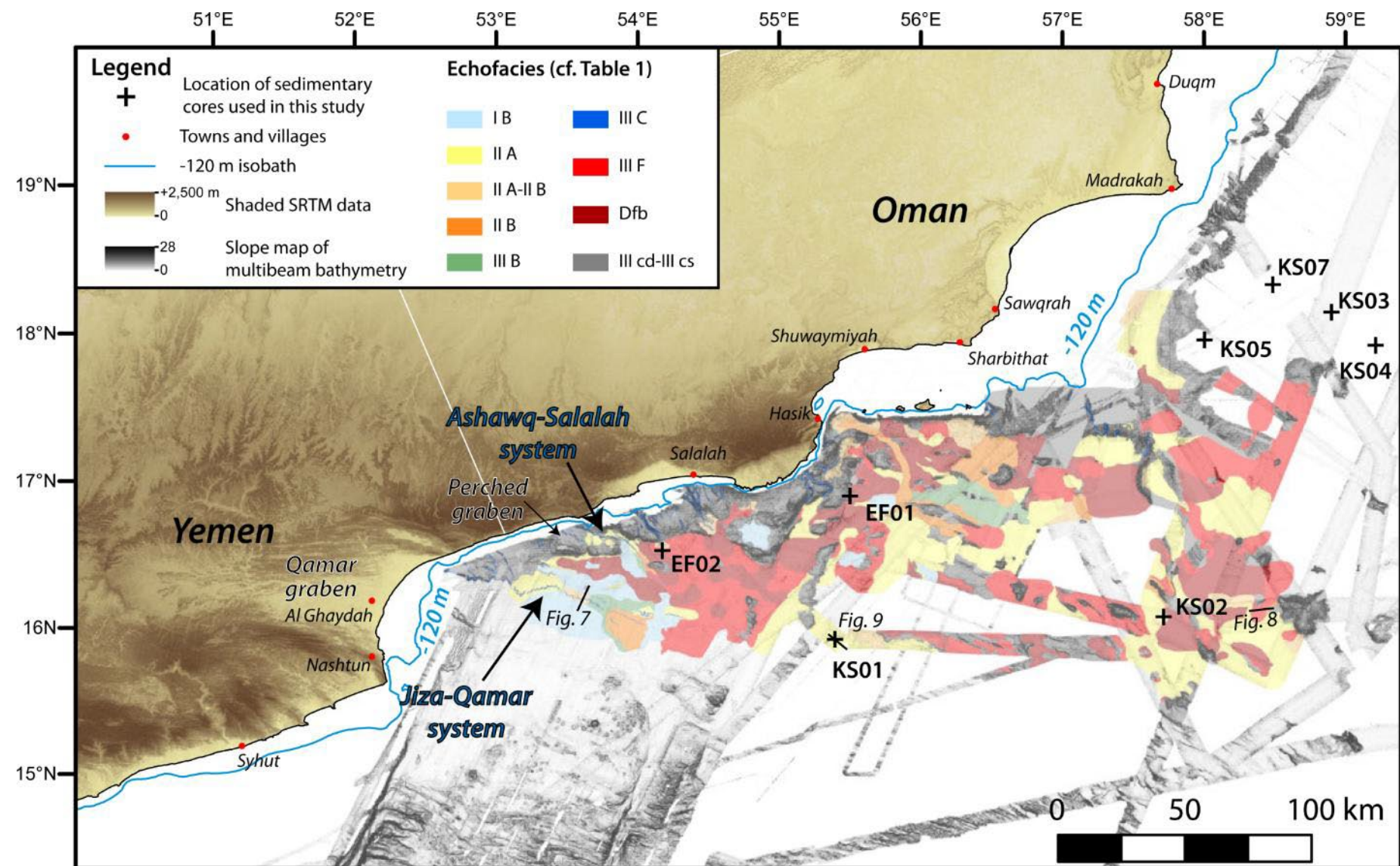


Baurion 2012

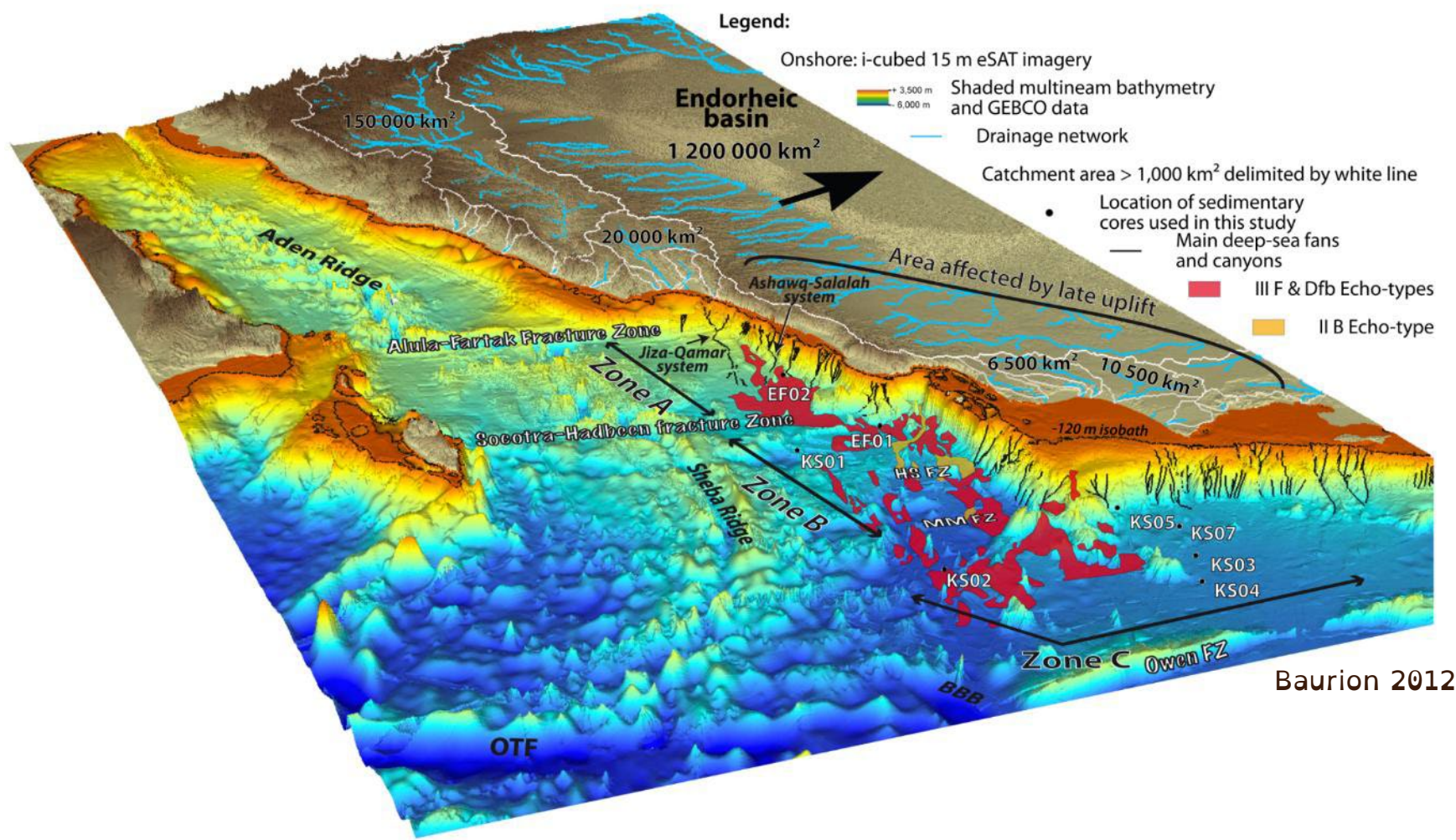


Baurion 2012



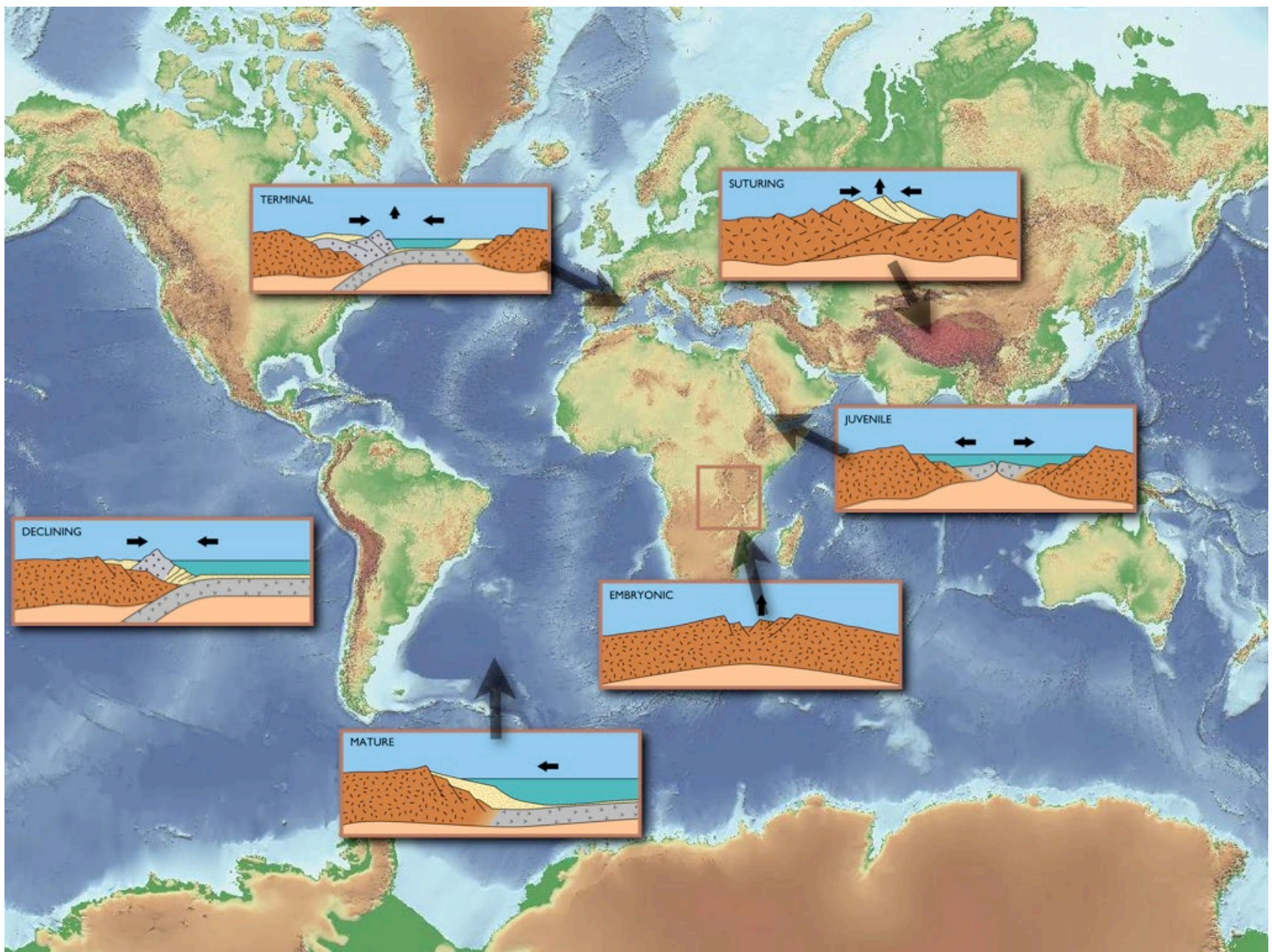


Baurion 2012



Baurion 2012

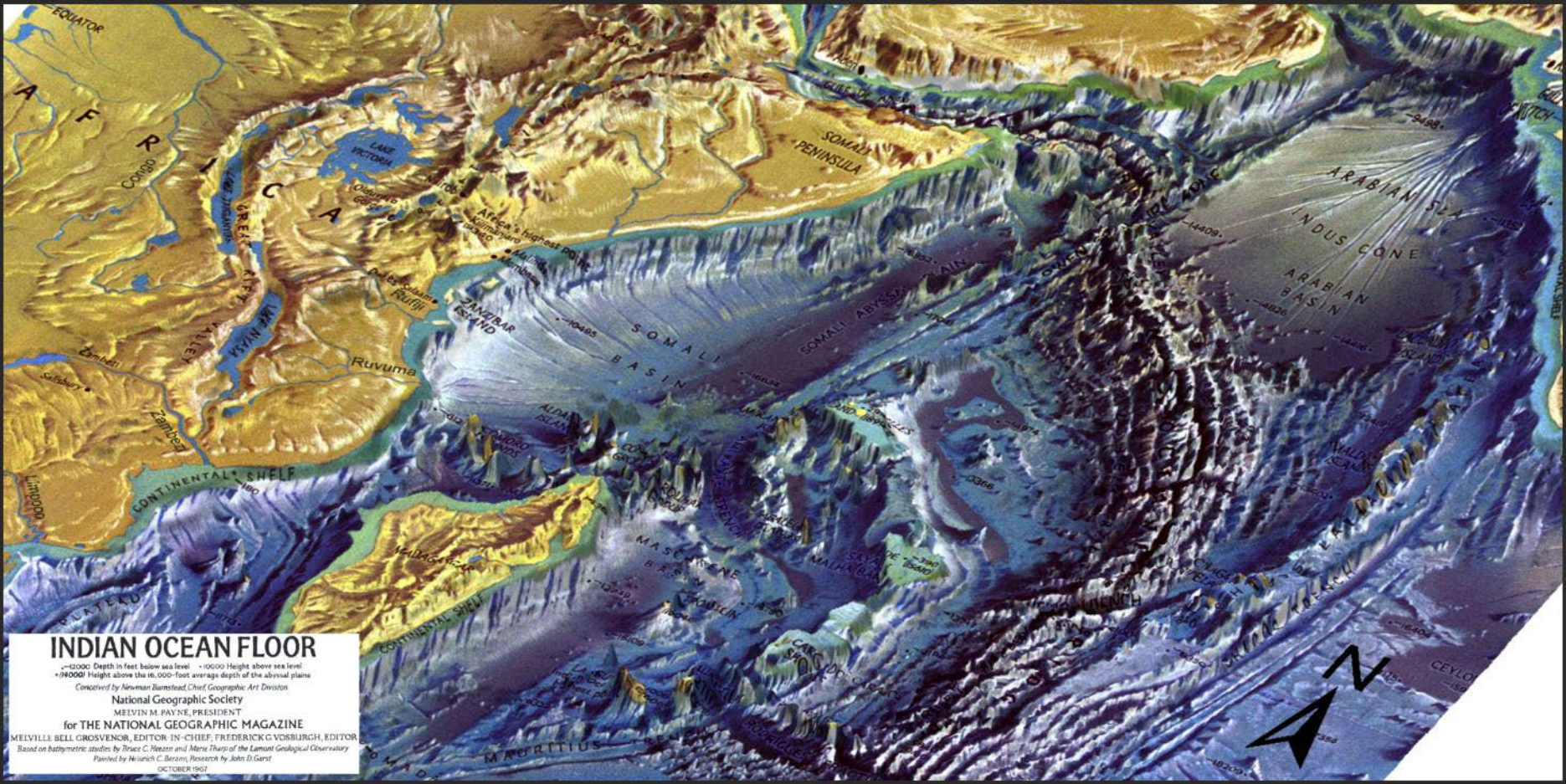




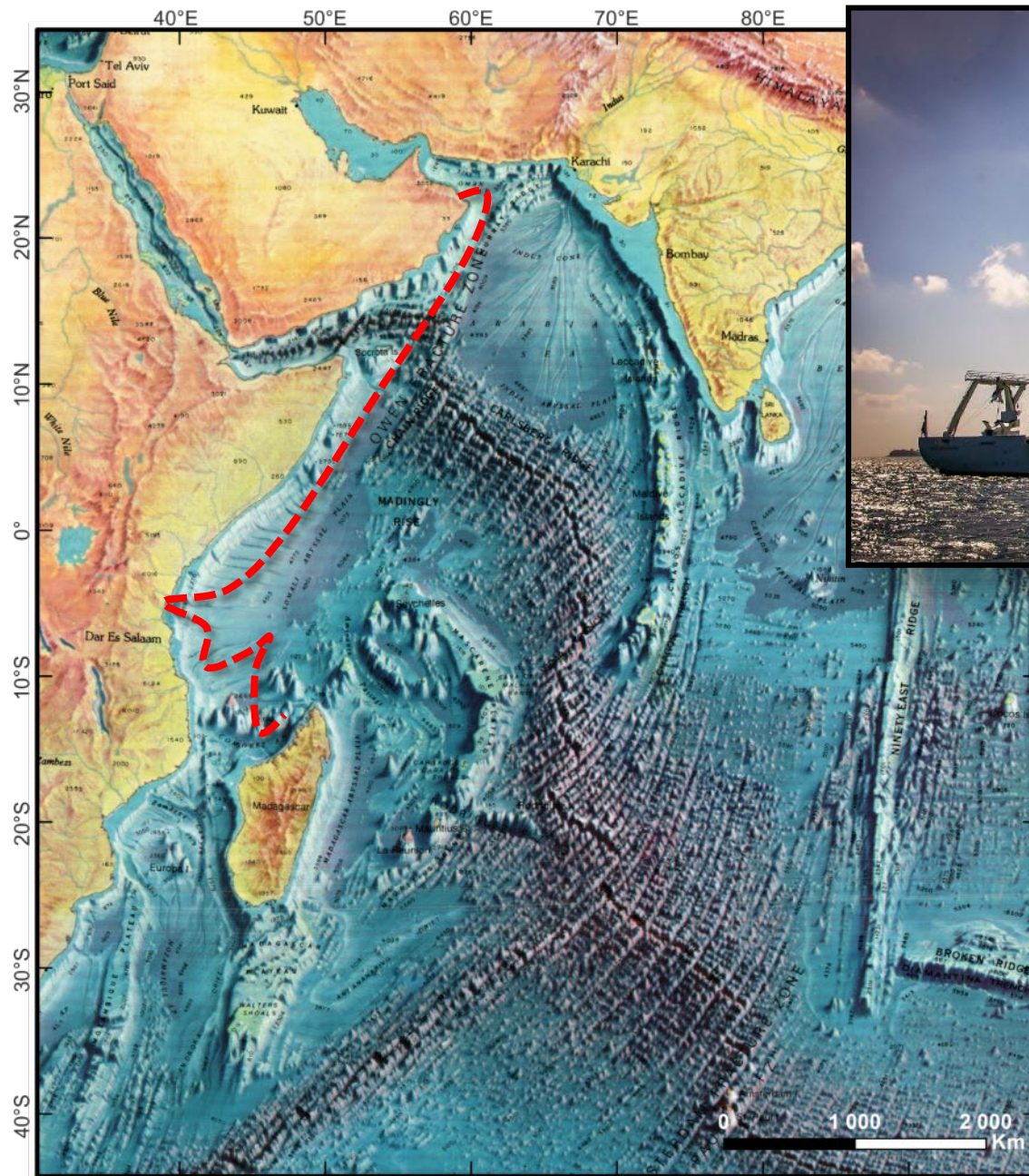
[http://commons.wikimedia.org/wiki/File:Wilson-stages\\_hg.png](http://commons.wikimedia.org/wiki/File:Wilson-stages_hg.png)



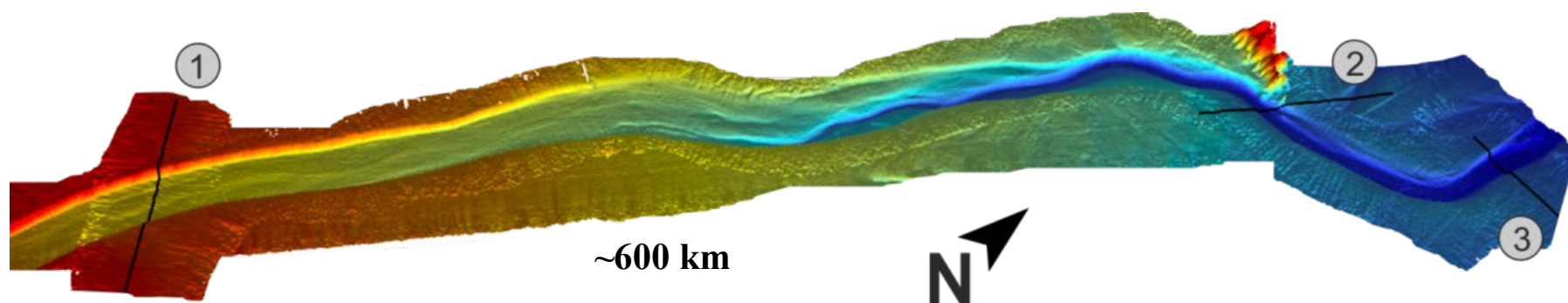
# La marge tanzanienne et les Comores



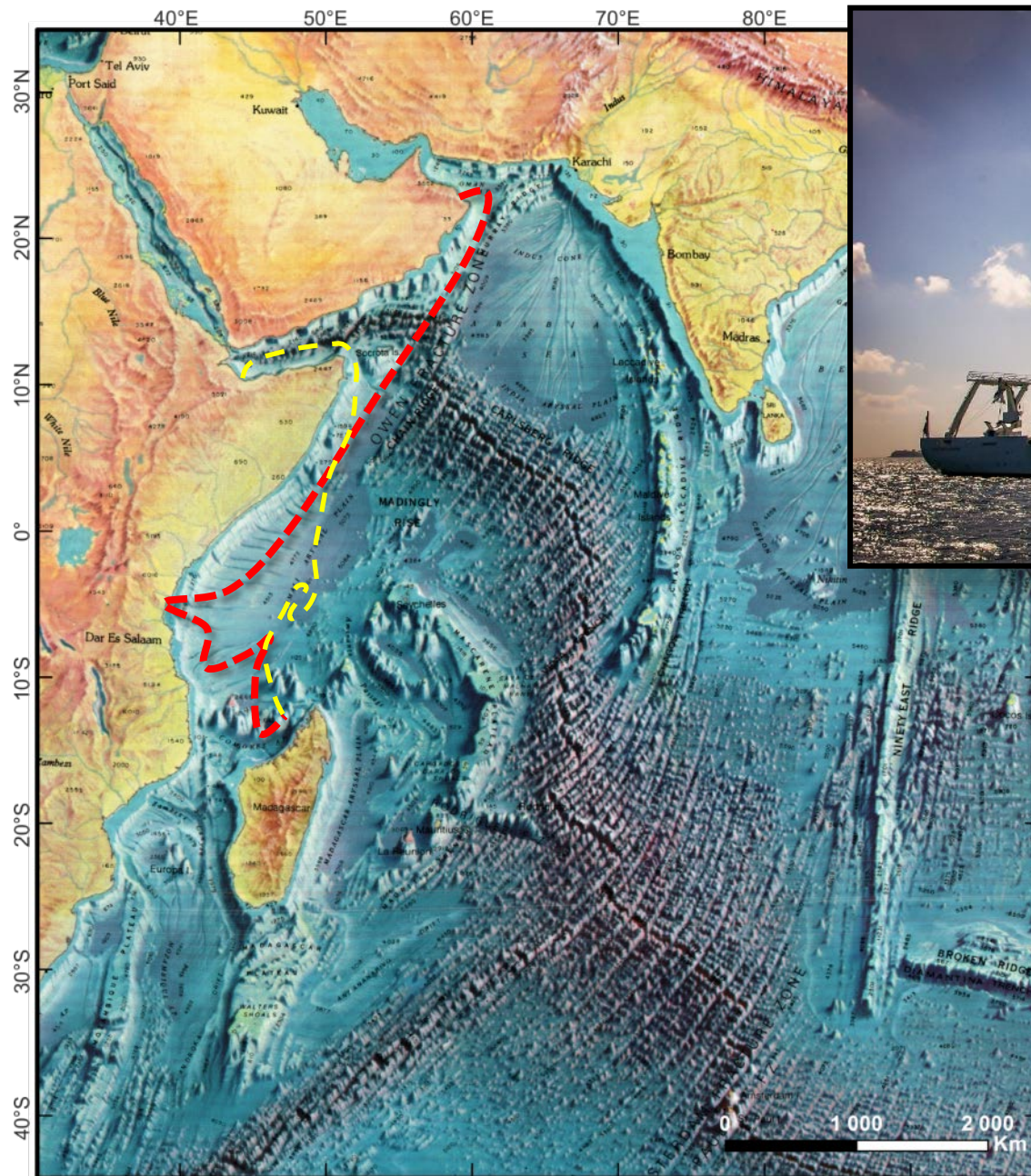




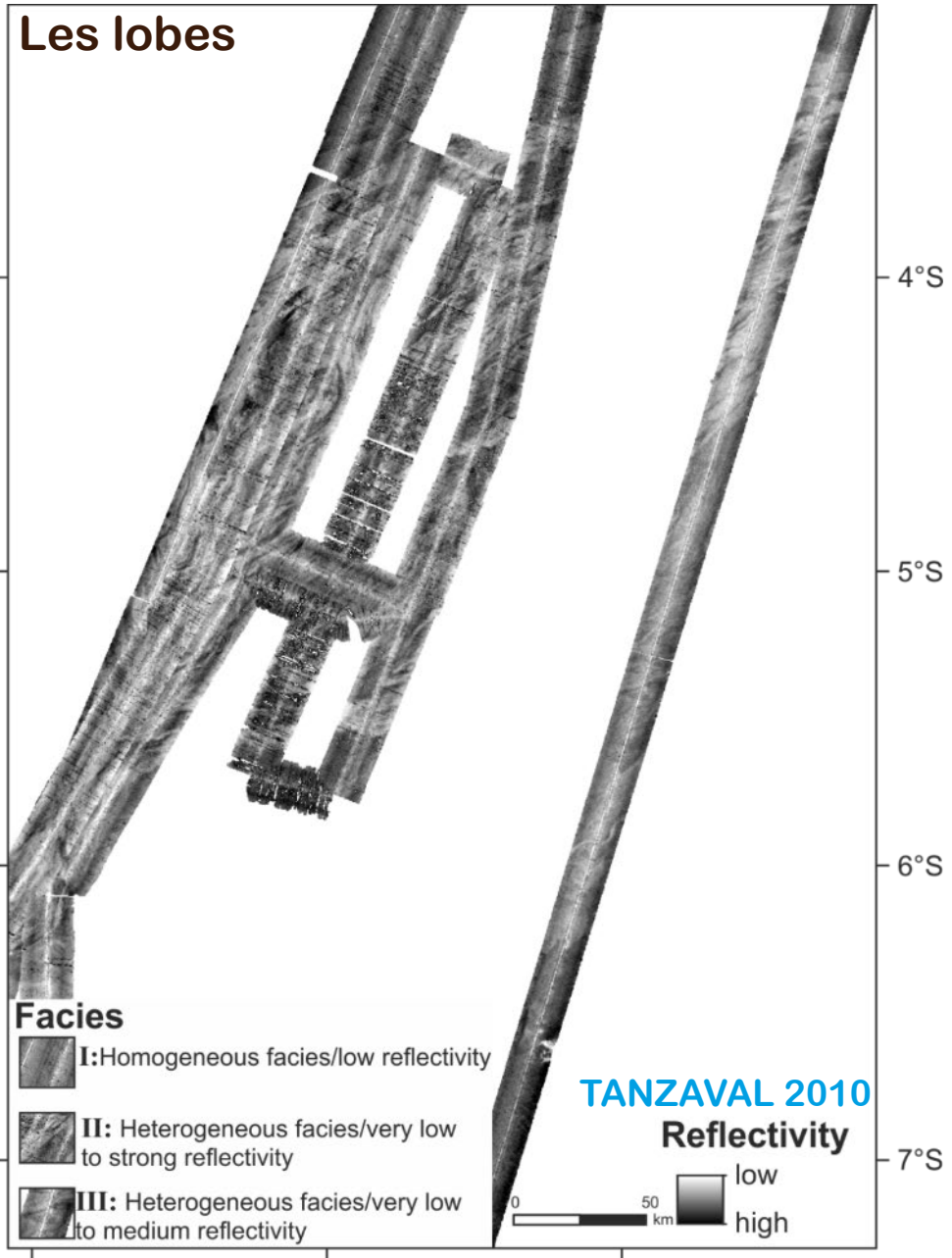
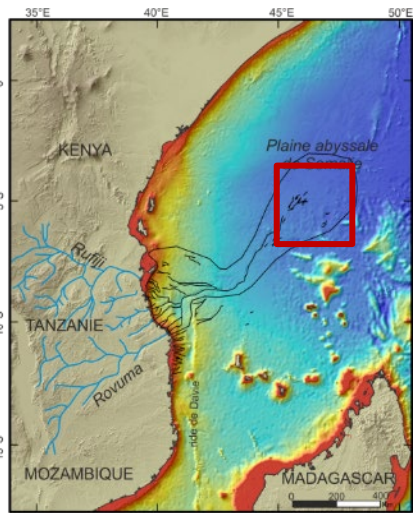
**FANINDIEN 2006**



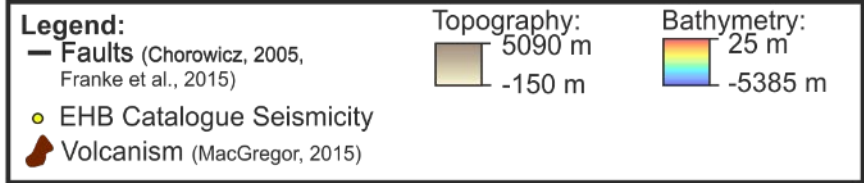
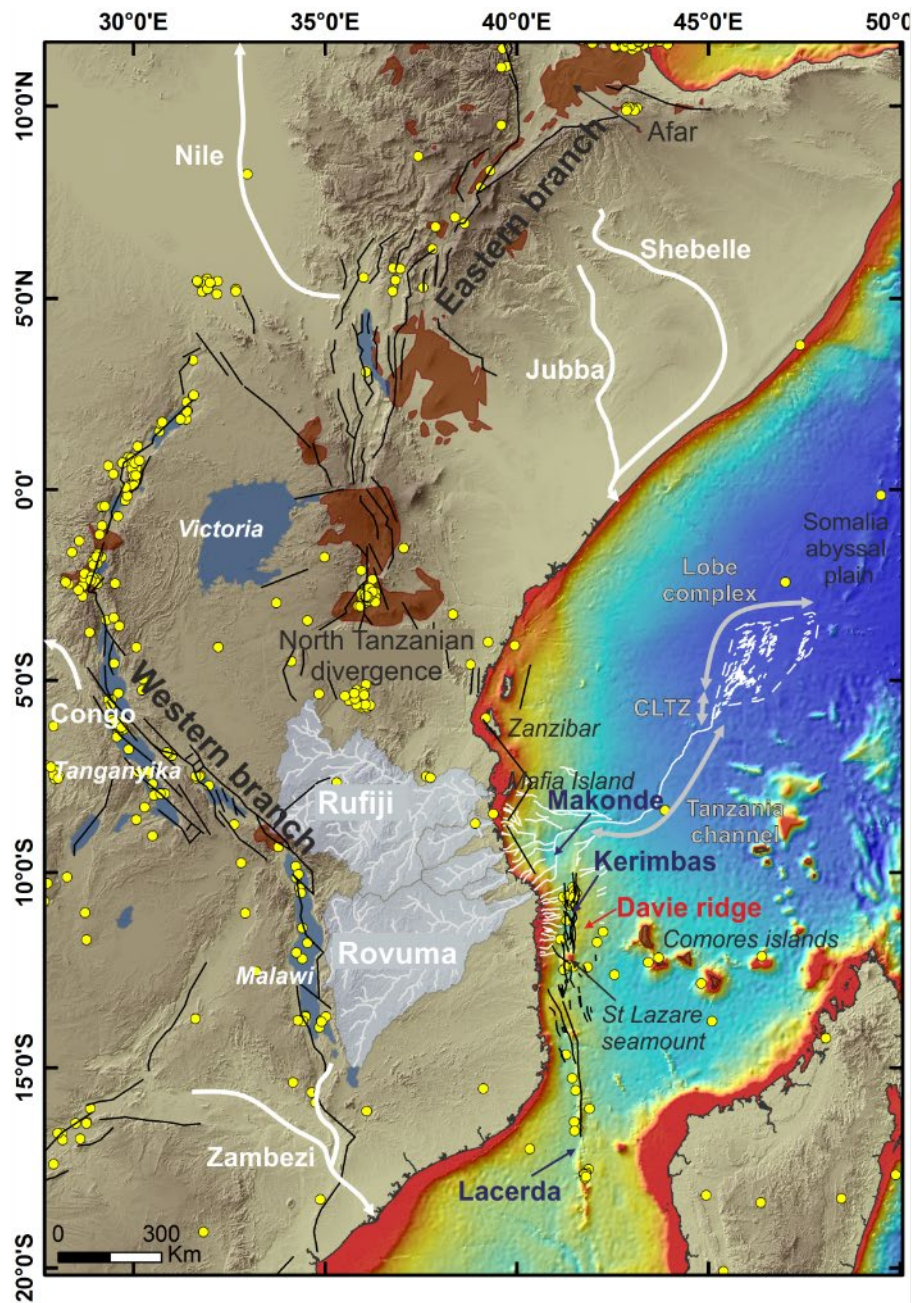




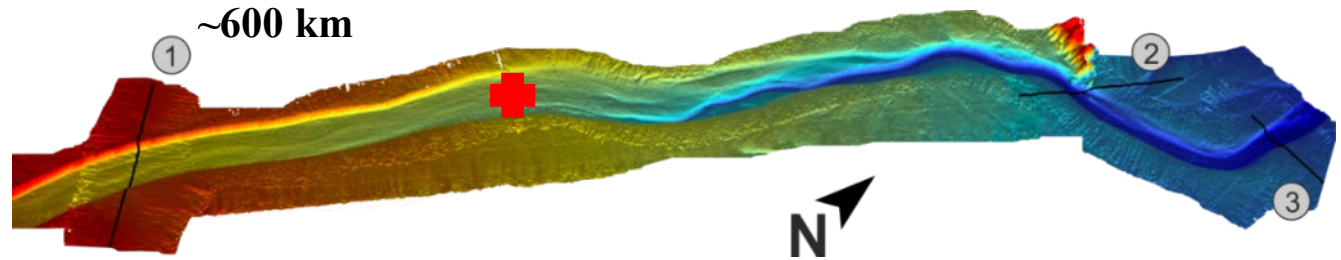
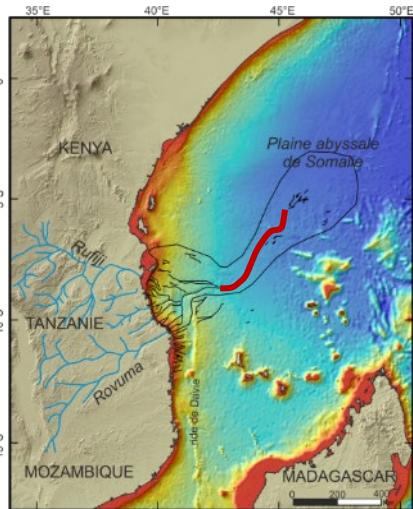
## TANZAVAL 2010



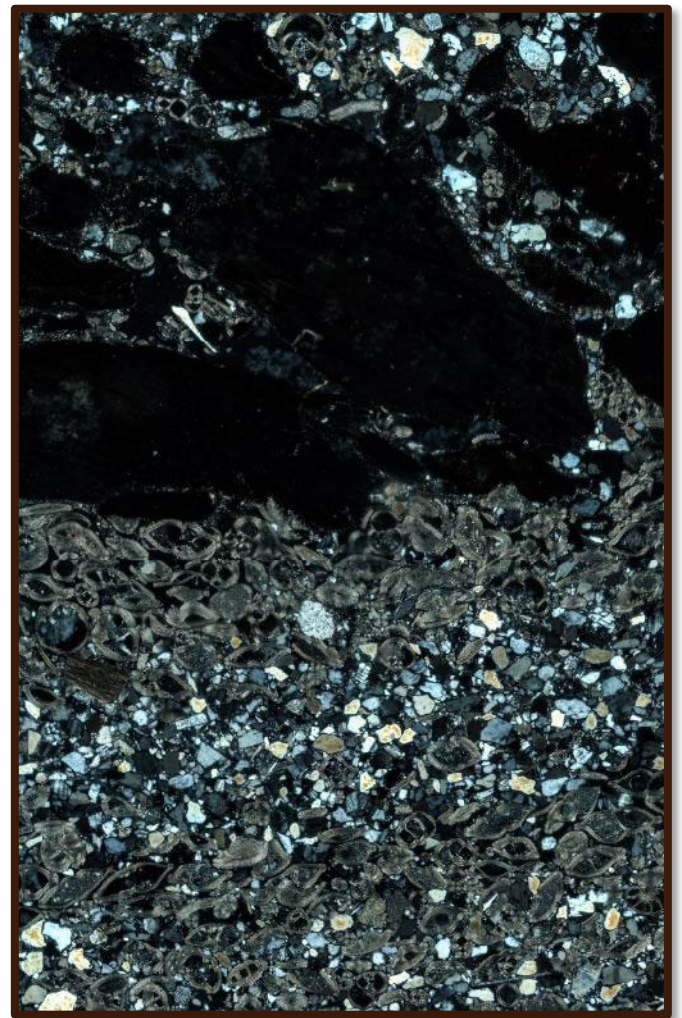
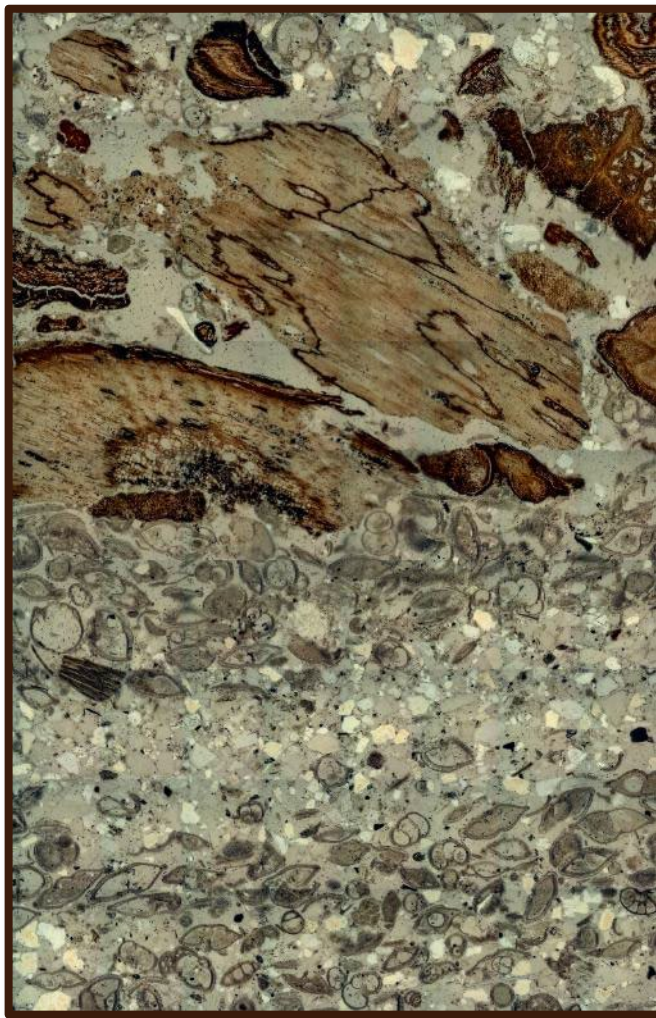
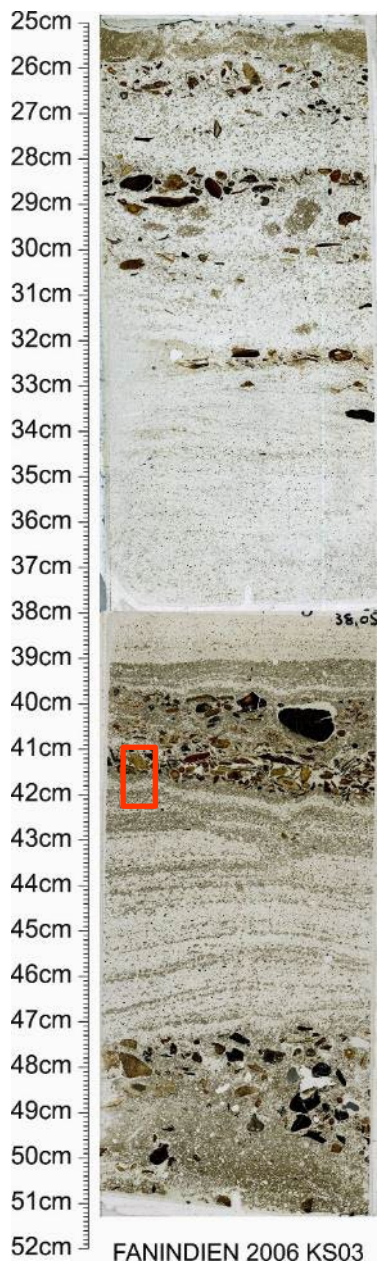




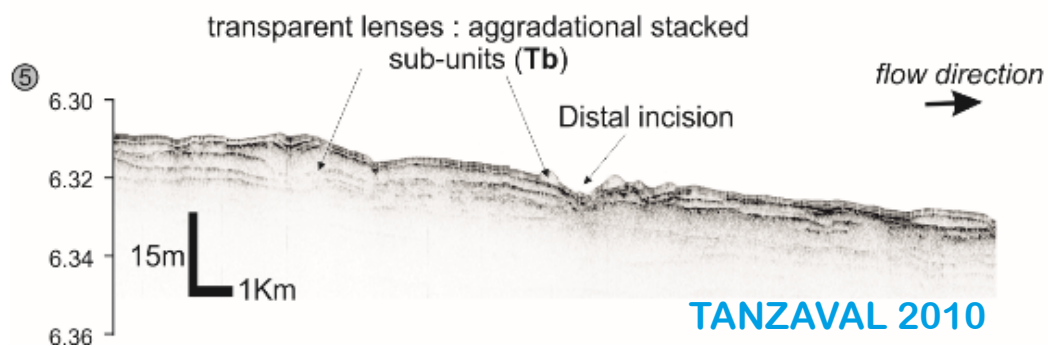
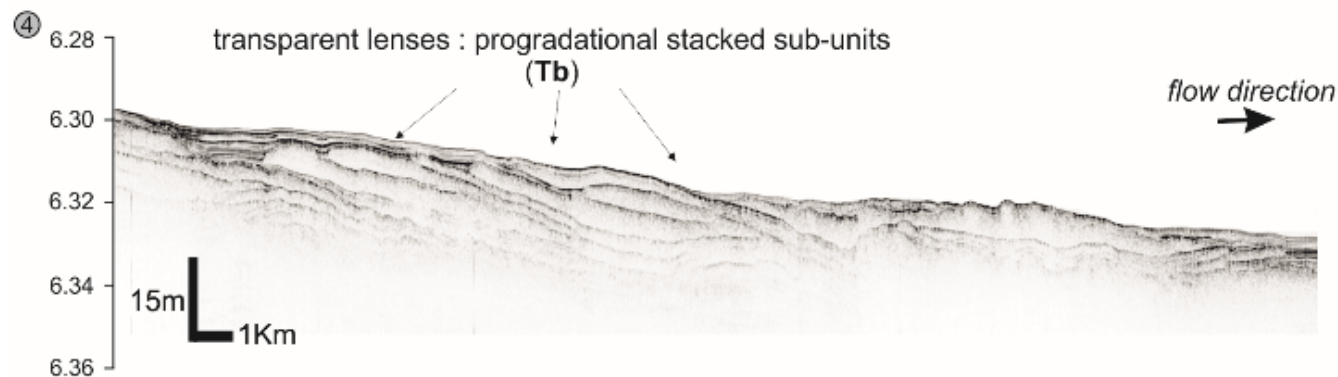
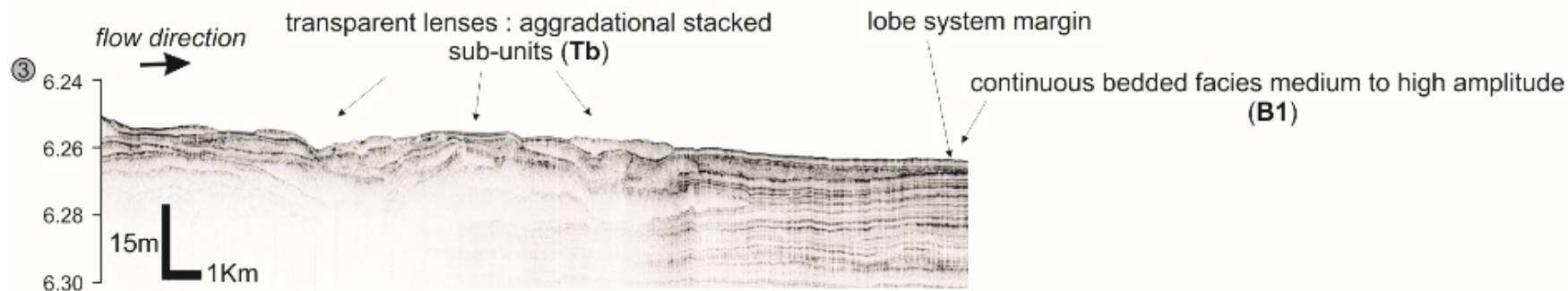
# Le chenal de Tanzanie





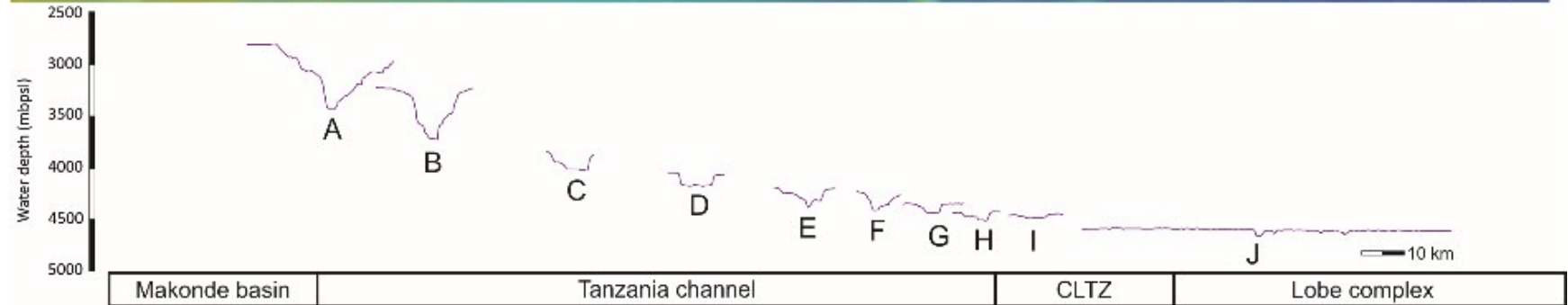
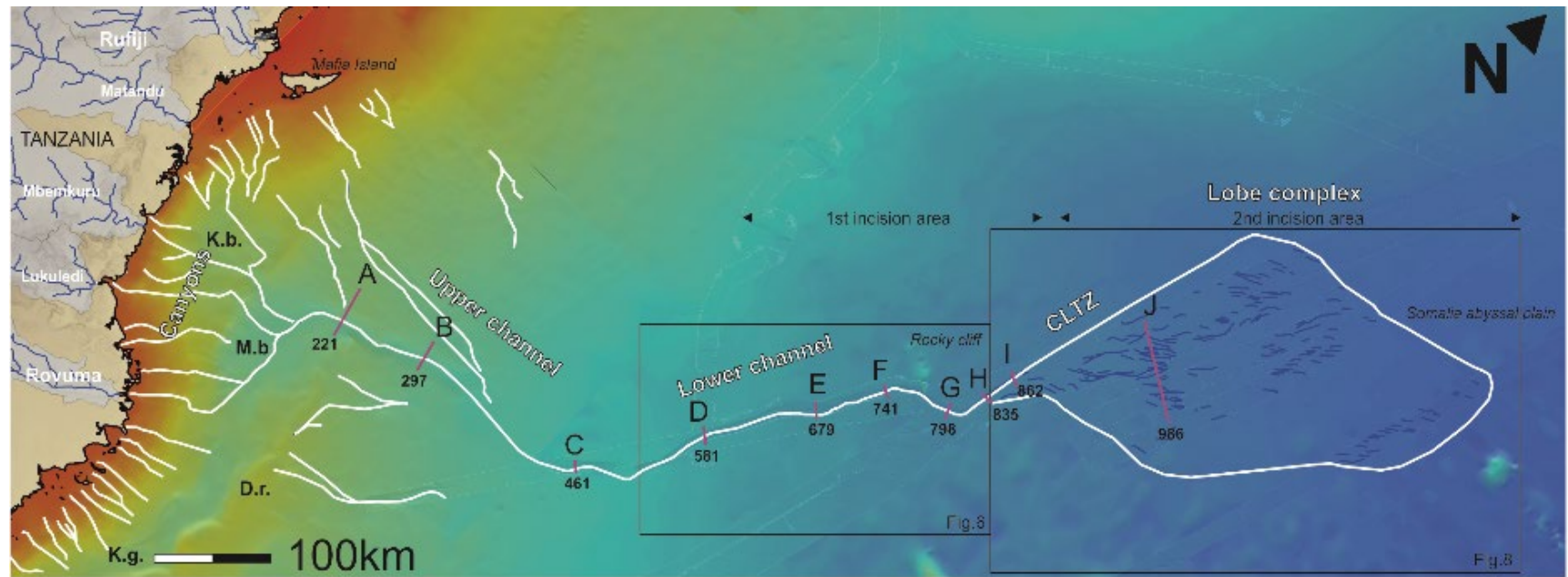


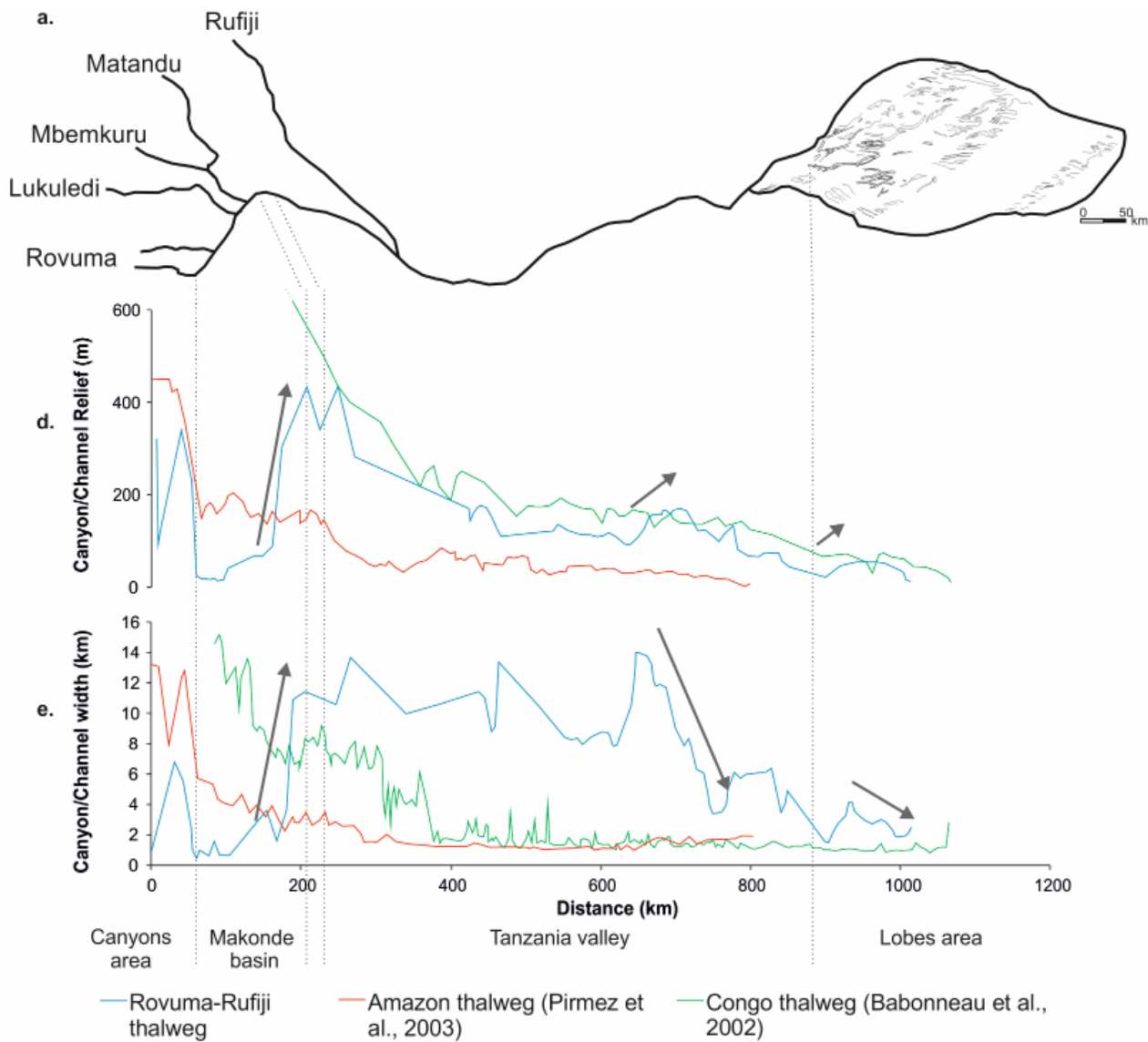
1 cm



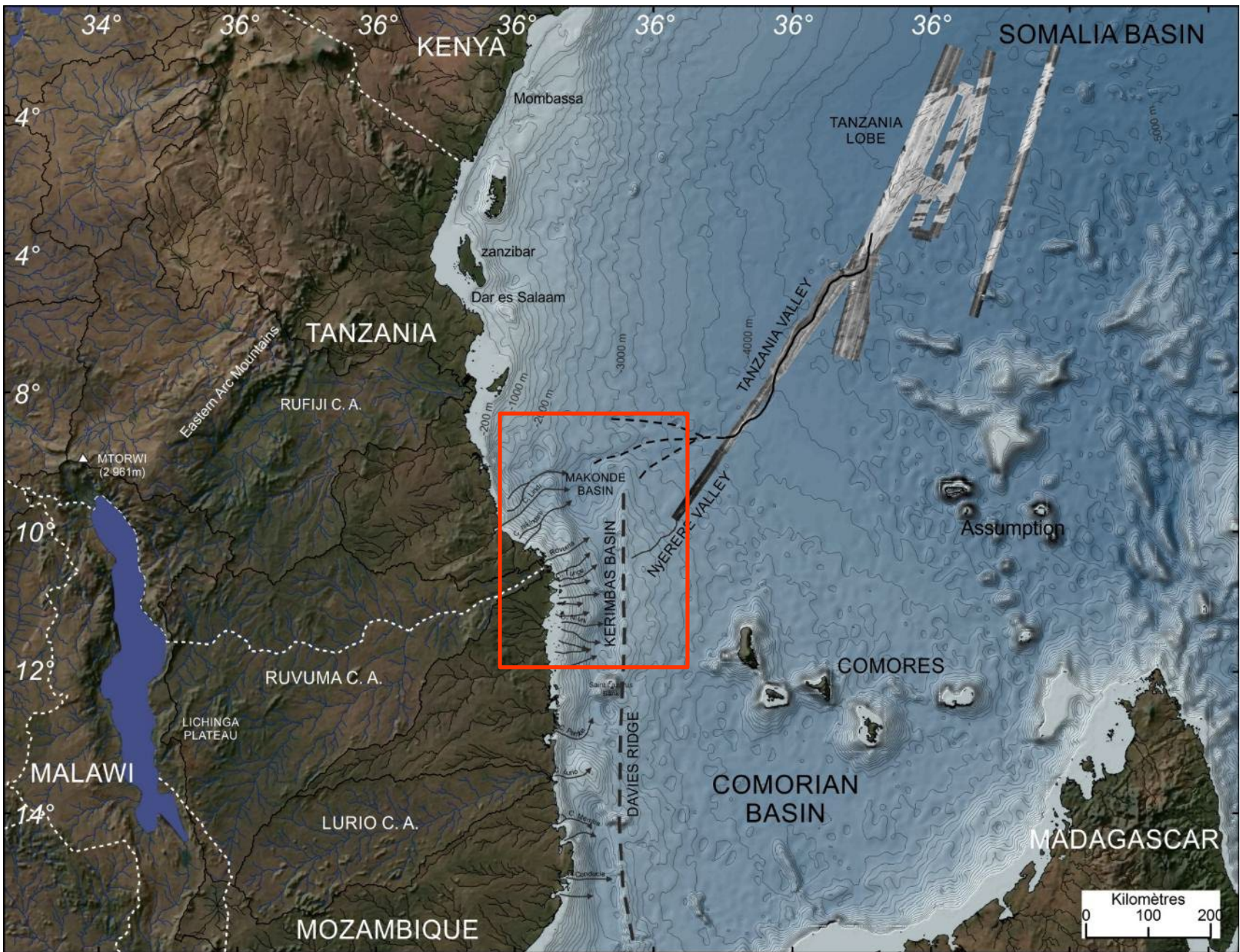
TANZAVAL 2010



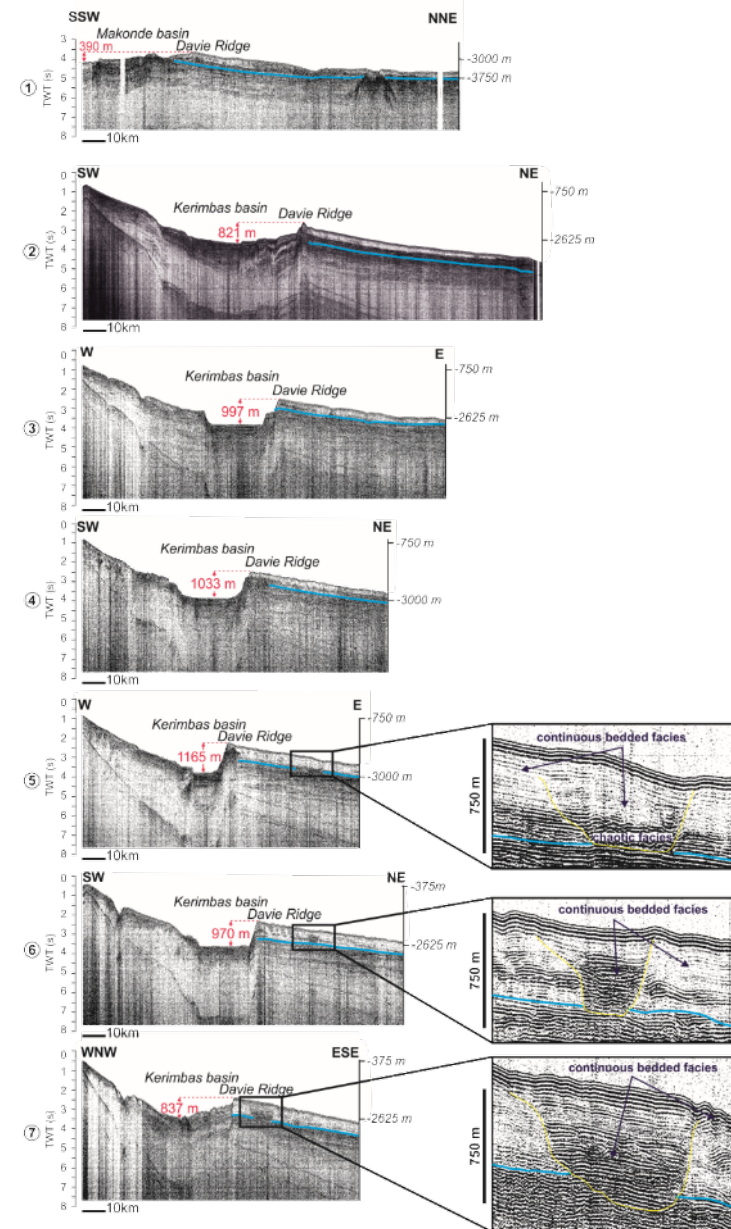
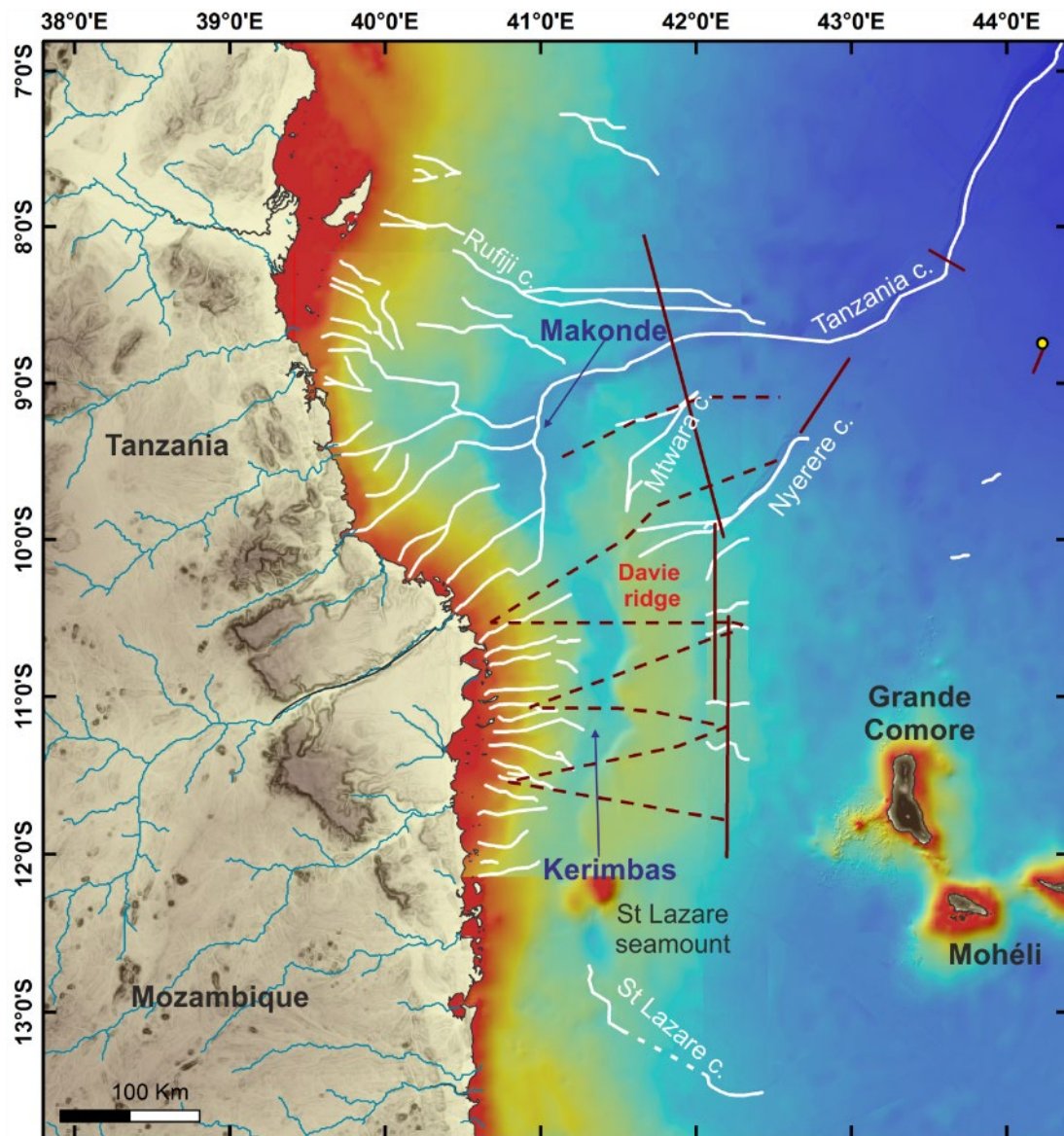








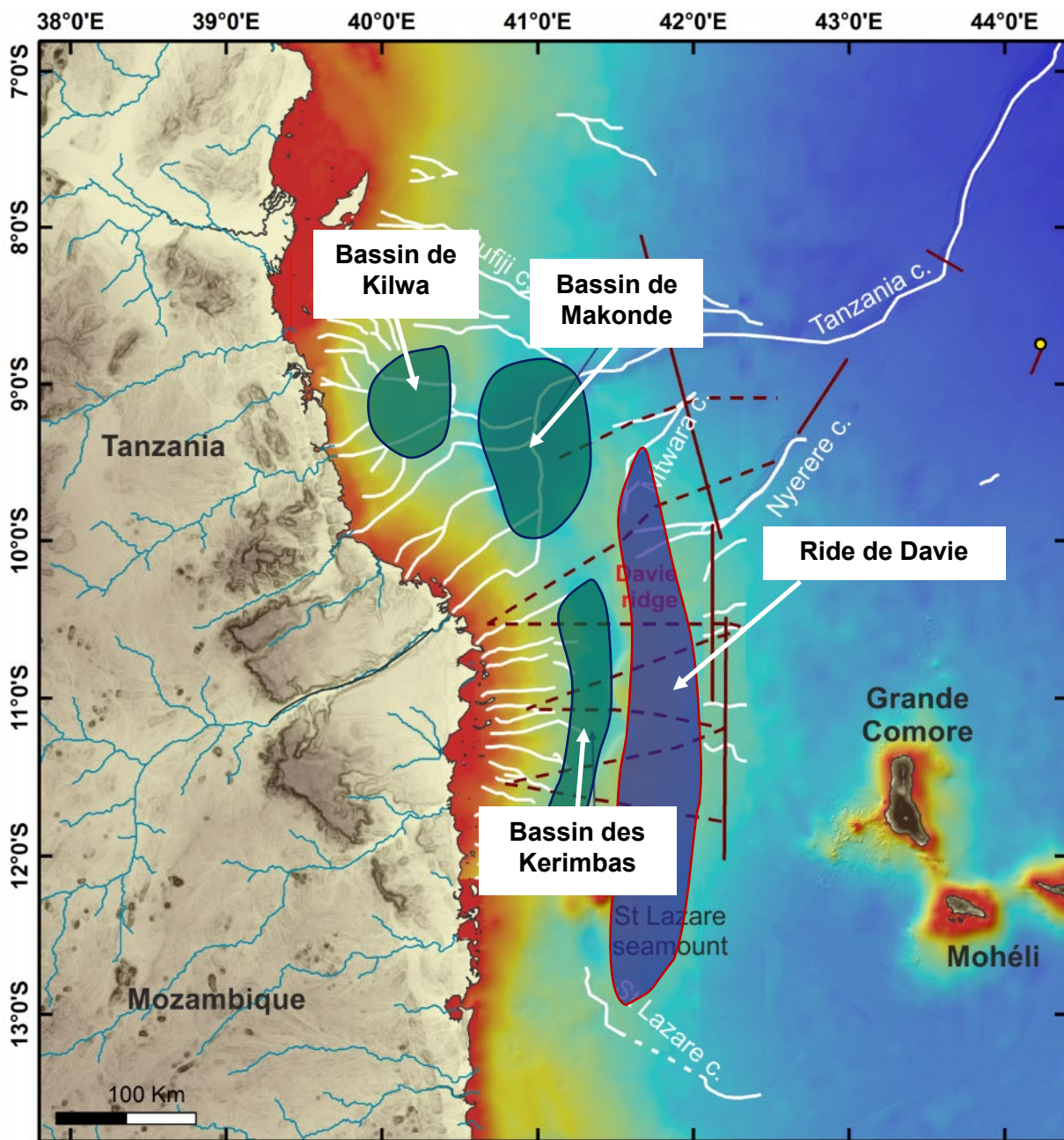


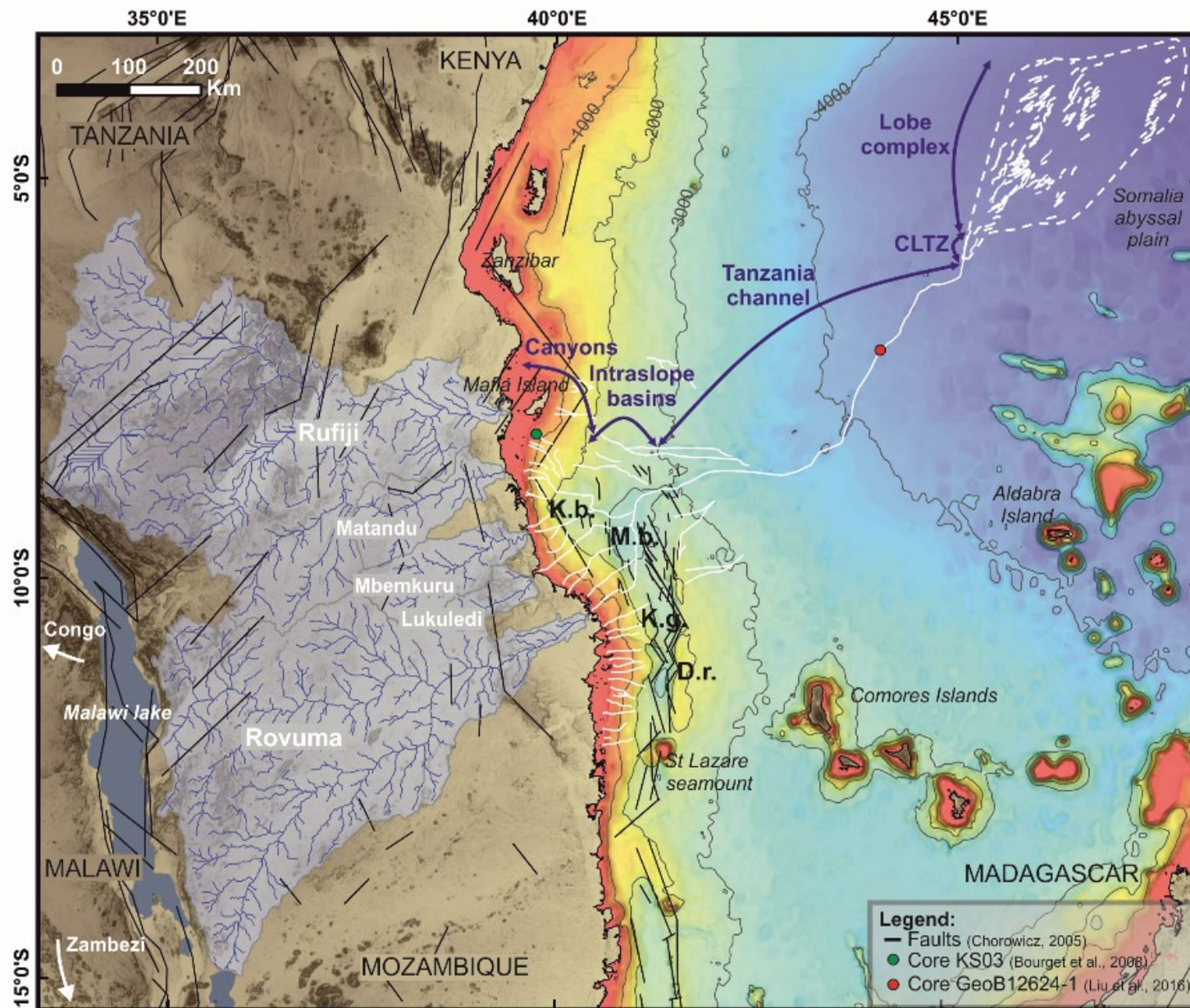


**MACAMO 1984 cruise**

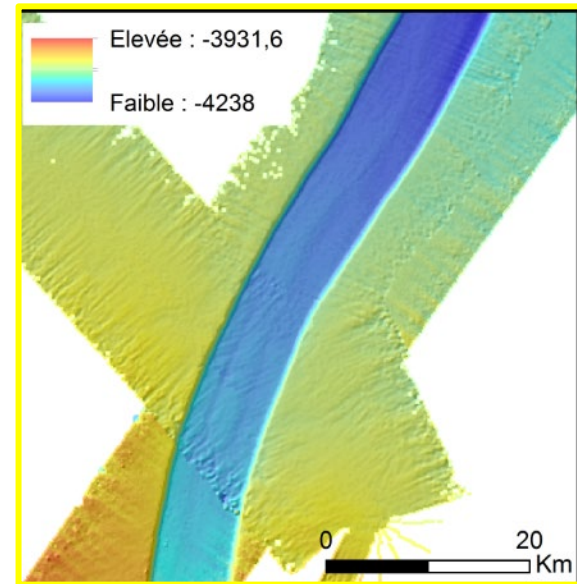
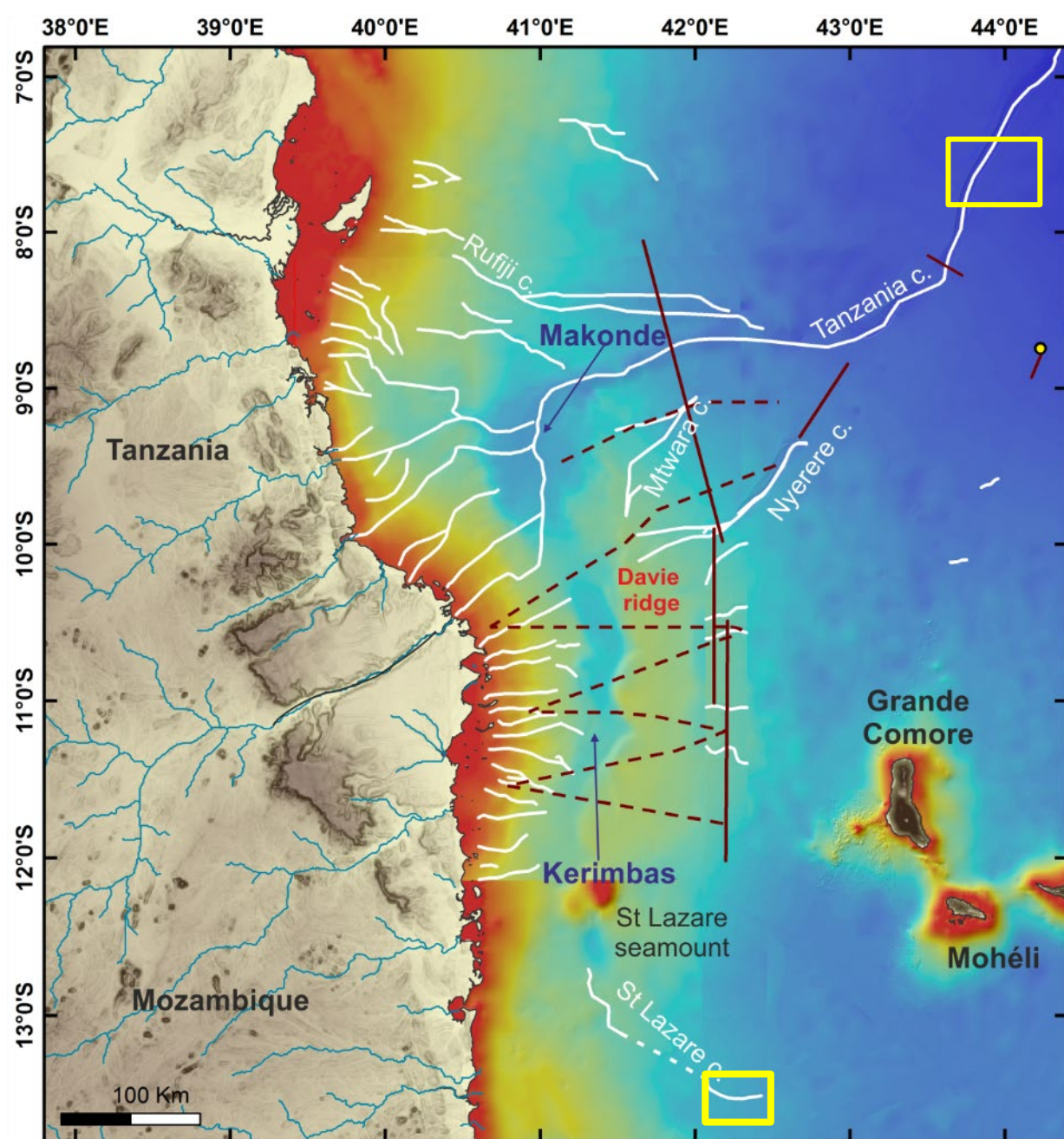
Mougenot, D., M. Recq, P. Virlogeux, et C. Lepvrier. 1986  
 « SEAWARD EXTENSION OF THE EAST-AFRICAN RIFT », *Nature* 321, n° 6070: 599-603.



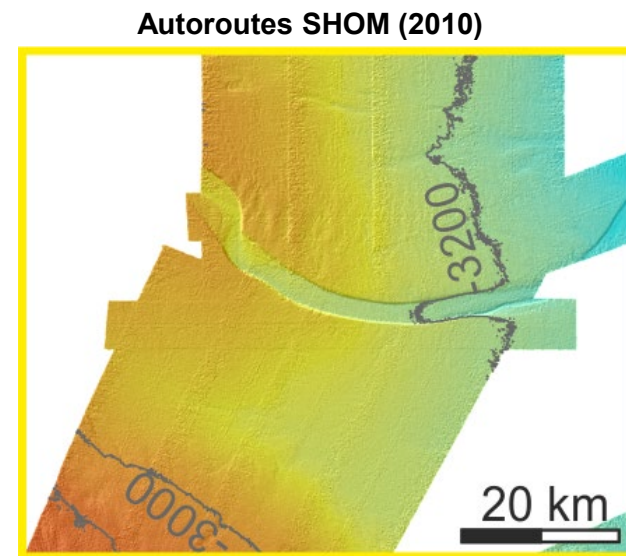






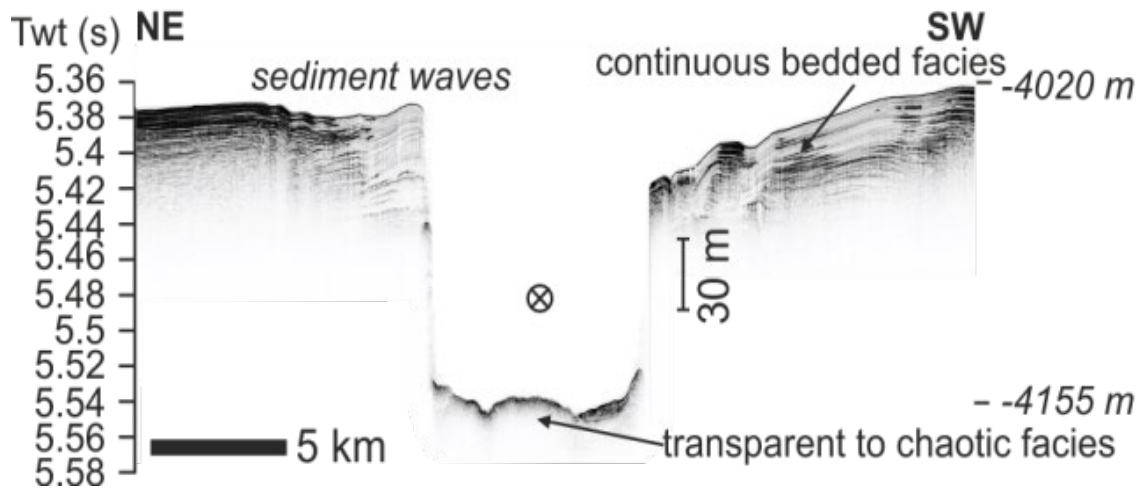


FanIndien (2006)



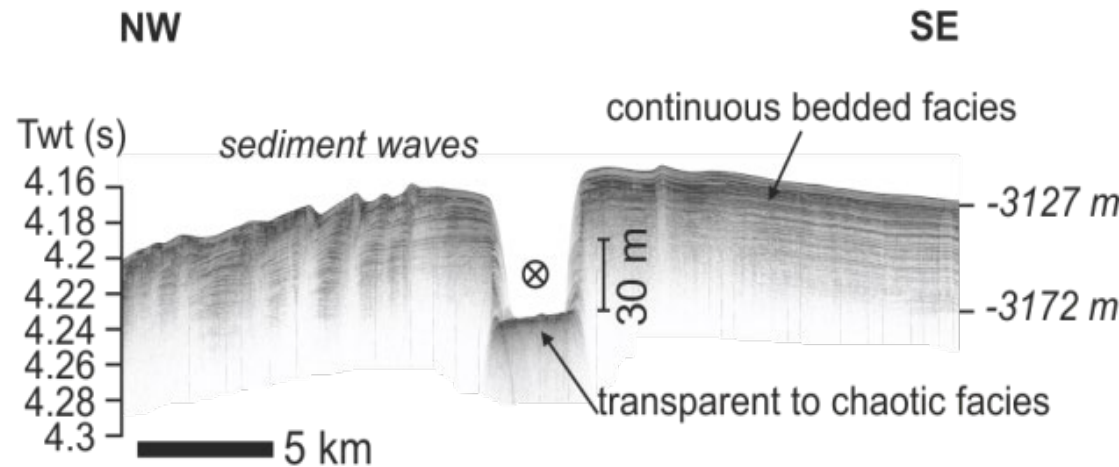
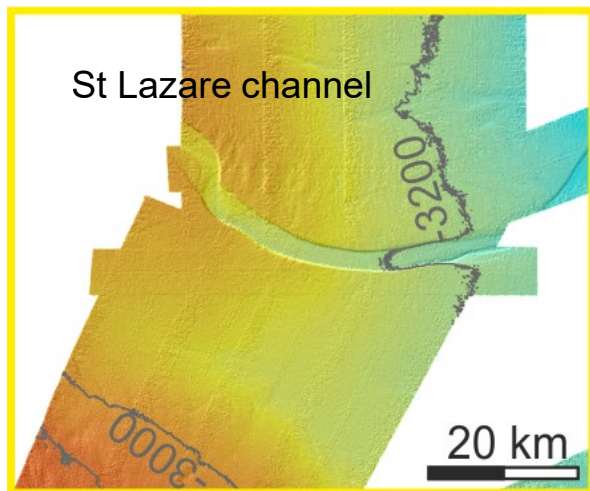
Autoroutes SHOM (2010)

## Tanzania channel

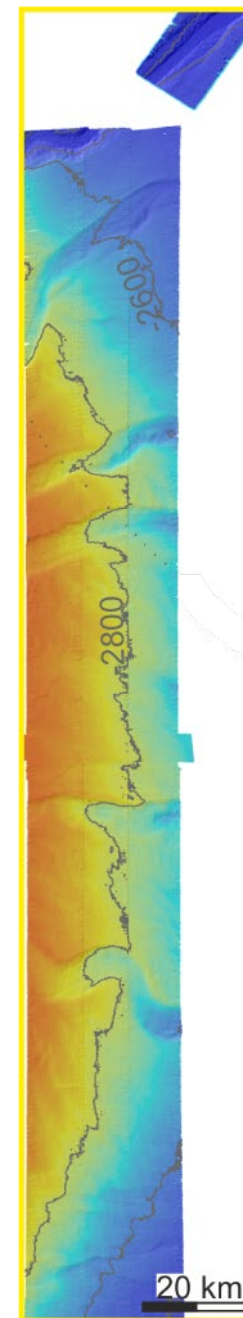
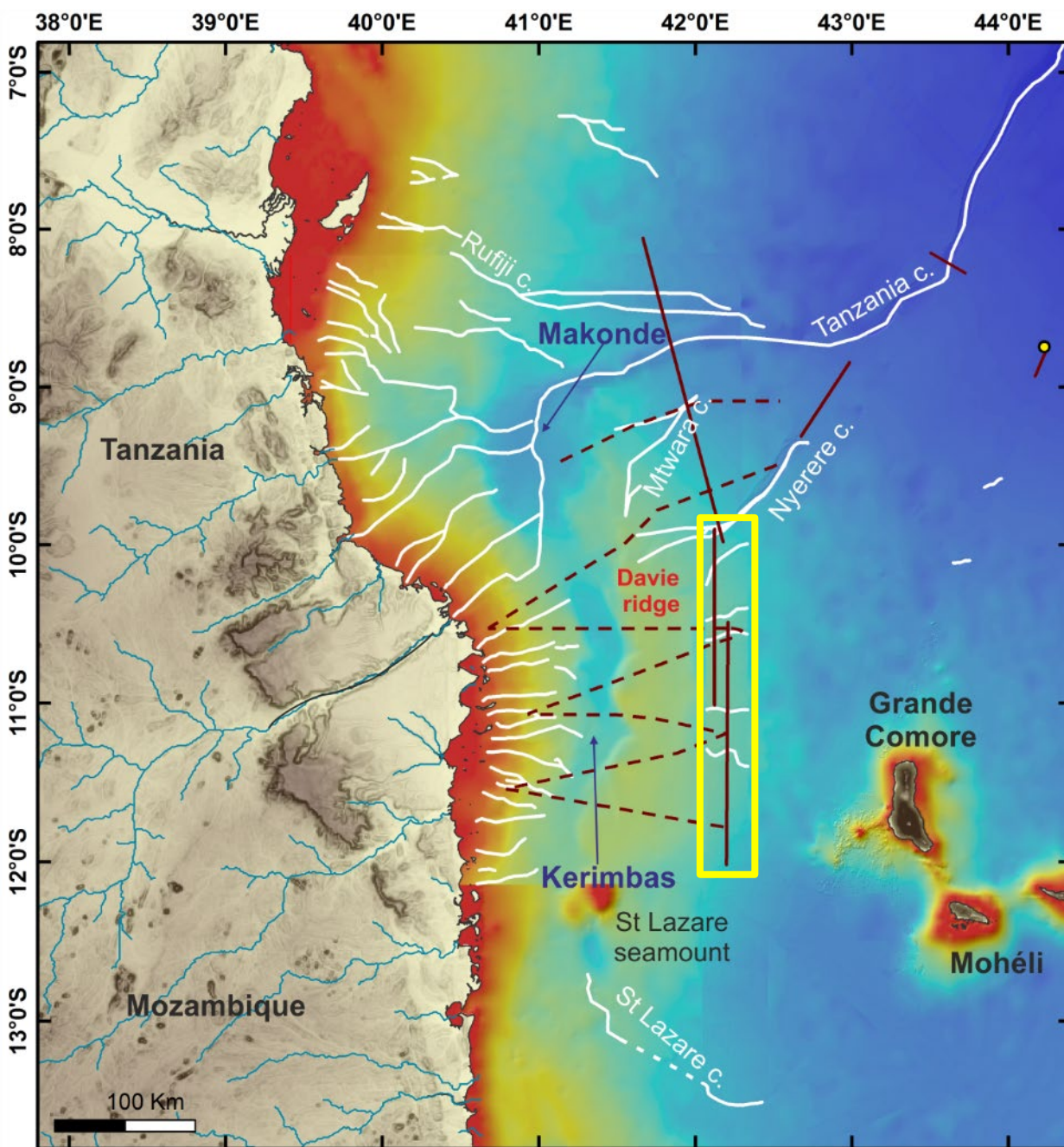


## St Lazare channel

Autoroutes SHOM (2010)

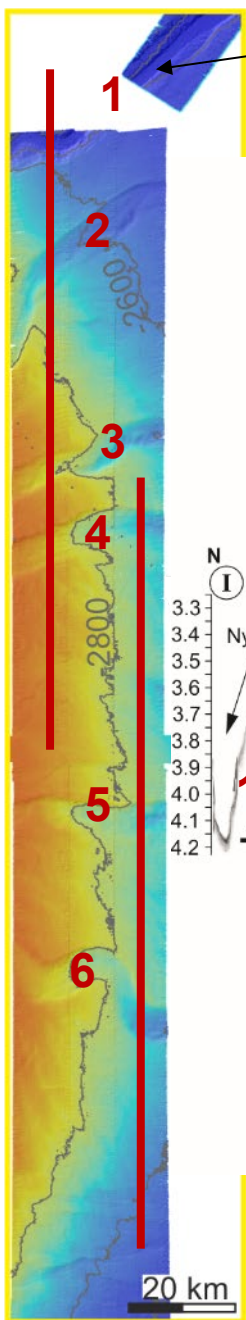




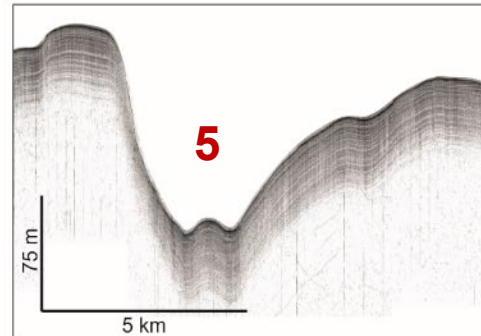
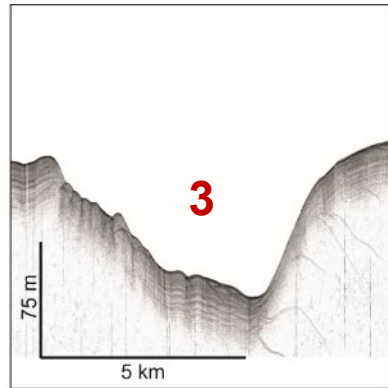


Autoroutes SHOM (2010)

Chenal de Nyerere



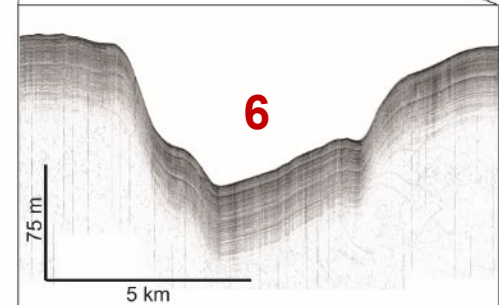
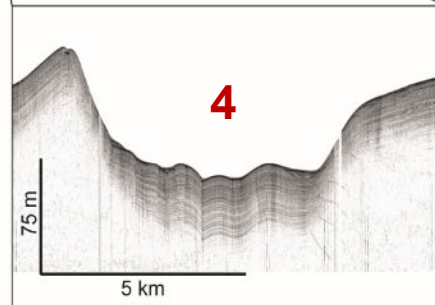
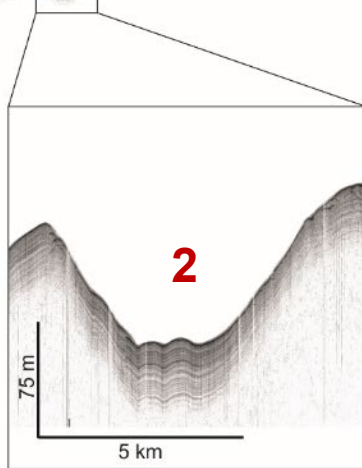
N  
I  
3.3  
3.4  
3.5  
3.6  
3.7  
3.8  
3.9  
4.0  
4.1  
4.2  
Nyerere  
10 km



Continuous bedded facies :  
hemipelagic/turbiditic sedimentation

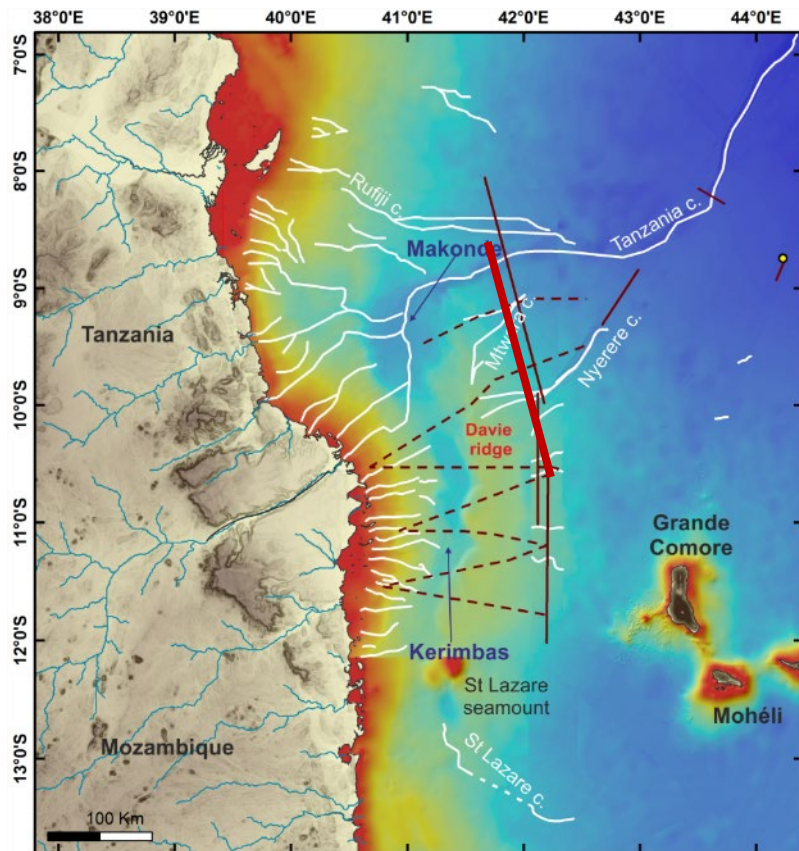
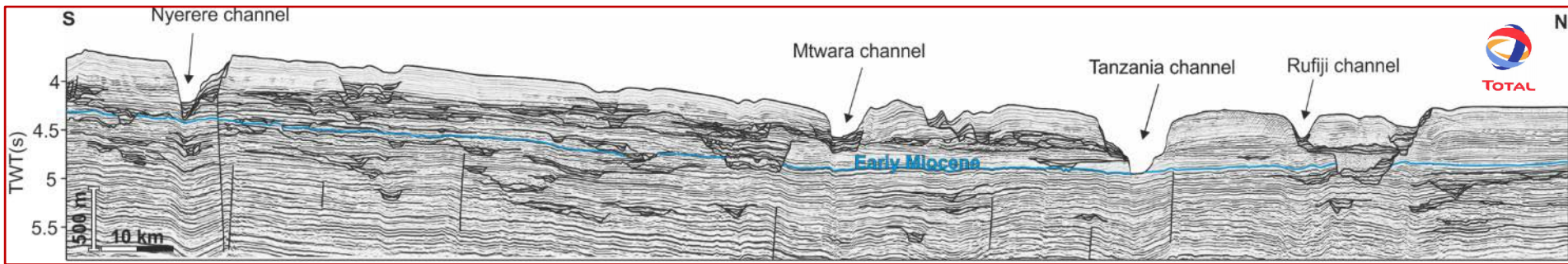
S

2475 m  
3150 m  
II



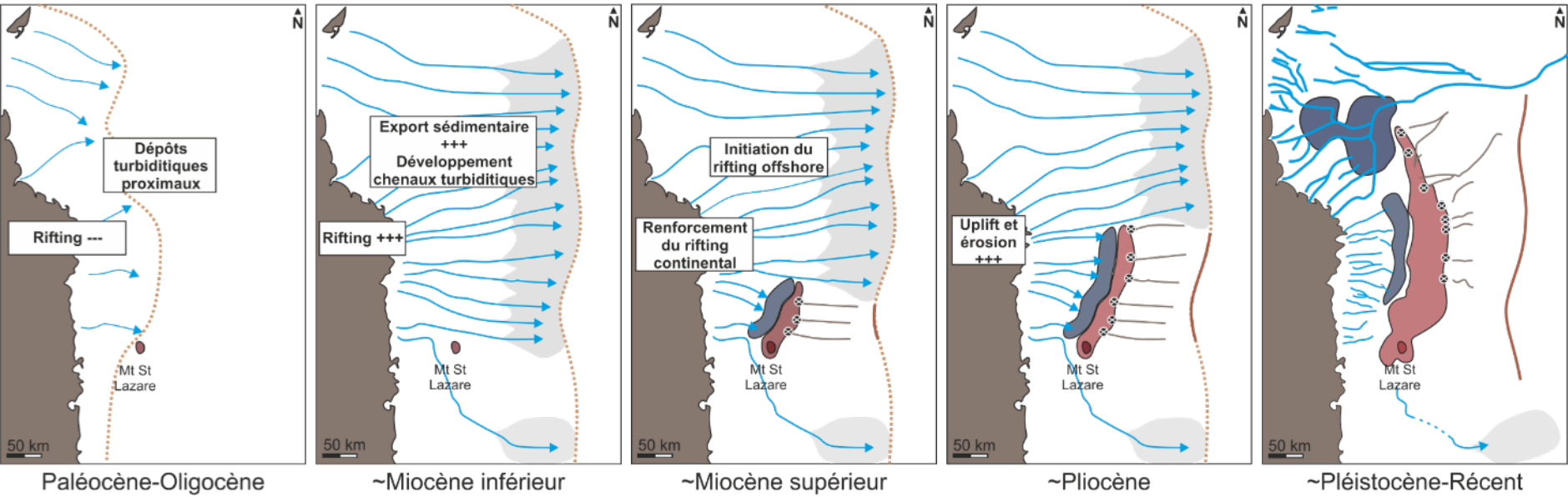
Autoroutes SHOM (2010)





Chenal de Rufiji  
Chenal de Tanzanie  
Chenal Mtwara  
Chenal de Nyéréré

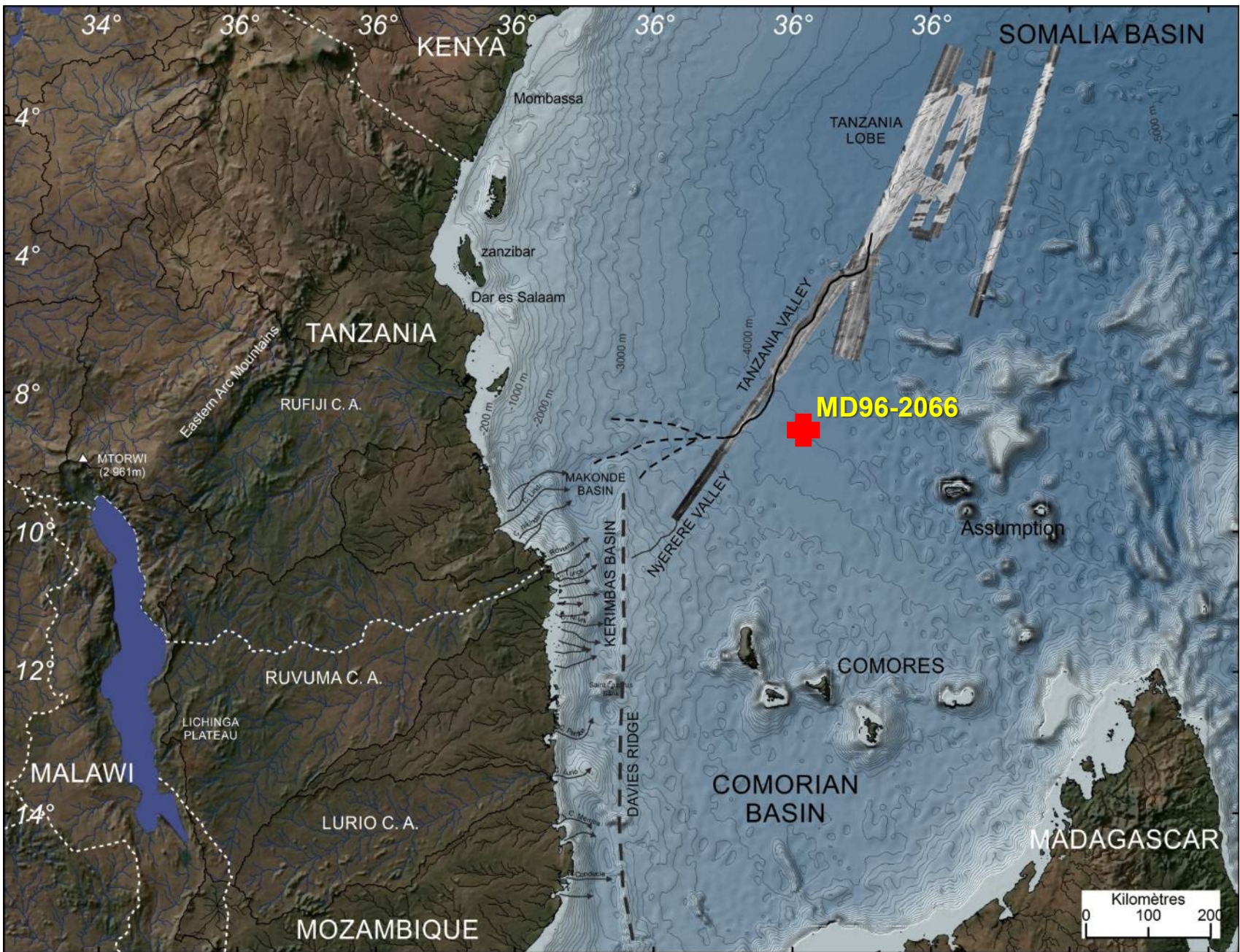
Post Miocène  
inférieur (23 millions  
d'années)

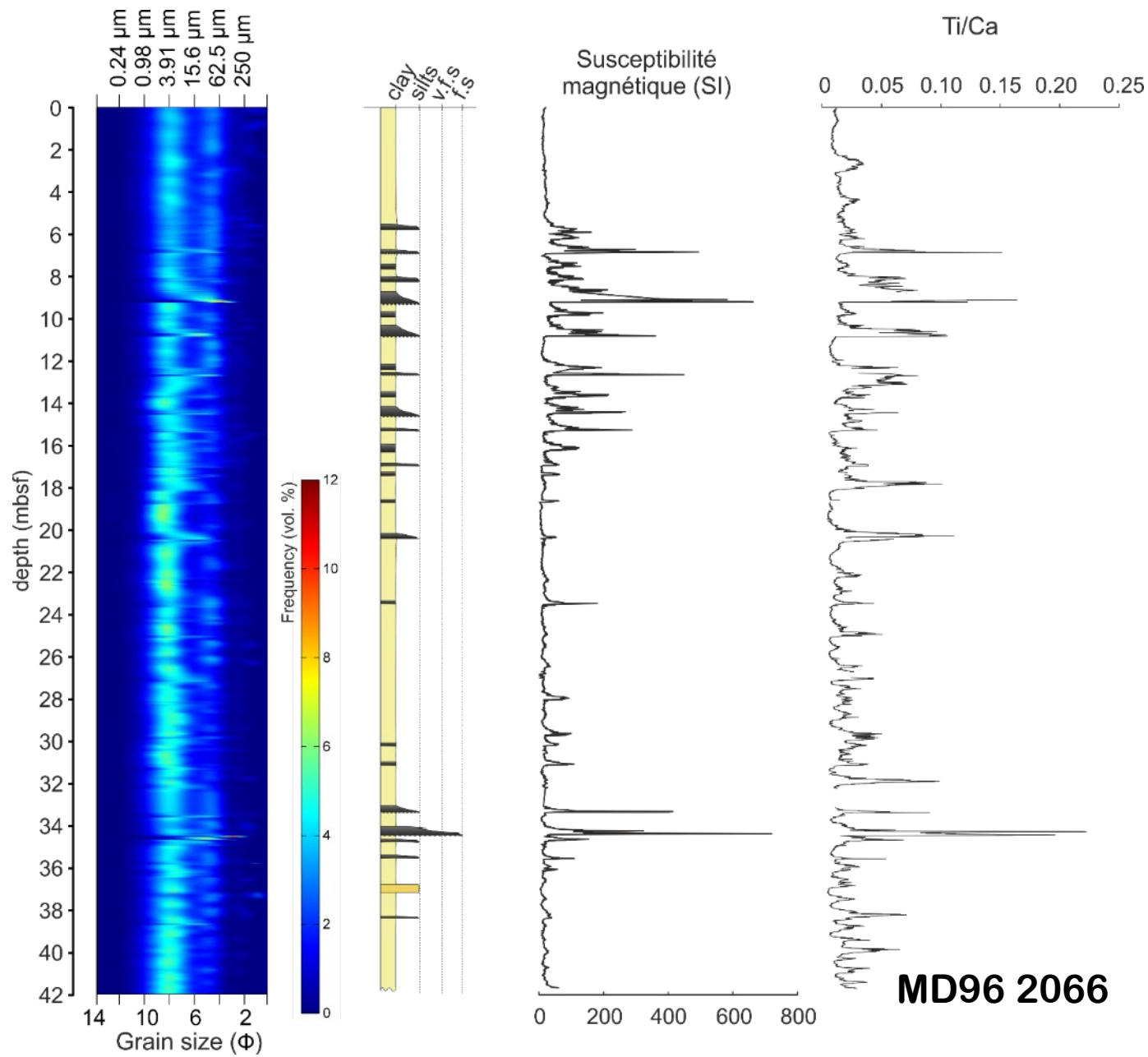


Léa Fournier 2016

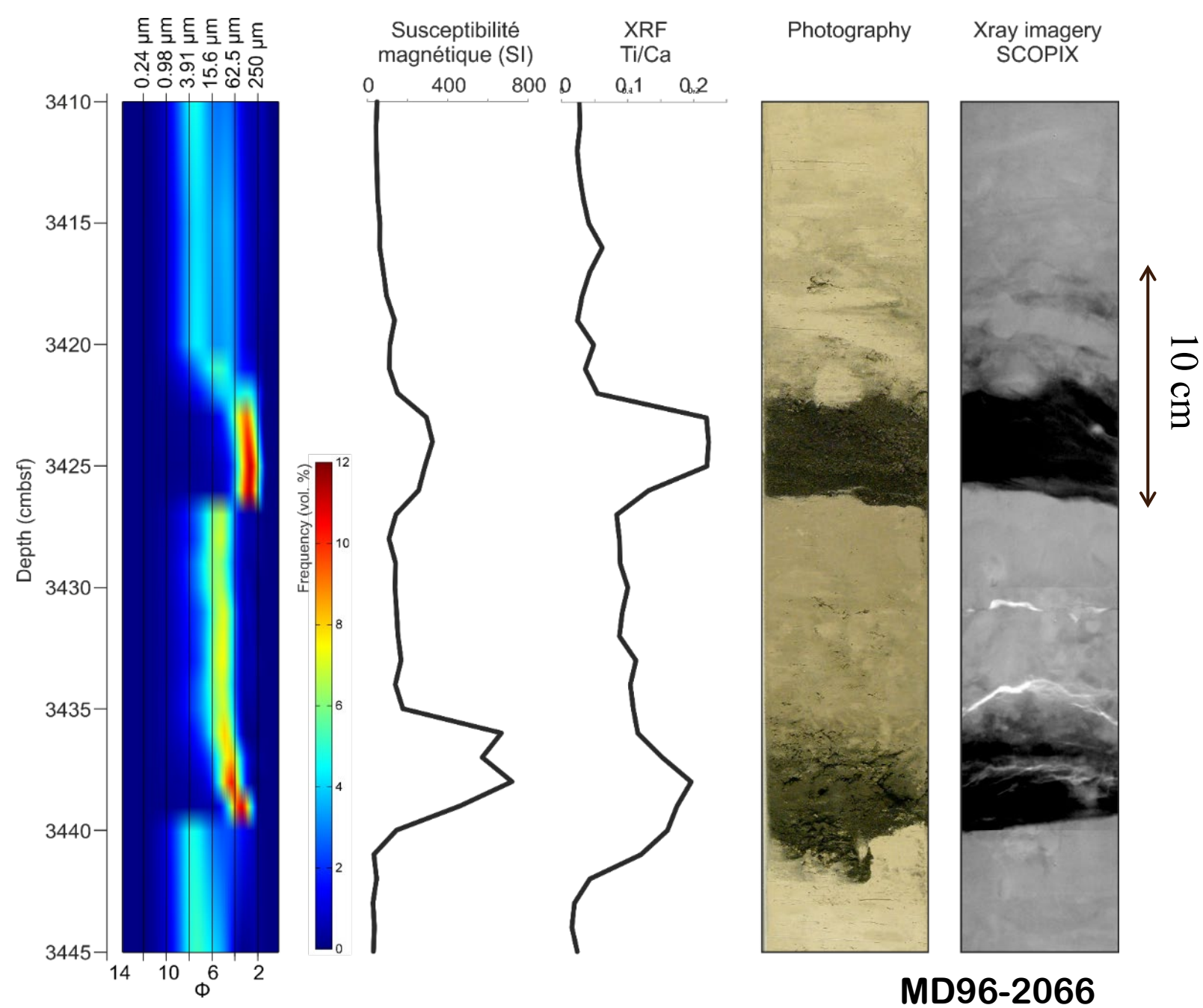




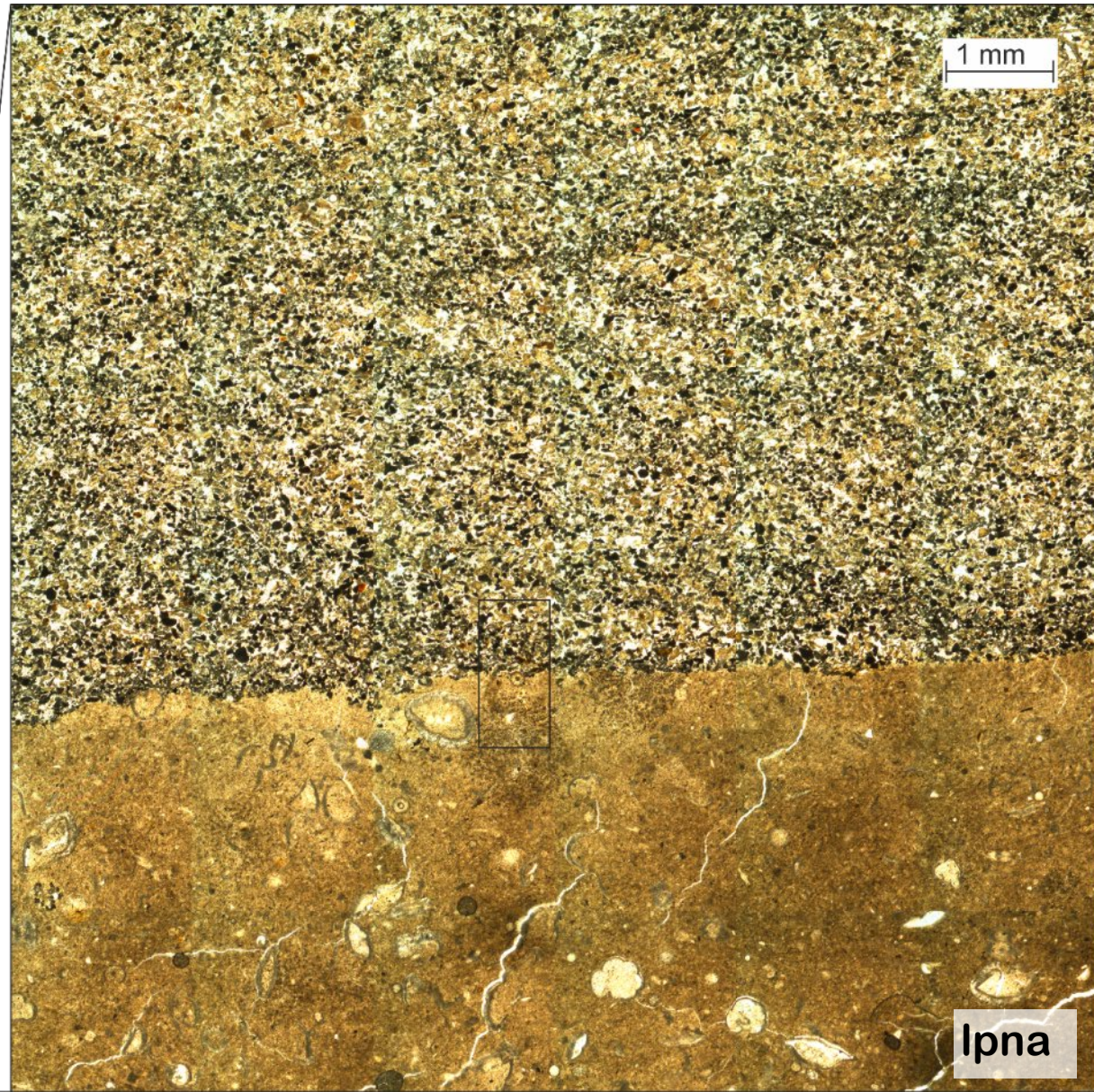






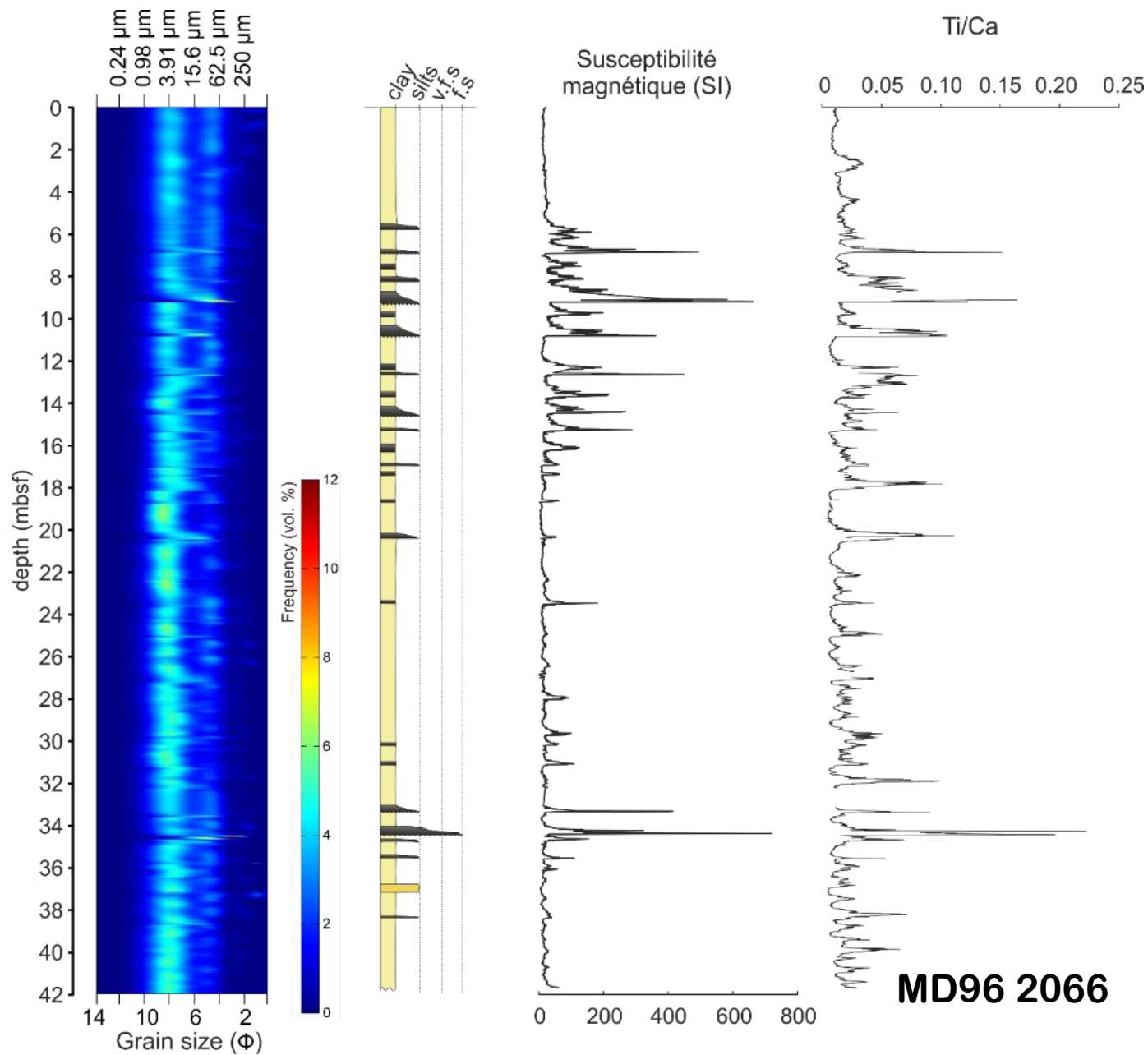






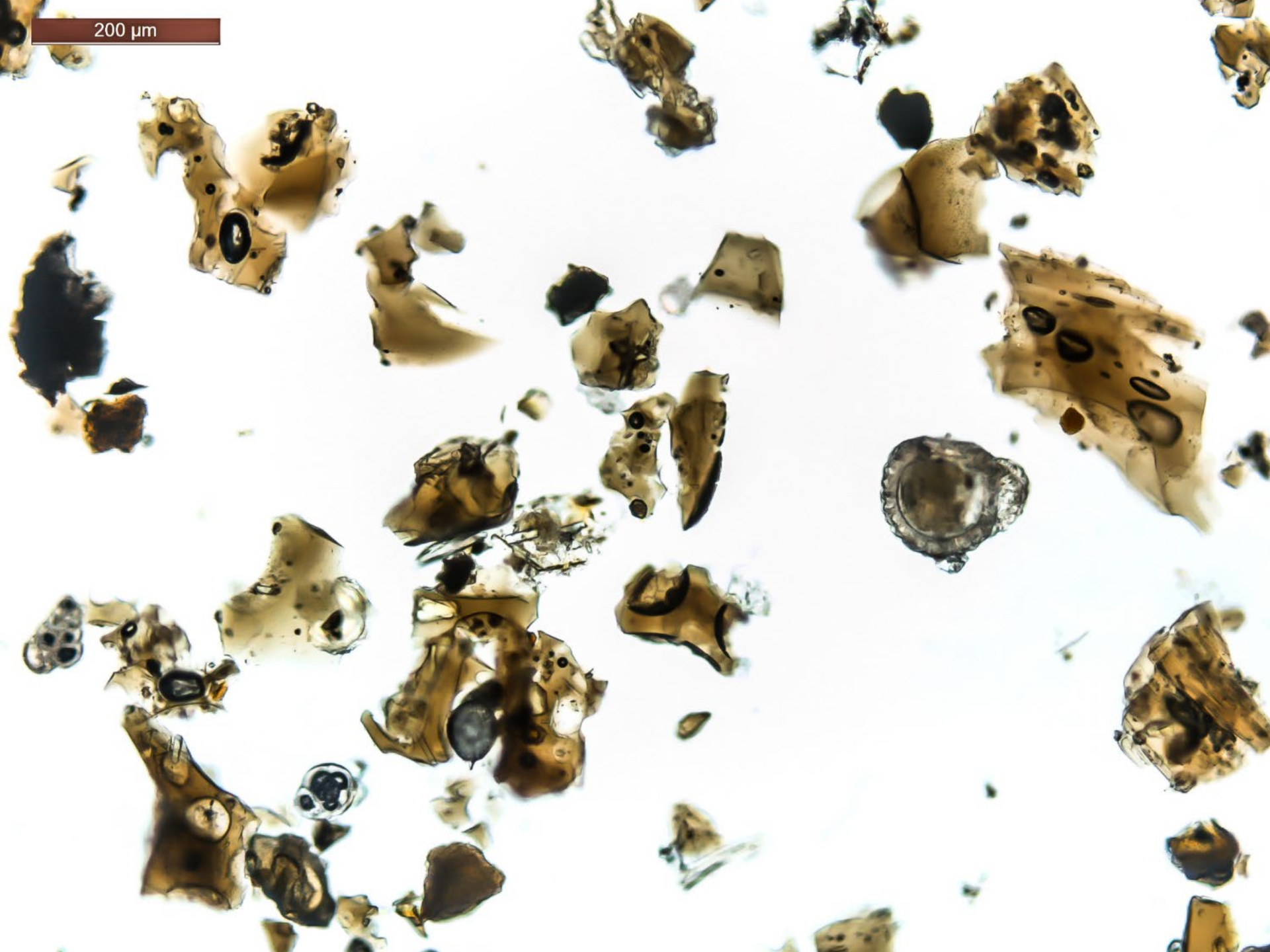
MD96-2066



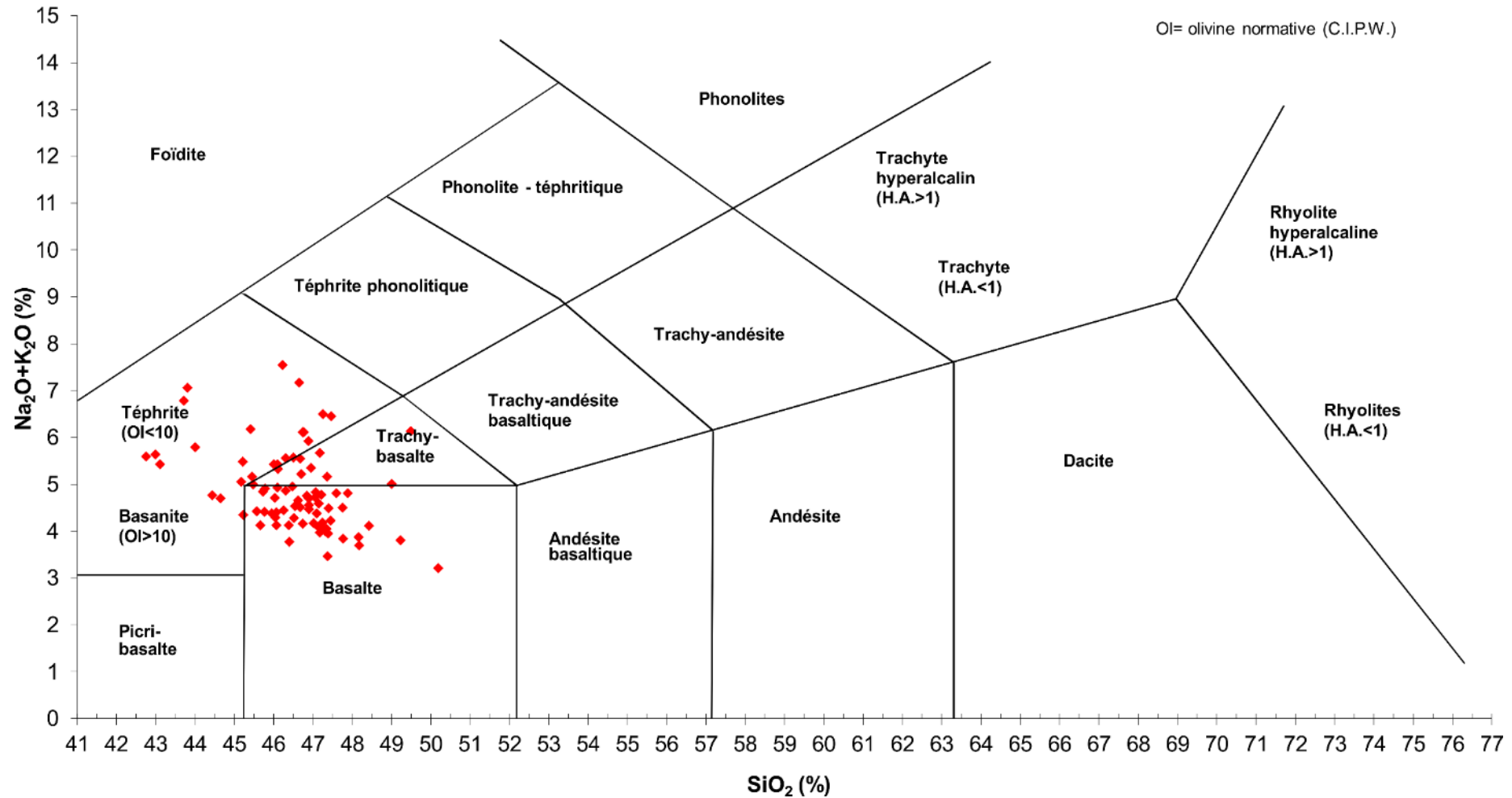


MD96 2066

200  $\mu$ m

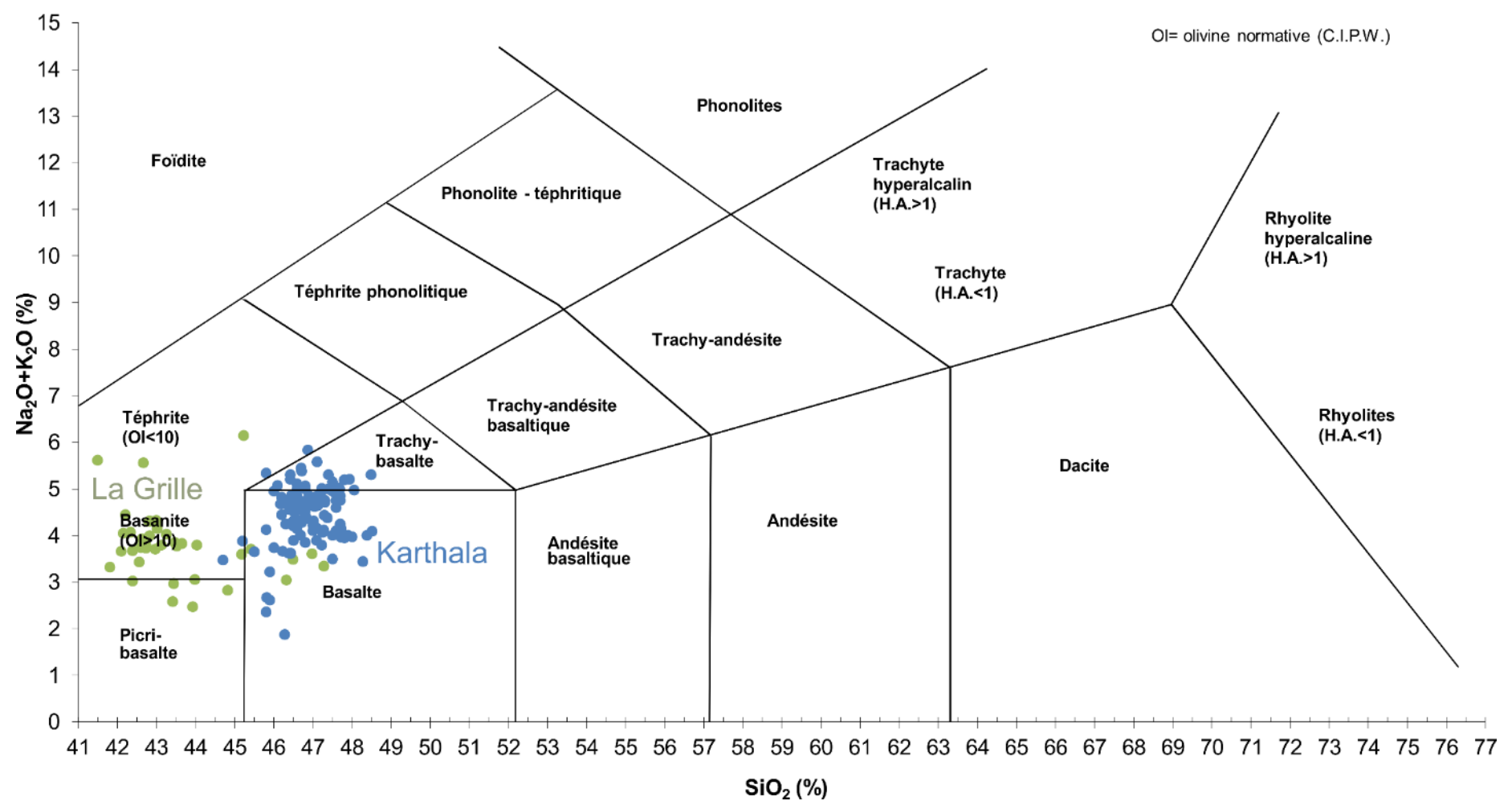




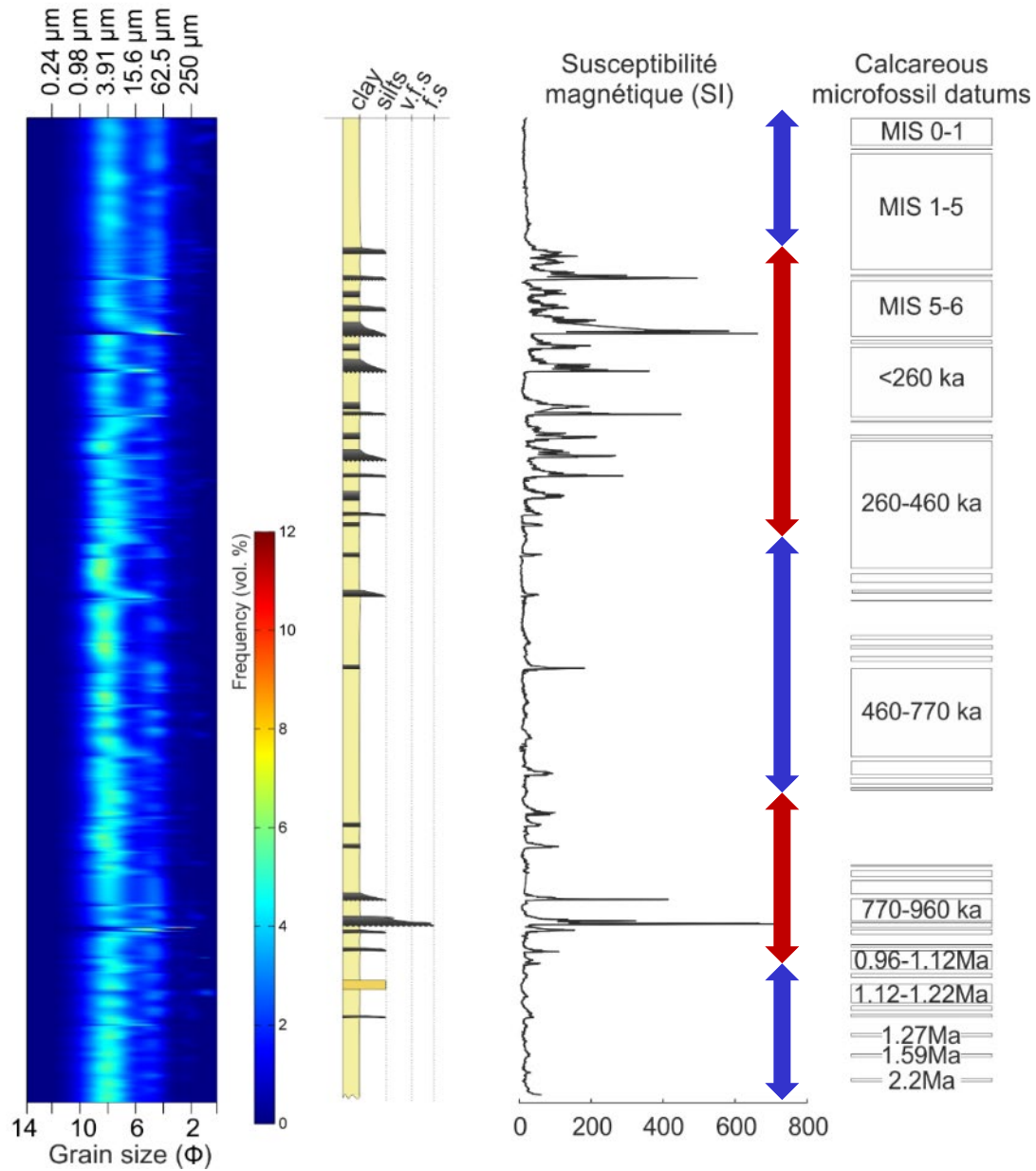


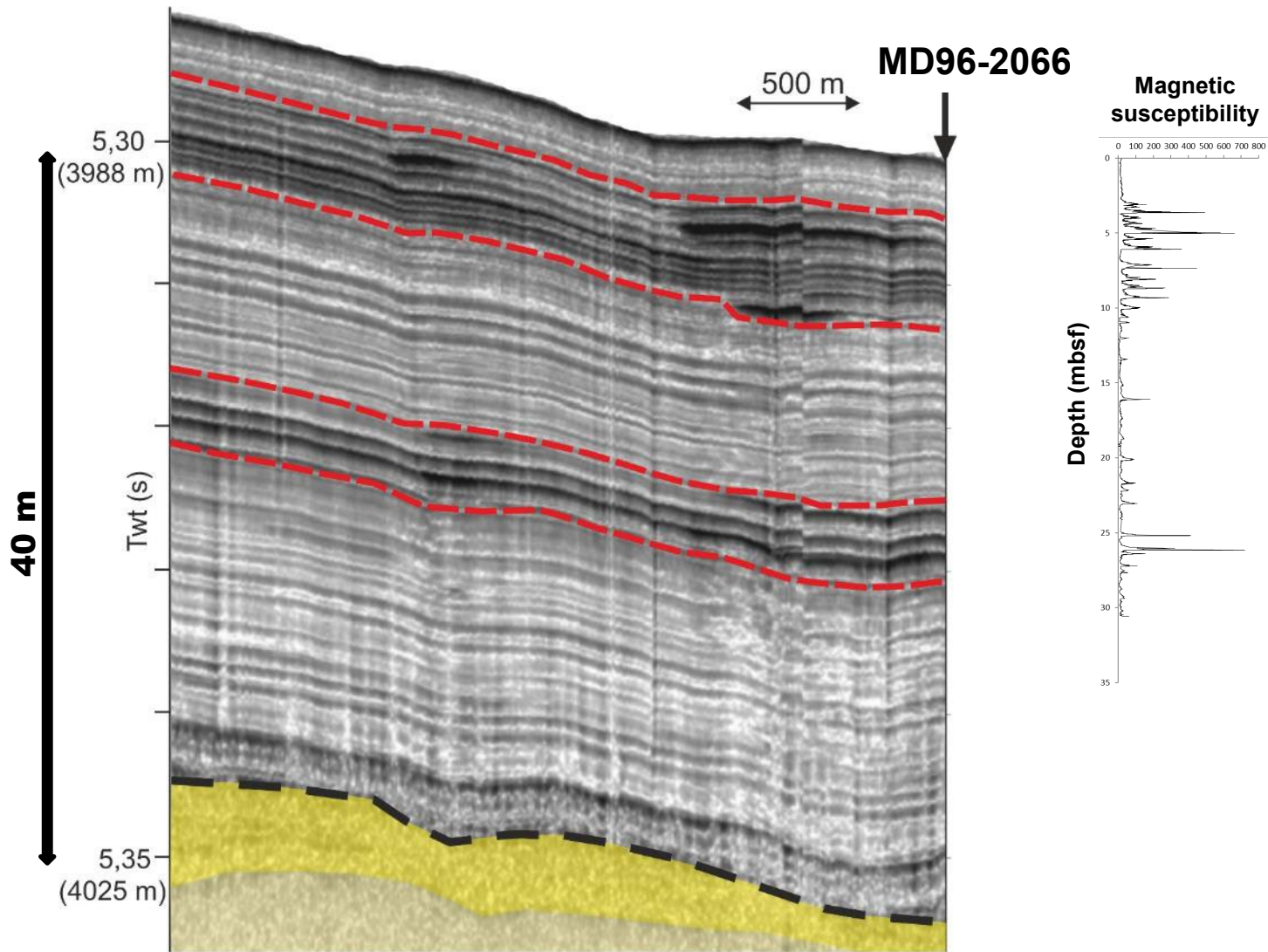
**GRANDE COMORE** selon Lebas, Le Maître, Streckeisen et Zanettin (1986).

$H.A = \frac{mol(Na_2O + K_2O)}{Al_2O_3}$   
Ol = olivine normative (C.I.P.W.)

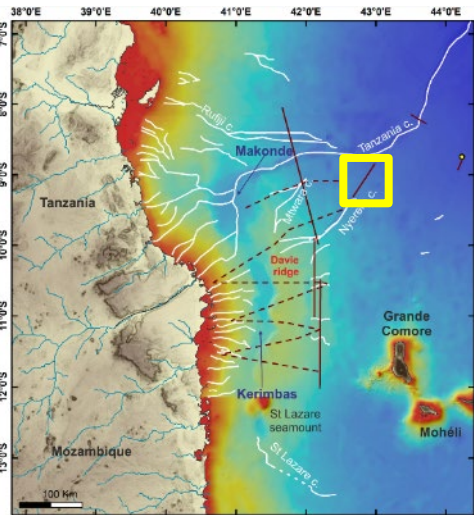
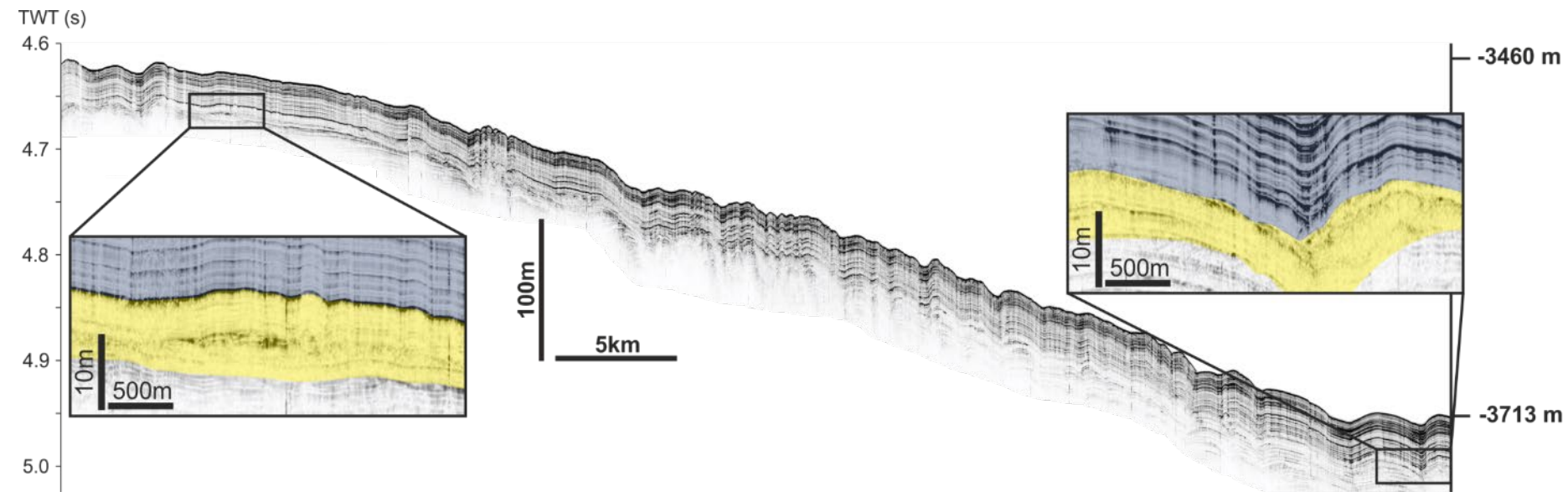


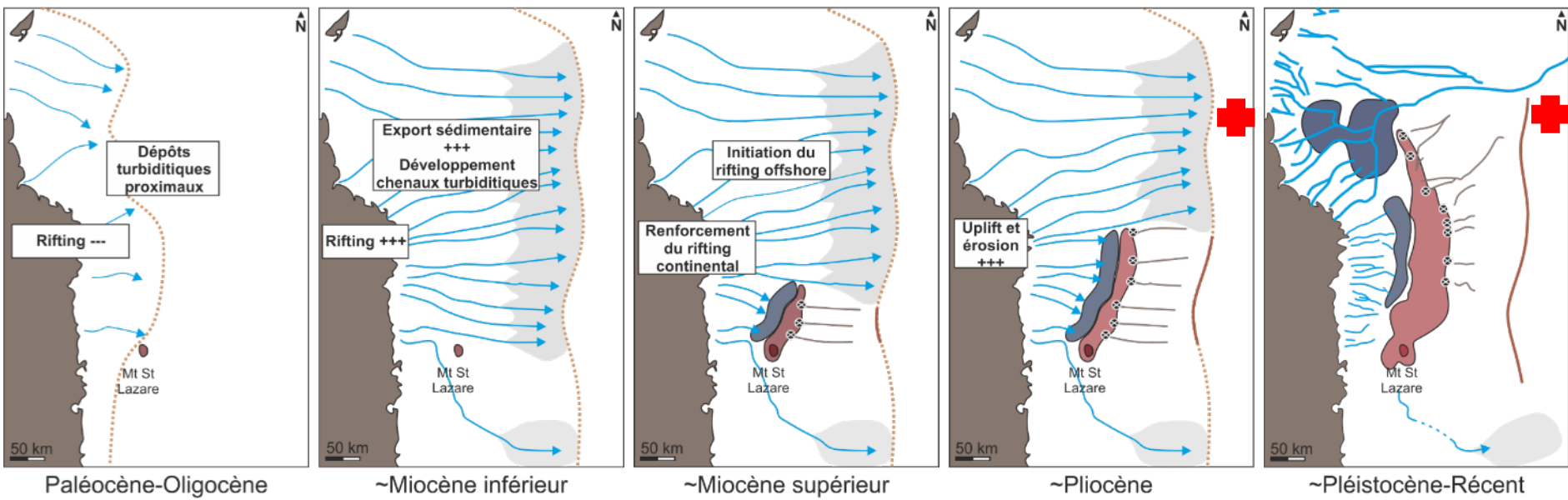




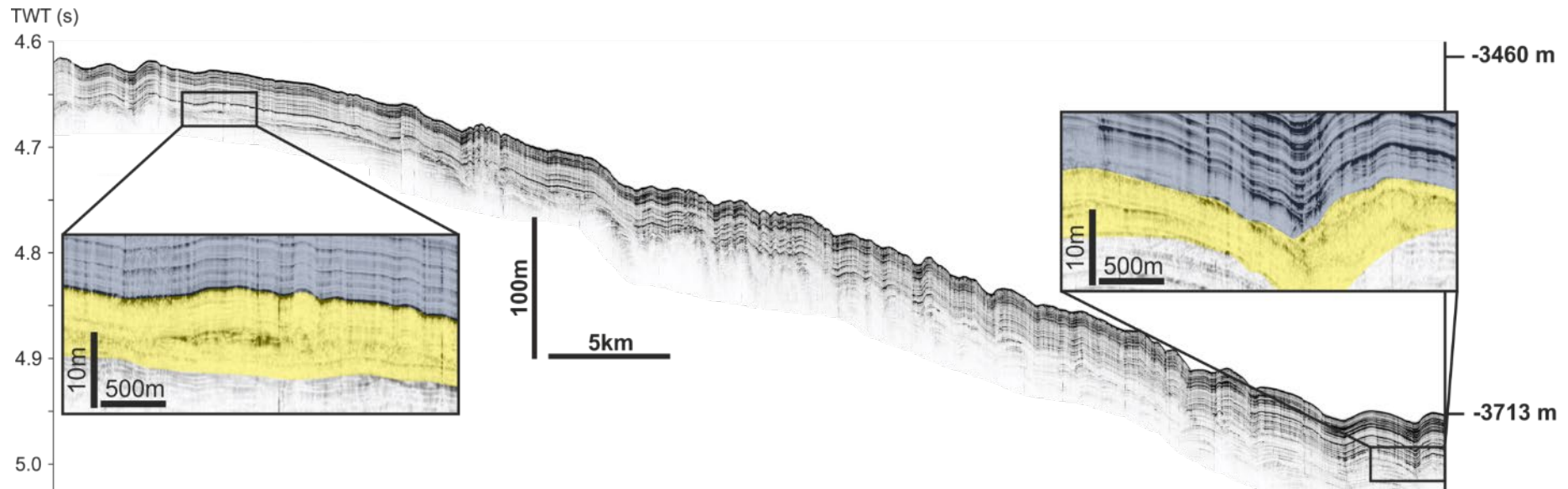




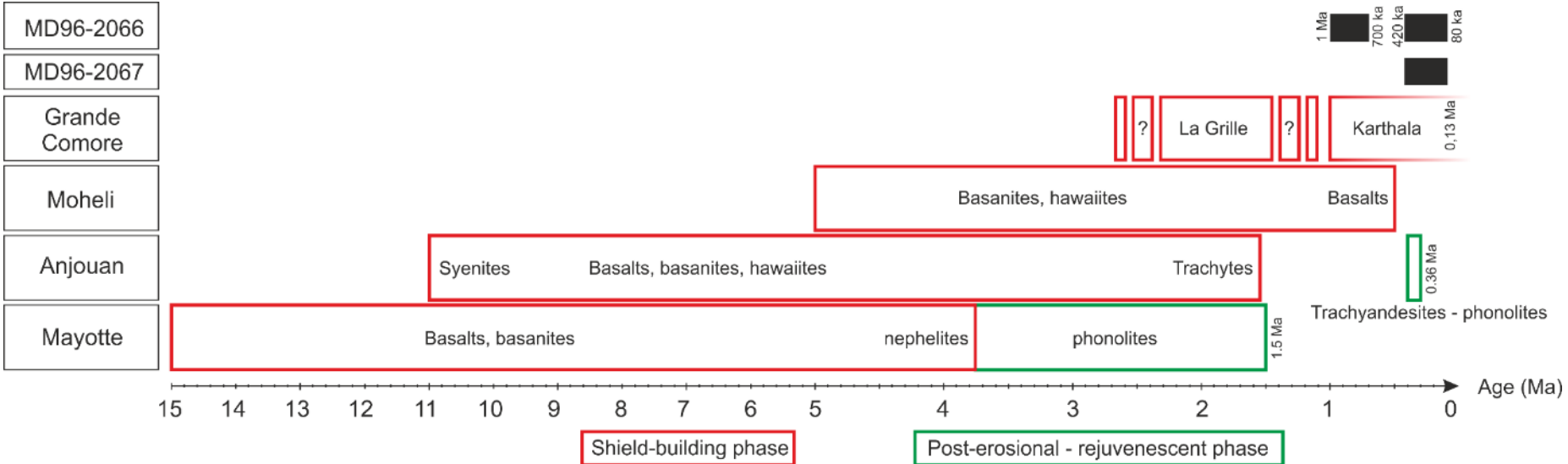




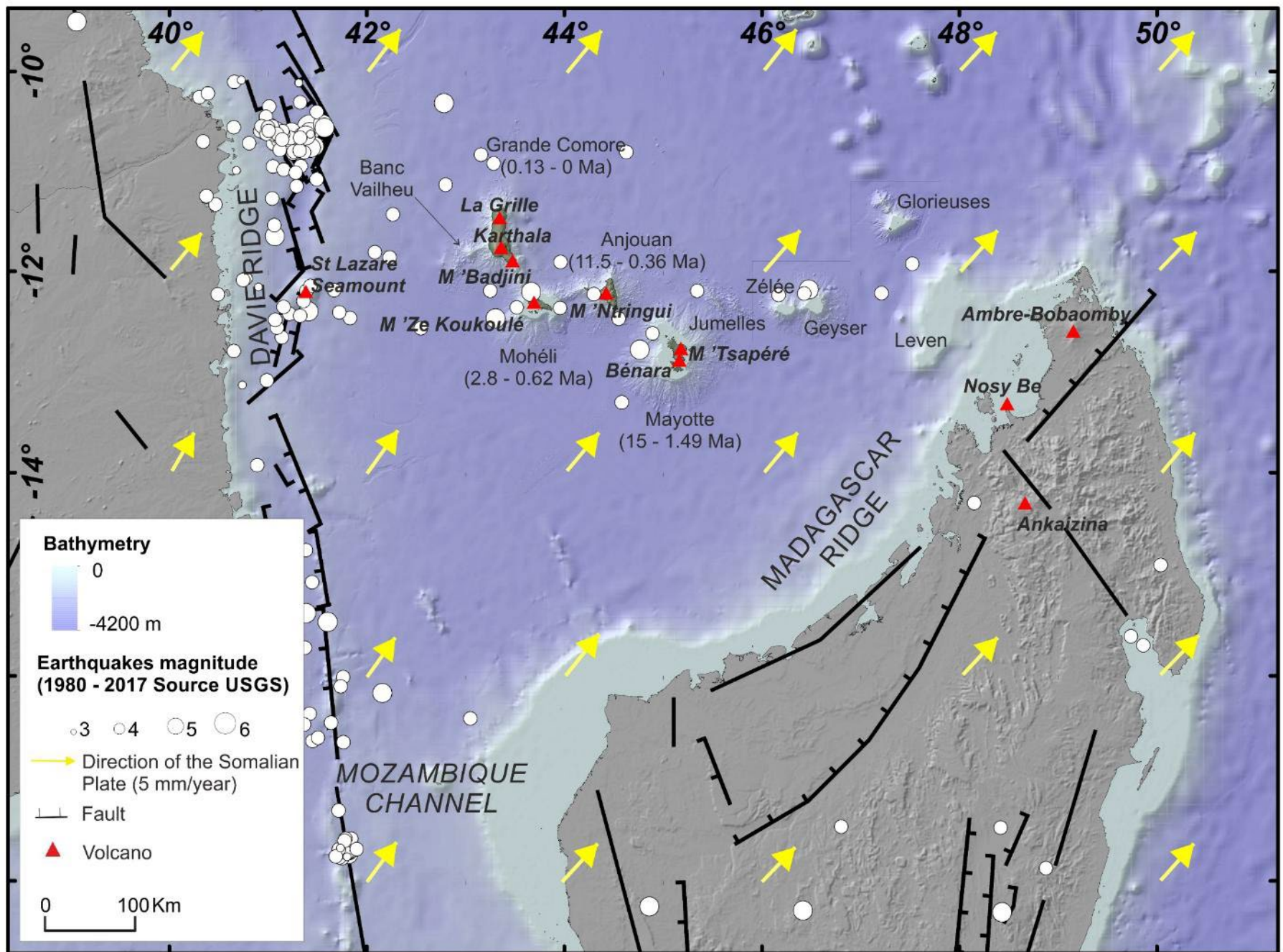
Léa Fournier 2016



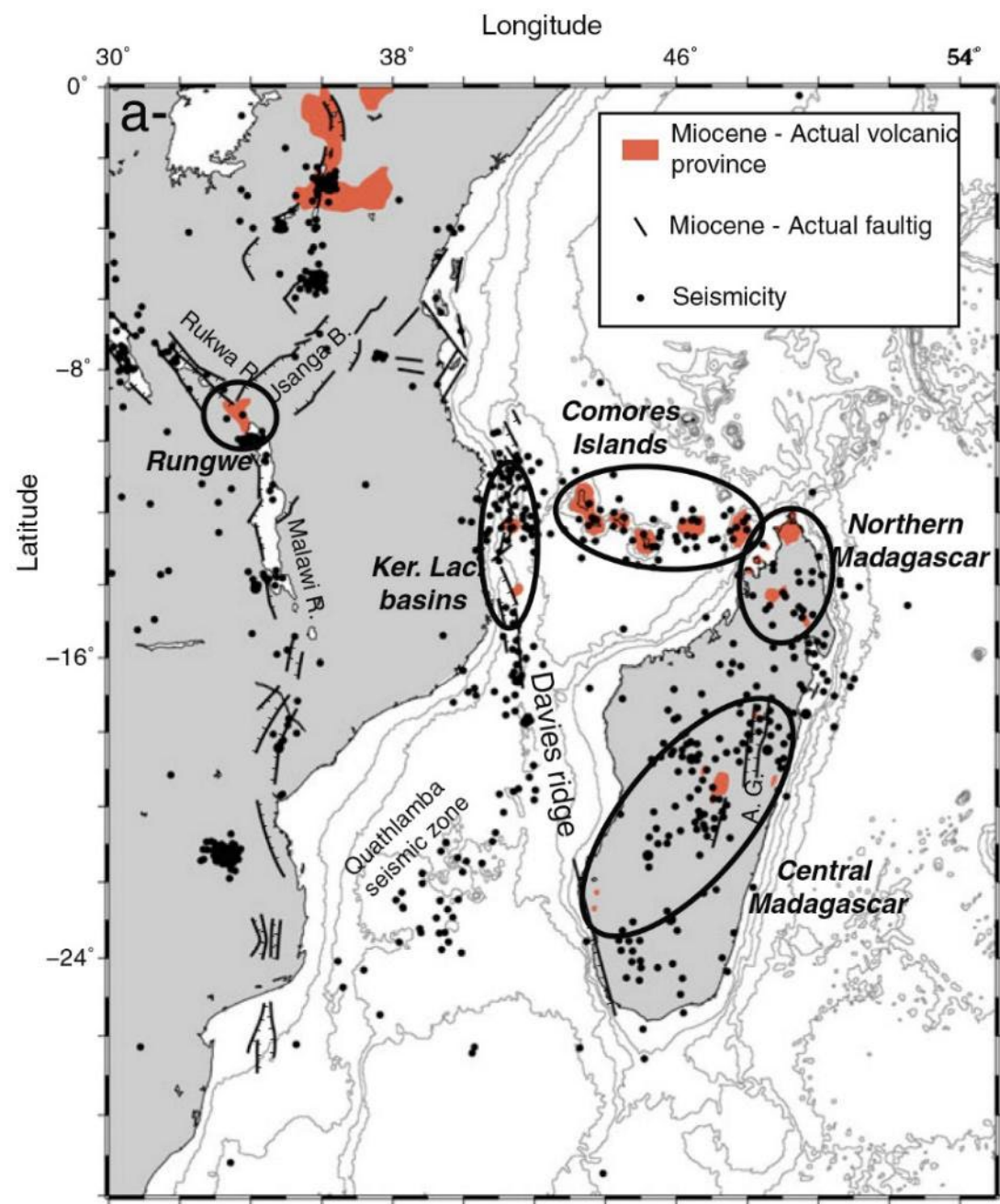




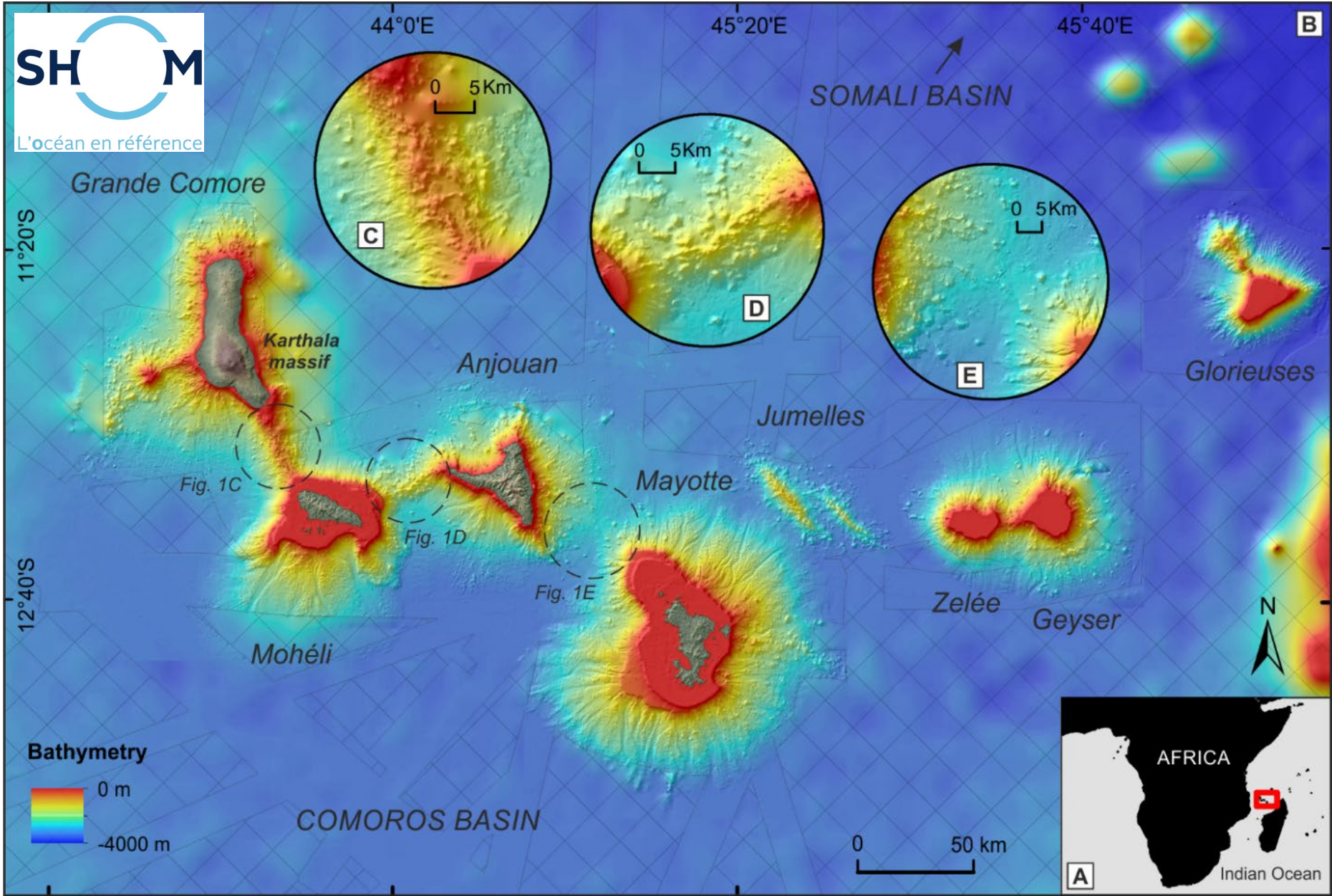
Audru, J.-C. et al. 2006 ; Spath, A. et al. 1996 ; Nougier, J. et al. 1986 ; Emerick, C.M., Duncan, R.A., 1982





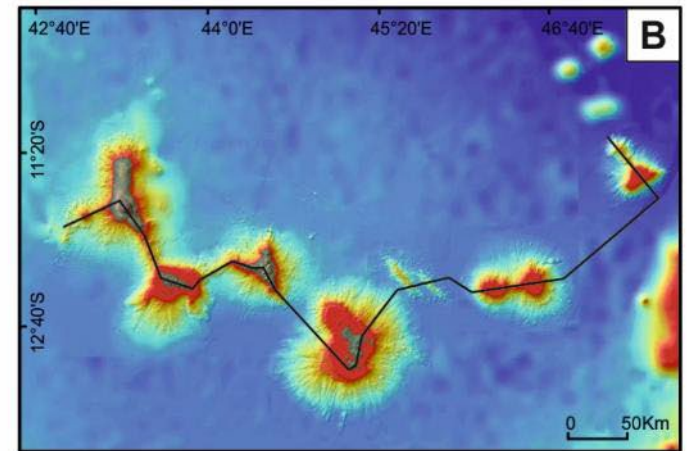
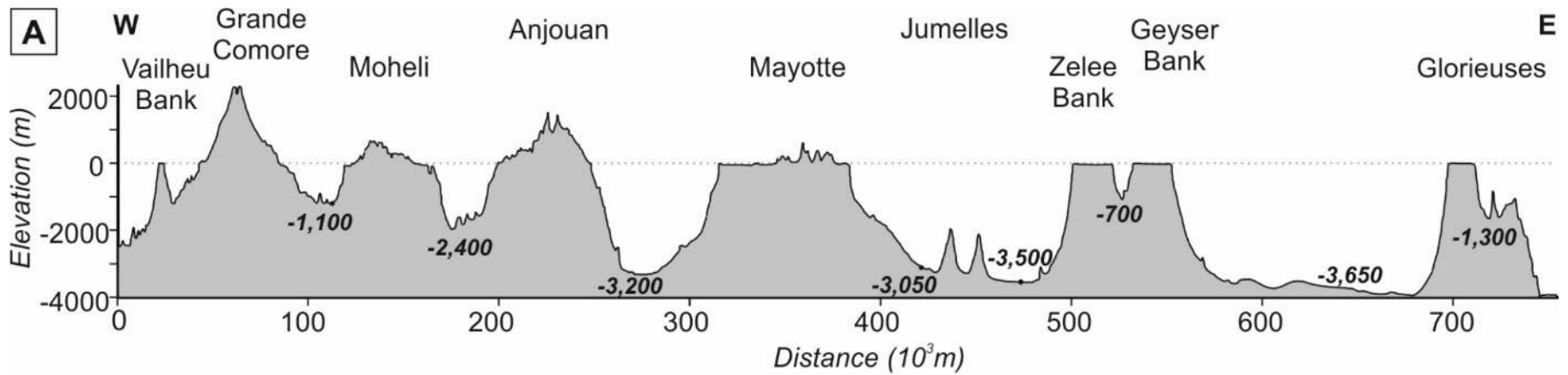


Bachelery, Patrick, Jean-François Lenat, Andrea Di Muro, et Laurent Michon, éd. Active Volcanoes of the Southwest Indian Ocean. Active Volcanoes of the World. Berlin, Heidelberg: Springer Berlin Heidelberg, 2016.

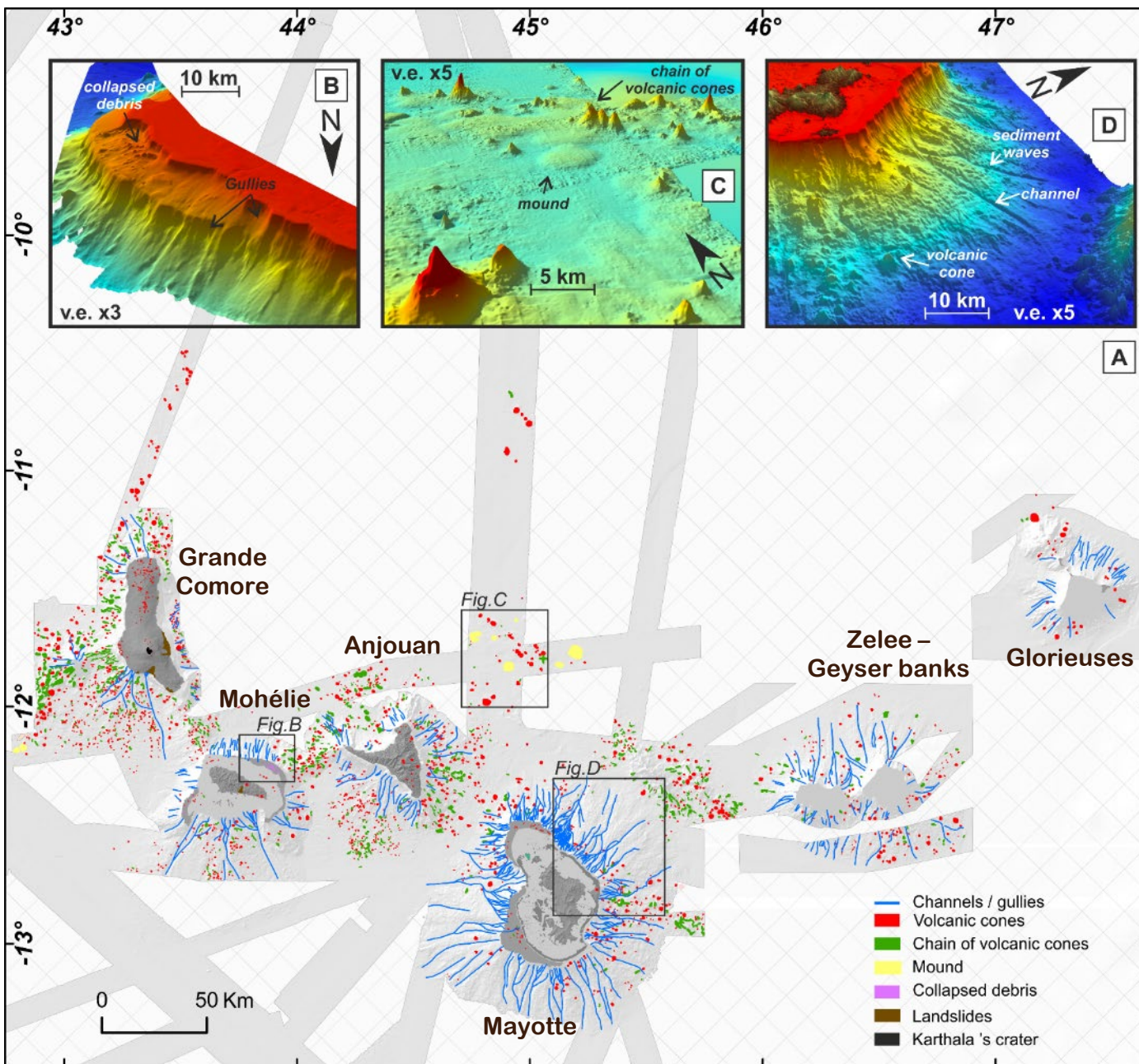


Athina Tzevahirtzian et al. 2021 Submarine morphology of the Comoros volcanic archipelago. Marine Geology





Athina Tzevahirtzian et al. 2021 Submarine morphology of the Comoros volcanic archipelago. Marine Geology



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# Mai 2018

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### L'île de Mayotte touchée par un « essaim de séismes »

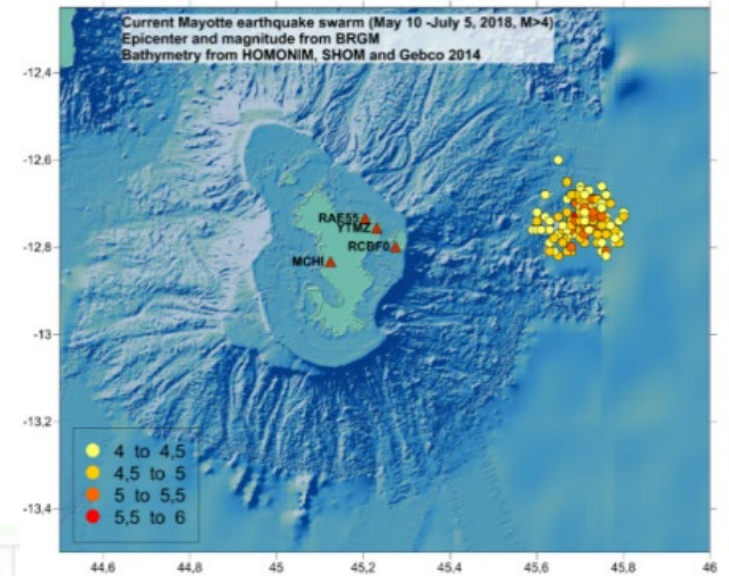
Plus de huit cents secousses ont été comptabilisées en trois semaines. Le département demande la reconnaissance de l'état de catastrophe naturelle.

Par Patrick Roger · Publié le 01 juin 2018 à 14h57 · Mis à jour le 01 juin 2018 à 14h57

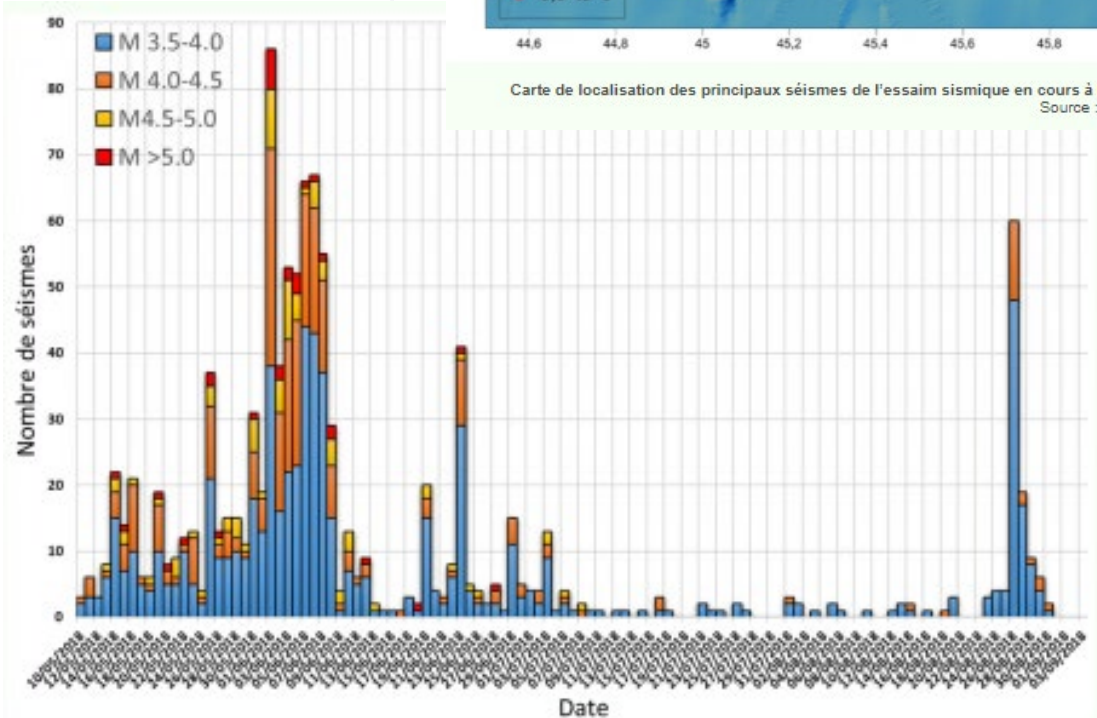
Lecture 2 min.

Article réservé aux abonnés

A Koungou sur l'île de Mayotte, dans un bidonville où de fortes pluies ont provoqué un glissement de terrain, le 11 janvier. ORNELLA LAMBERTI / AFP



Carte de localisation des principaux séismes de l'essaim sismique en cours à Mayotte  
Source : BRGM?



Nombre journalier de séismes en fonction de leur magnitude  
Source : BRGM?

# SÉQUENCE SISMIQUE DE MAYOTTE (2018-2020)

Le Monde

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PLANÈTE

Partag

## Angoisse à Mayotte après plus de 1 400 séismes en un mois

Depuis le 10 mai, la préfecture de Mayotte a recensé plus de 1 400 secousses dont plus de 20 de magnitude supérieure à 5 et plus de 140 de magnitude supérieure à 4.

Le Monde avec AFP

Publié le 14 juin 2018 à 13h42 - Mis à jour le 14 juin 2018 à 14h38 • Lecture 2 min.

ouest  
france

Recherche : ville, actualité, fait divers...

Avec plus de 1 400 séismes en un mois, la population vit dans l'angoisse  
magnitudes, c'est rare ».



### « Psychose » générale

Les premiers jours, plusieurs centaines d'habitants ont quitté leur logement pour dormir dans la rue, comme Nissoiti, qui se demande « si les maisons vont tomber » et qui est prête à quitter temporairement l'île pour rentrer aux Comores, affirme-t-elle à l'AFP.

franceinfo:

france.tv

radiofrance

outre-mer

1

l'actu videos tv

menu

incendie de notre-dame

politique

bruxelles outre-mer

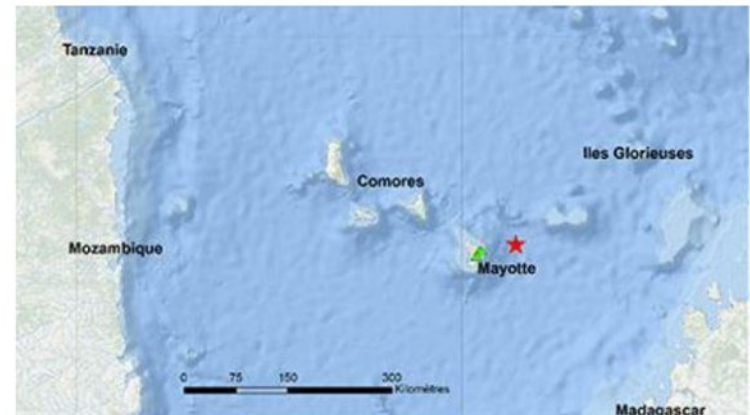
qcm1ere



Capture rectangulaire

## Séismes à Mayotte : jusqu'à quand cela peut-il durer ?

Depuis le 10 mai, Mayotte connaît une activité sismique soutenue, causant de nombreux dégâts. Plusieurs centaines de secousses ont été enregistrées dont une de magnitude de 5,8, la plus forte jamais ressentie sur l'île. Jusqu'à quand cela va-t-il durer ?



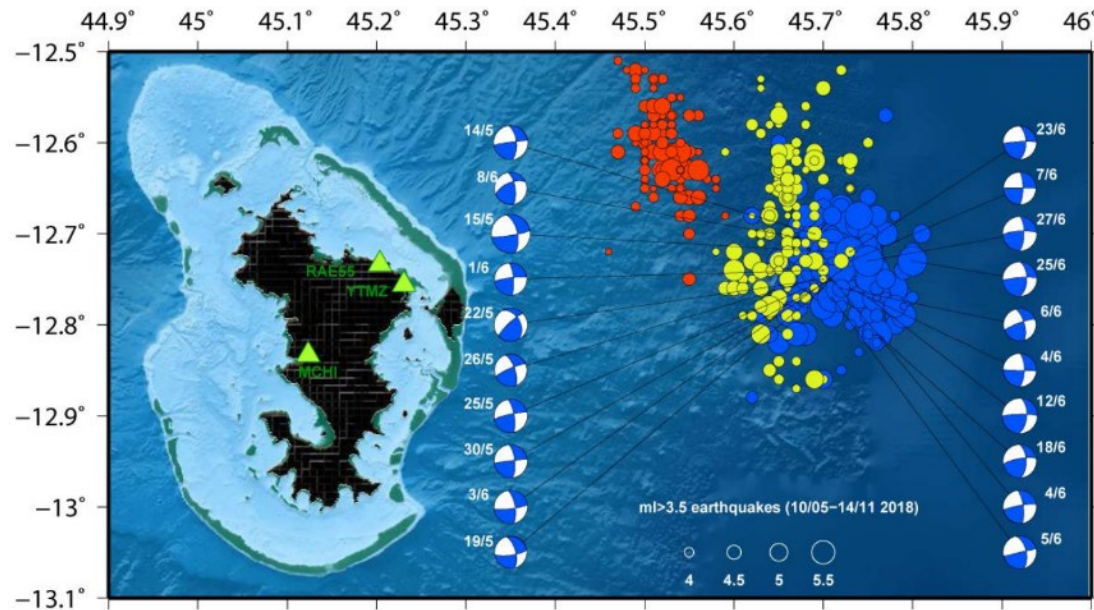
© BRGM Localisation de l'épicentre (étoile rouge) de la crise sismique de Mayotte (mai 2018)

Par Cécile Baquey

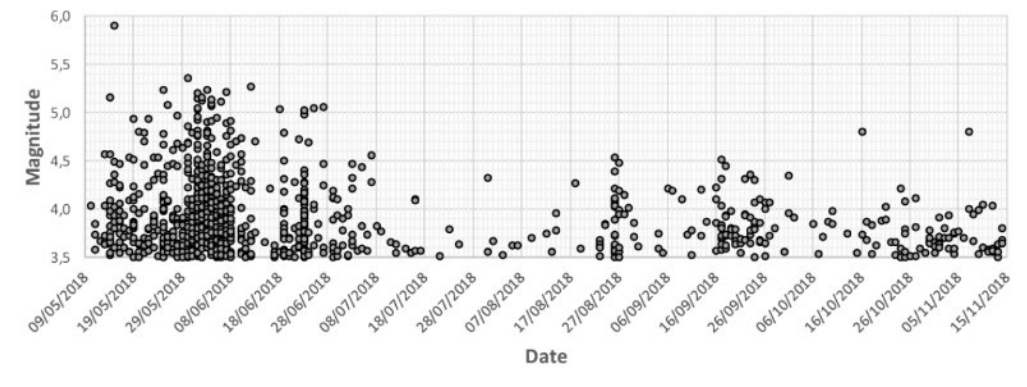
Publié le 29/05/2018 à 12:23, mis à jour le 29/05/2018 à 13:17



# CRISE SISMO-VOLCANIQUE DE MAYOTTE



**Figure 5.** Map of the localized earthquakes of  $m_l \geq 3.5$  from 2018 May 10 to November 14. The first cluster (blue) is active from May 10 to July 8, the second (yellow) from June 26 to October 30, the third (red) from July 5 to November 14. The G-CMT focal mechanisms correspond to  $m_l > 5$  events, all occurring from May 14 to June 27. The bathymetry is from SHOM (2015).



**Figure 4.** Magnitude of the 1109  $m_l > 3.5$  events recorded from 2018 May 10 to November 14.

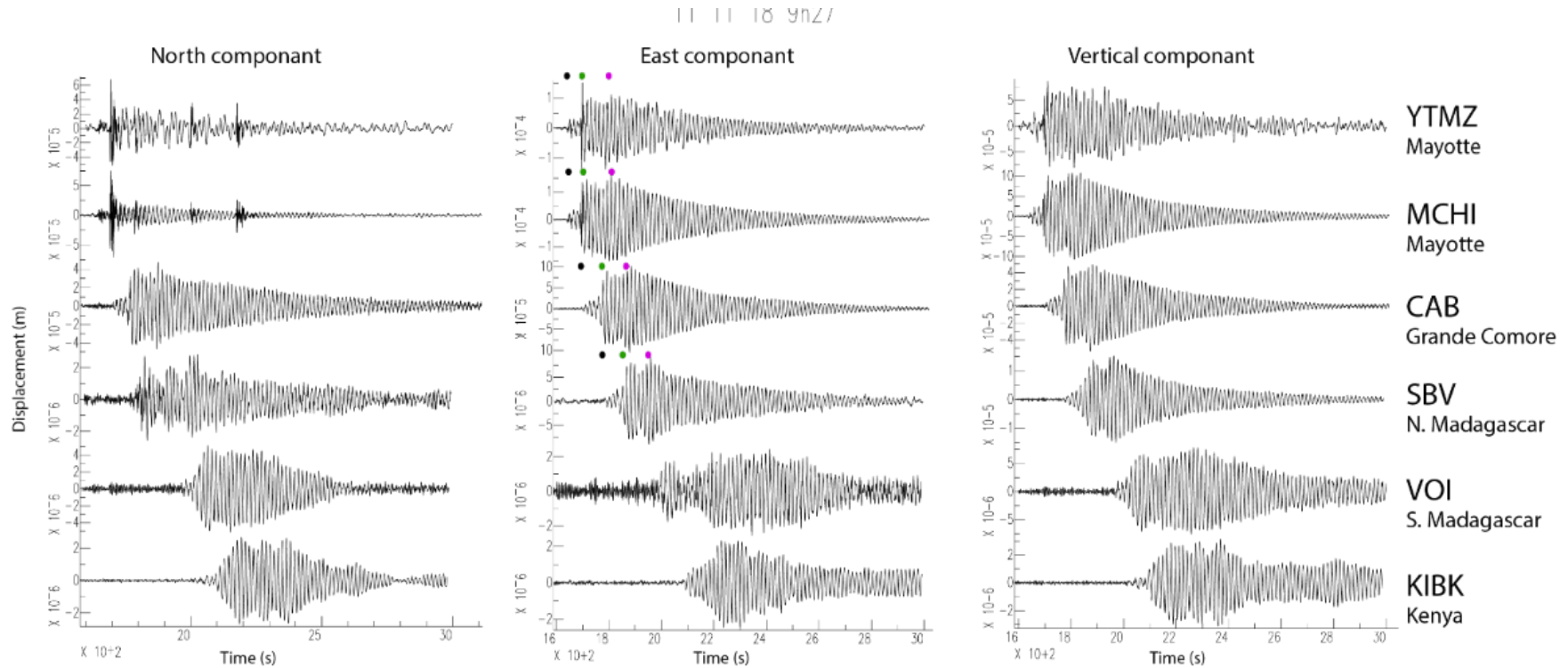
Lemoine, A., Bertil, D., Roullé, A., Briole, P., 2019. The volcano-tectonic crisis of 2018 east of Mayotte, Comoros islands.

# CRISE SISMO-VOLCANIQUE DE MAYOTTE

Séismes de type **Tremor** du novembre 2018

Signal atypique long et très basse fréquence

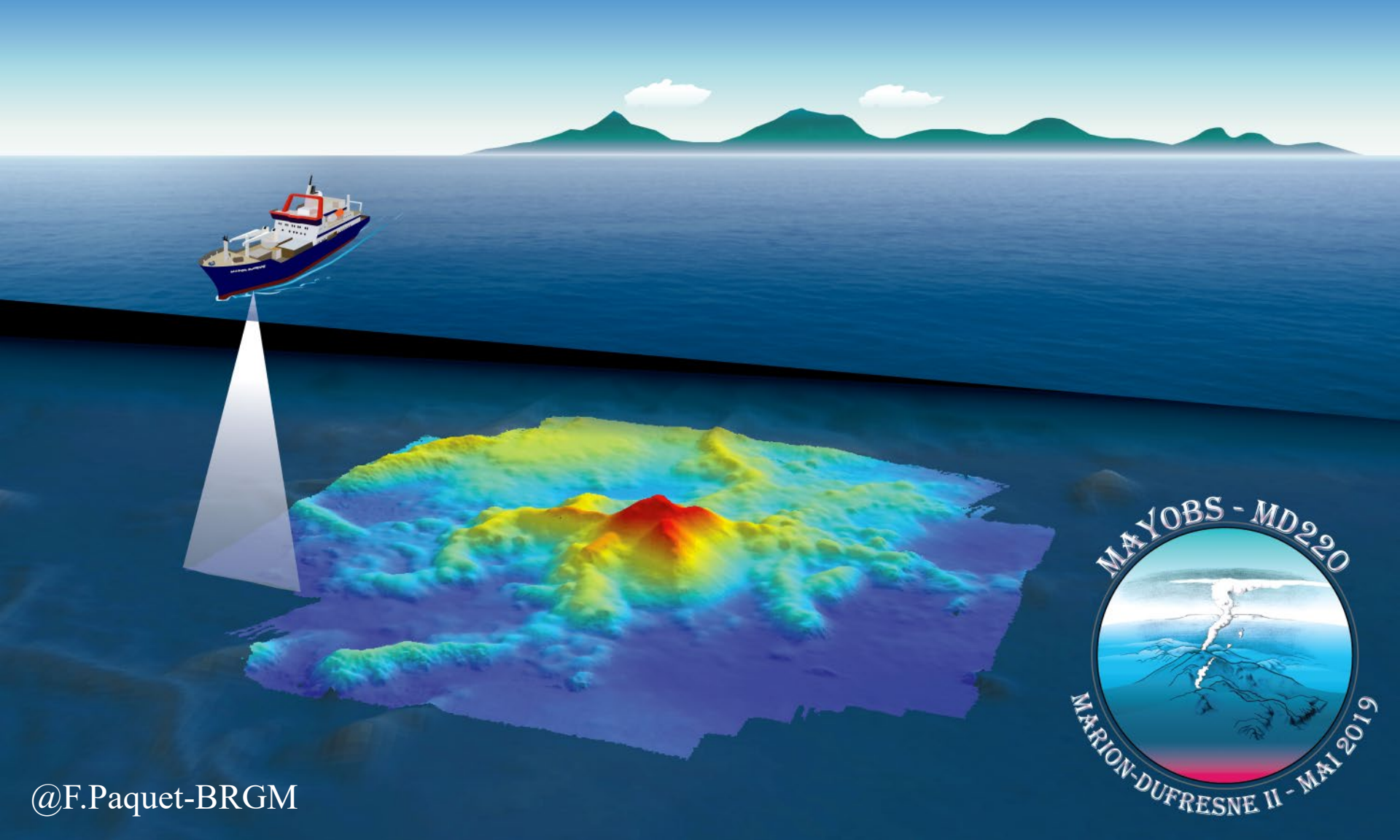
Témoigne de résonance dans un grand réservoir magmatique



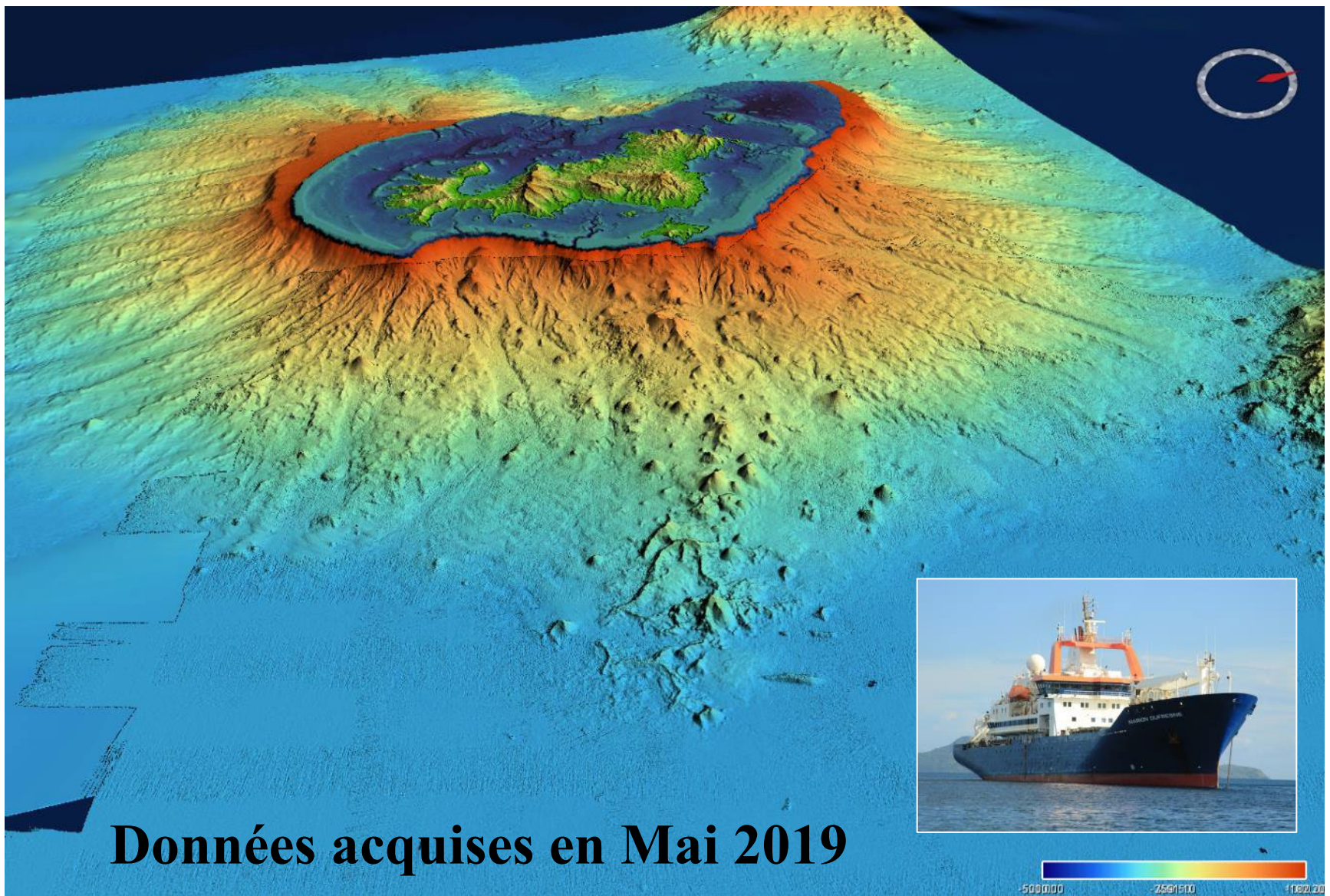
**Figure 9.** The 2018 November 11 tremor, (a) seismogram and spectrogram for the EW component of MCHI, (b) Fourier spectrum of the EW component of MCHI (peak at 0.062 Hz), (c) Displacements of local and regional stations, in meters. Black dots tag the initial excitation, green and purple dots its end and the beginning of the two embedded monochromatic damping phase, (d) Particles motions at YTMZ, MCHI and CAB and map showing the azimuth of the oscillation (green lines).

Lemoine, A., Bertil, D., Roullé, A., Briole, P., 2019. The volcano-tectonic crisis of 2018 east of Mayotte, Comoros islands.



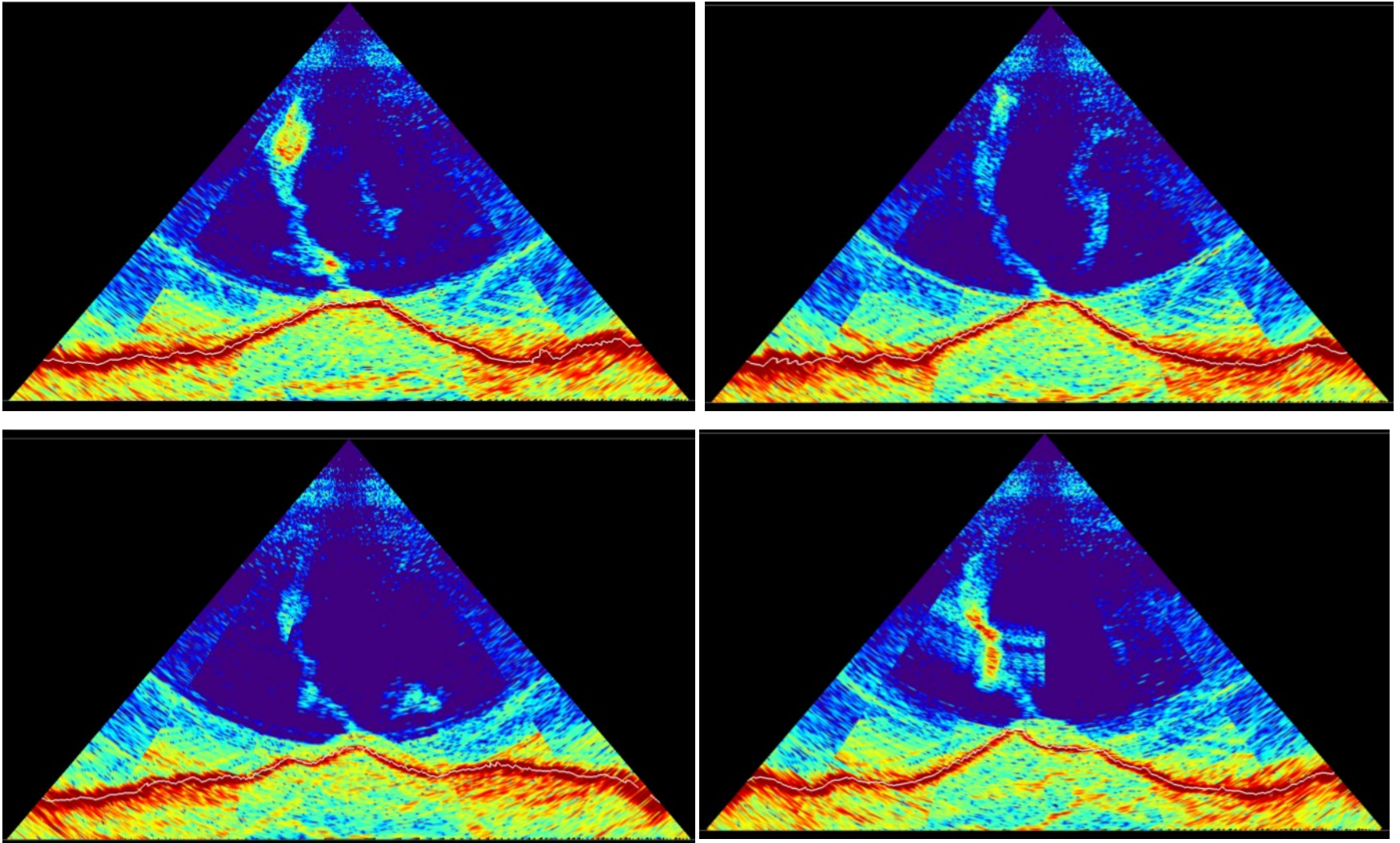


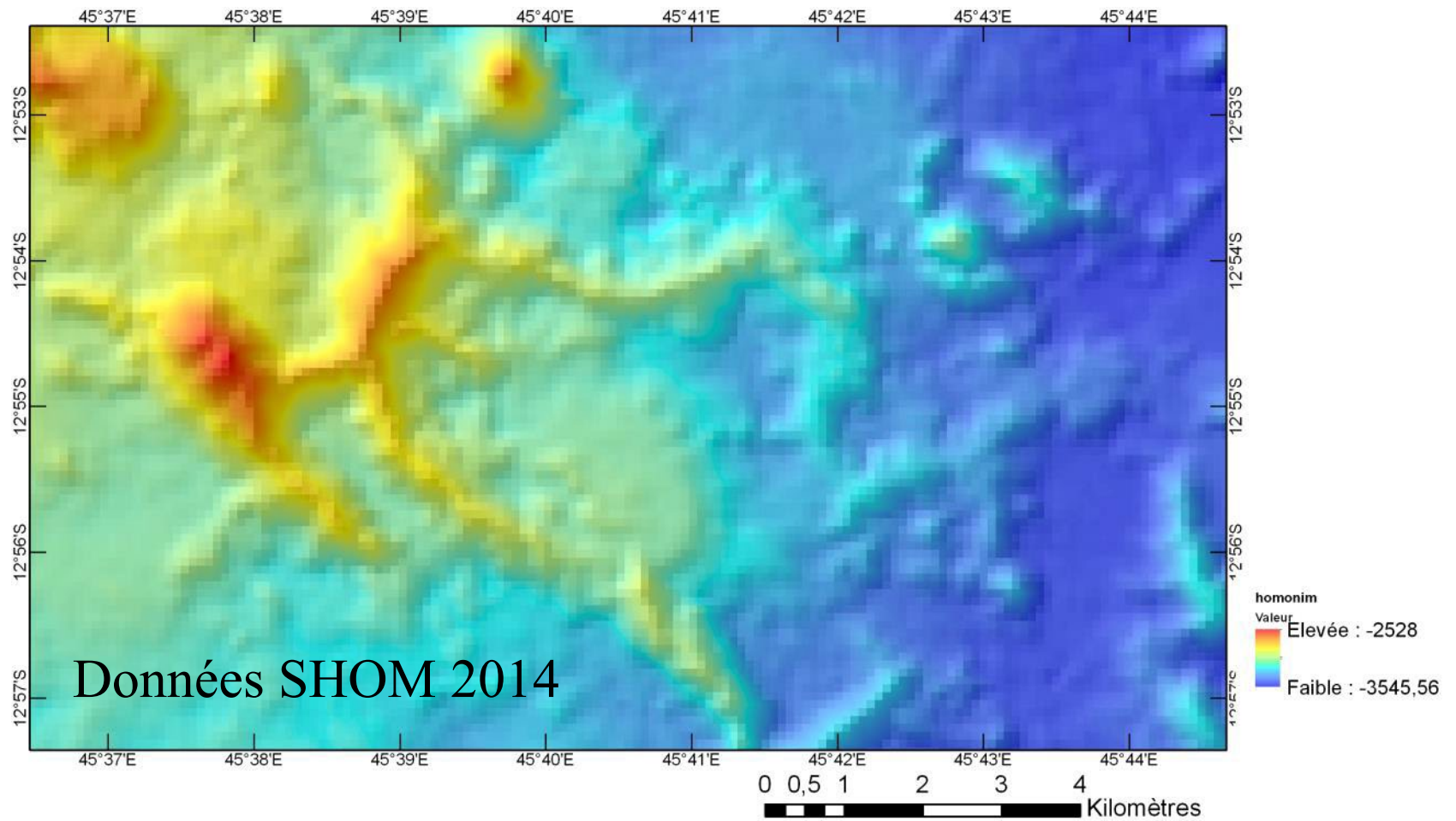
@F.Paquet-BRGM





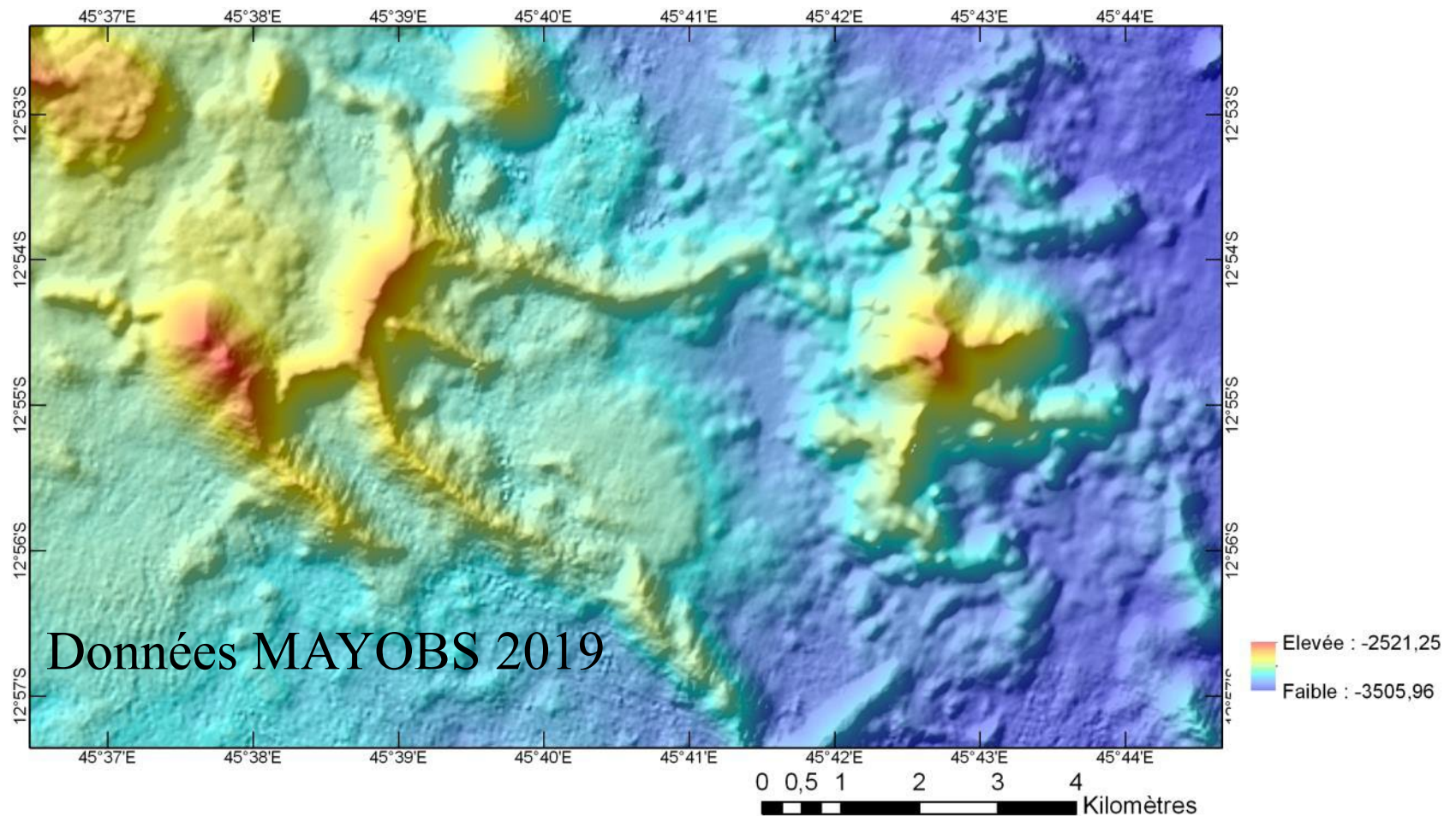
# Les premiers indices détectés dans la colonne d'eau





Feuillet, N. et al. 2021. Birth of a large volcanic edifice offshore Mayotte via lithosphere-scale dyke intrusion. Nat. Geosci. 14, 787–795.





## Découverte d'un nouveau relief par 3600 m de fond

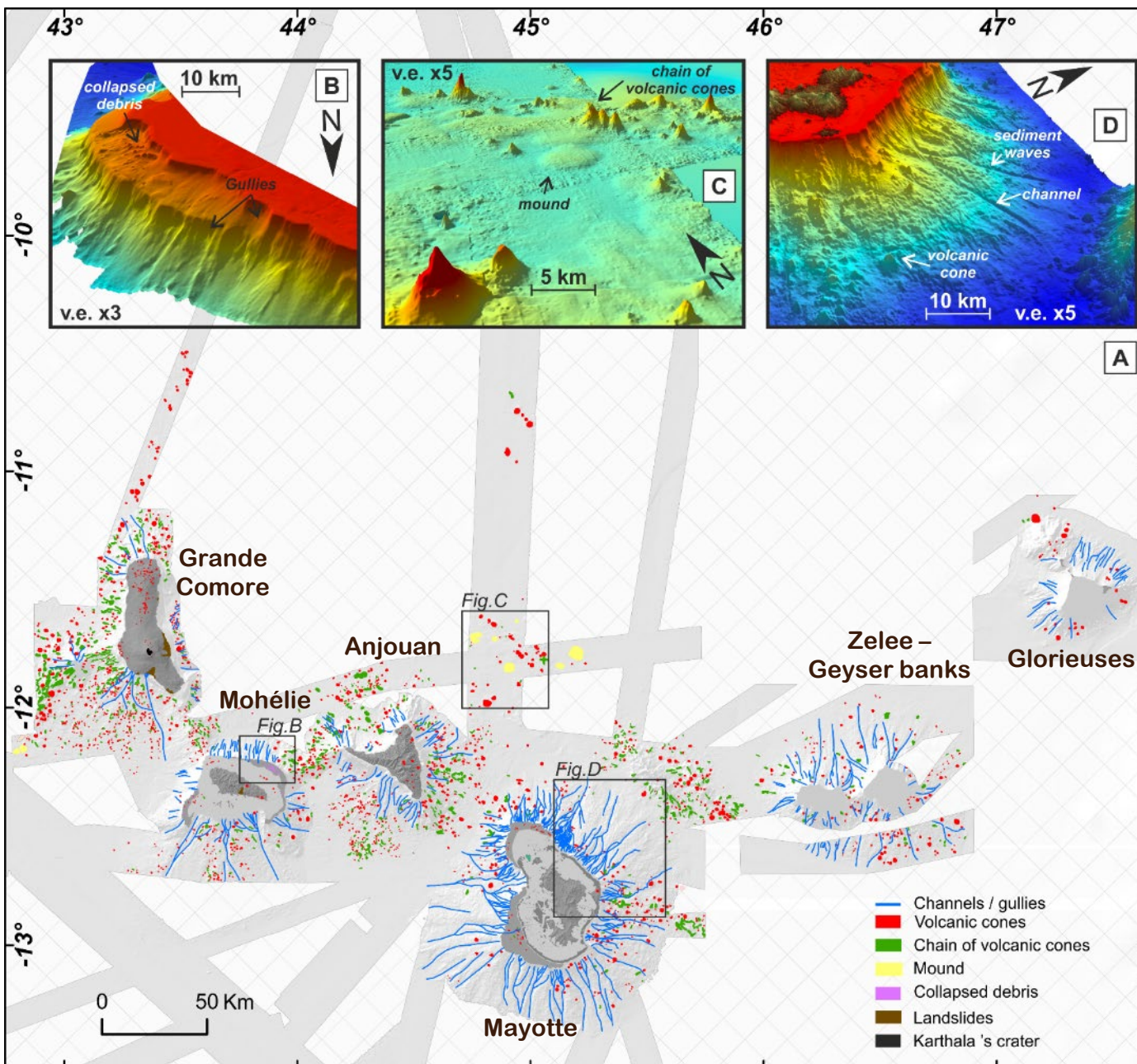
Feuillet, N. et al. 2021. Birth of a large volcanic edifice offshore Mayotte via lithosphere-scale dyke intrusion. Nat. Geosci. 14, 787–795.

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Feuillet, N. et al. 2021. Birth of a large volcanic edifice offshore Mayotte via lithosphere-scale dyke intrusion. Nat. Geosci. 14, 787–795.

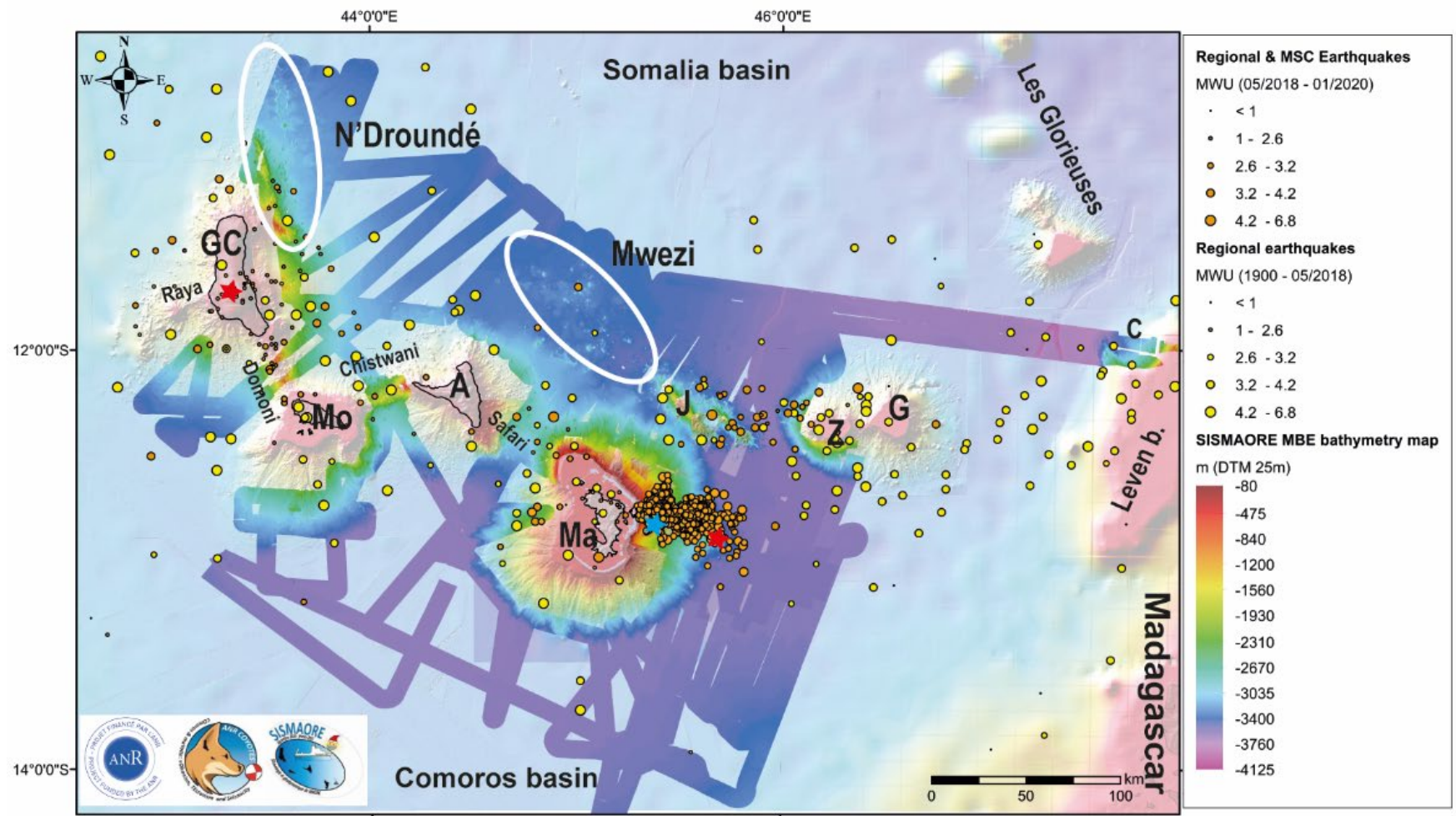




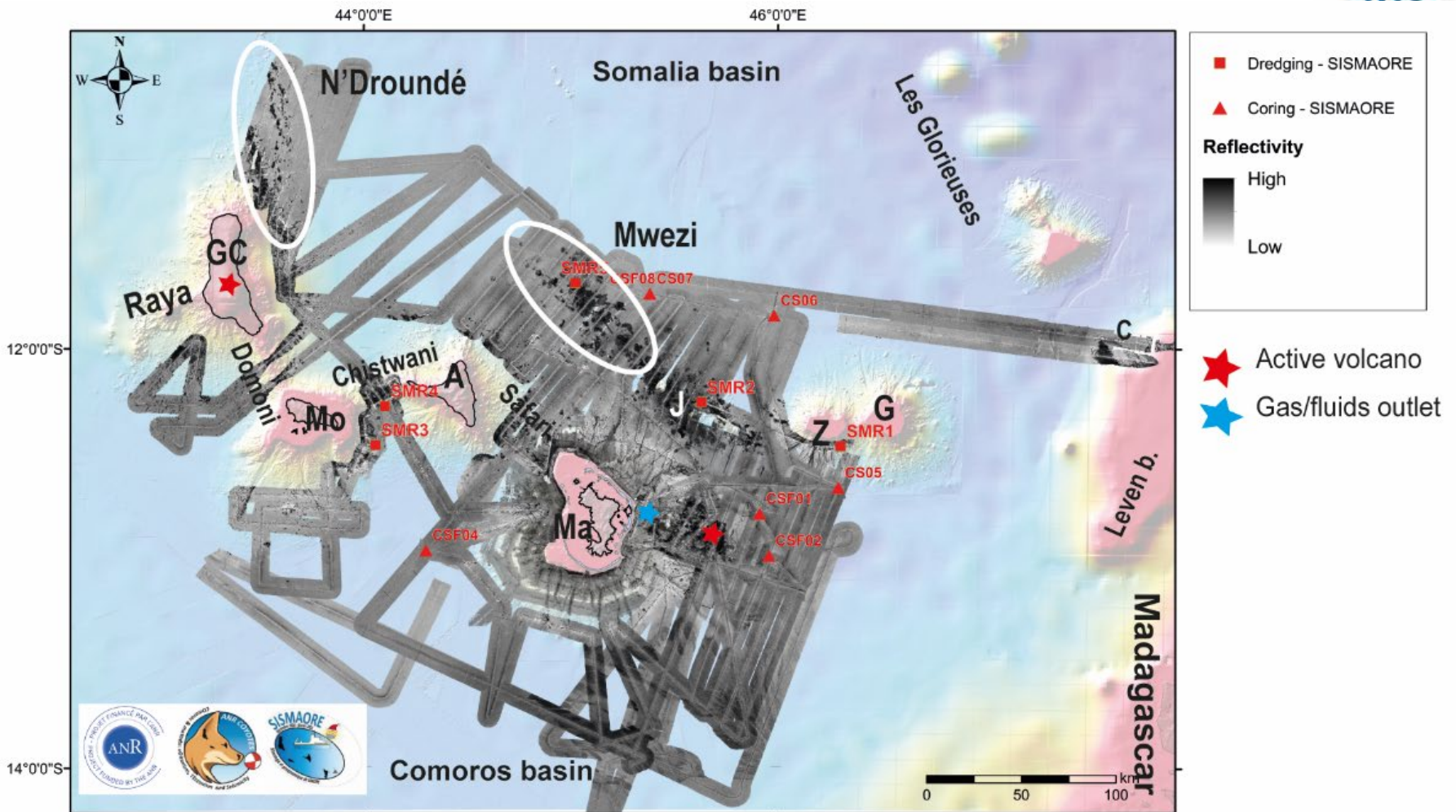
Athina Tzevahirtzian et al. 2021 Submarine morphology of the Comoros volcanic archipelago. Marine Geology







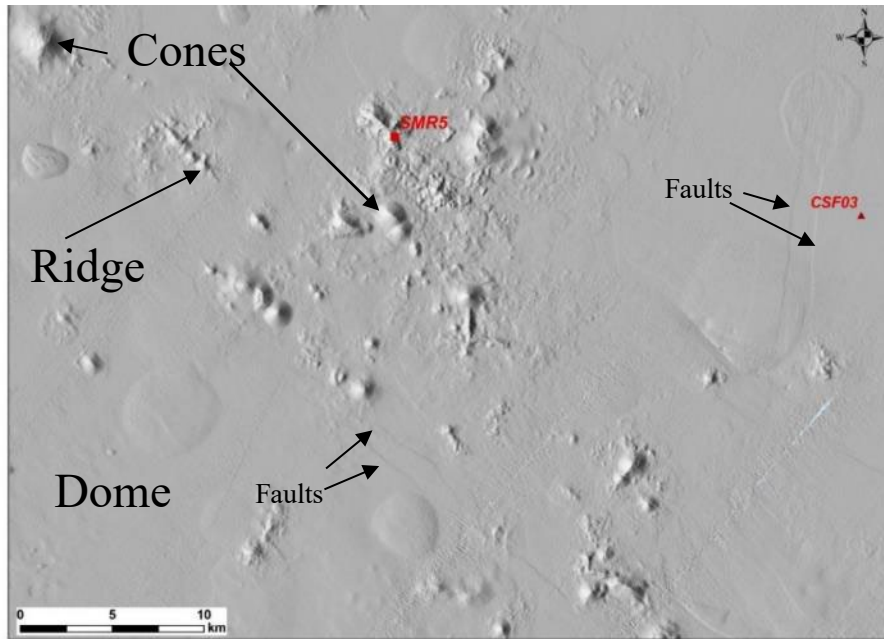
Thinon, I. et al. 2023. Volcanism and tectonics unveiled in the Comoros Archipelago between Africa and Madagascar. *Comptes Rendus. Géoscience* 354, 7–34. <https://doi.org/10.5802/crgeos.159>



Thinon, I. et al. 2023. Volcanism and tectonics unveiled in the Comoros Archipelago between Africa and Madagascar. *Comptes Rendus. Géoscience* 354, 7–34. <https://doi.org/10.5802/crgeos.159>



# Mwezi tecto-volcanic province



bathymetry map

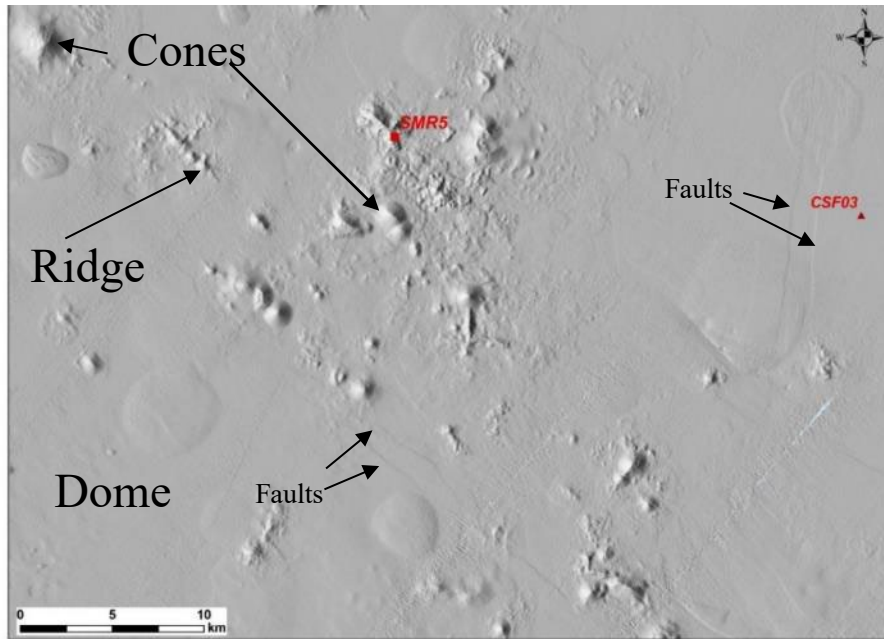


Backscatter map

- Various morphologies (cones, ridges), H max= 600m; Diameter max=4km; N130° and NNE-SSW alignments; high reflectivity; dredged rocks = Popping rocks (basaltic, gas-rich)
- Patches (diameter max~15km), without relief with high reflectivity → Lava flows
- Escarpments (H~10m; L ≤ 10 km), Faults in relay, grabens, cut or link the volcanic structures. Oriented: N130°, NNE-SSW, NW-SE
- Domes (H: 100m), no signature on backscatter map

Thinon, I. et al. 2023. Volcanism and tectonics unveiled in the Comoros Archipelago between Africa and Madagascar. *Comptes Rendus. Géoscience* 354, 7–34. <https://doi.org/10.5802/crgeos.159>

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12 carottages:

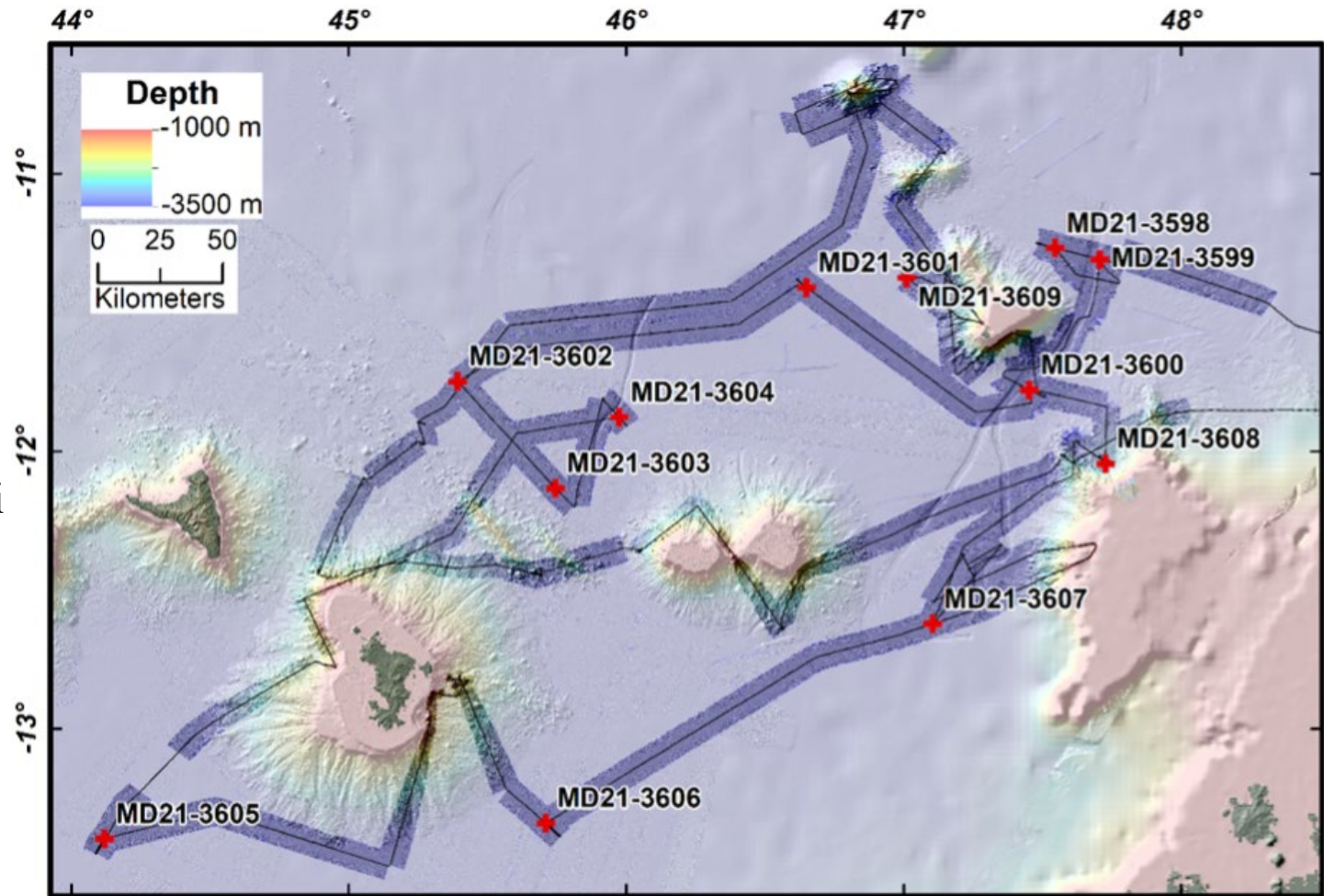
- Glorieuses
- Jumelles/Mwezi
- Mayotte
- Banc Leven



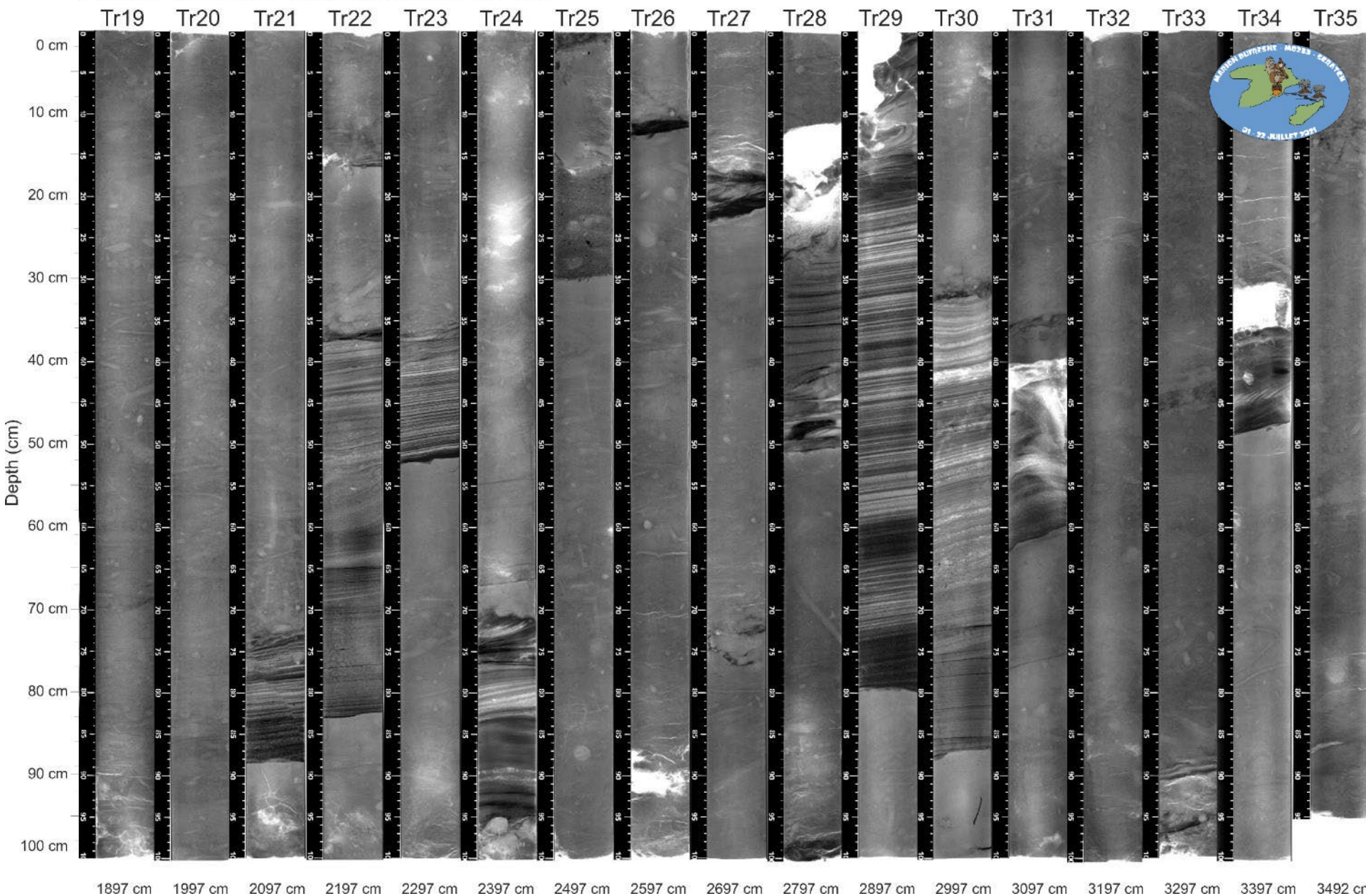


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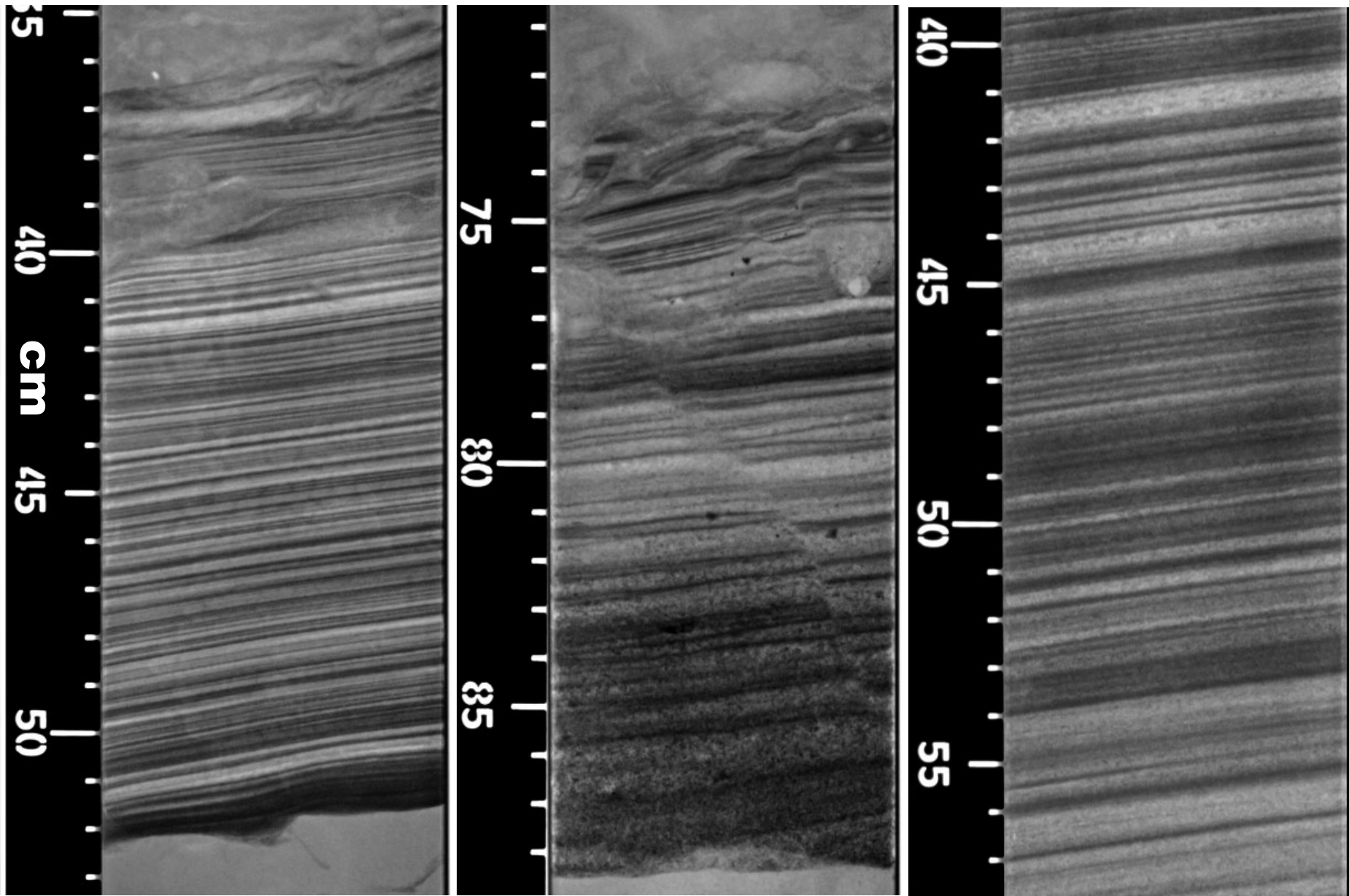
- Glorieuses
- Jumelles/Mwezi
- Mayotte
- Banc Leven

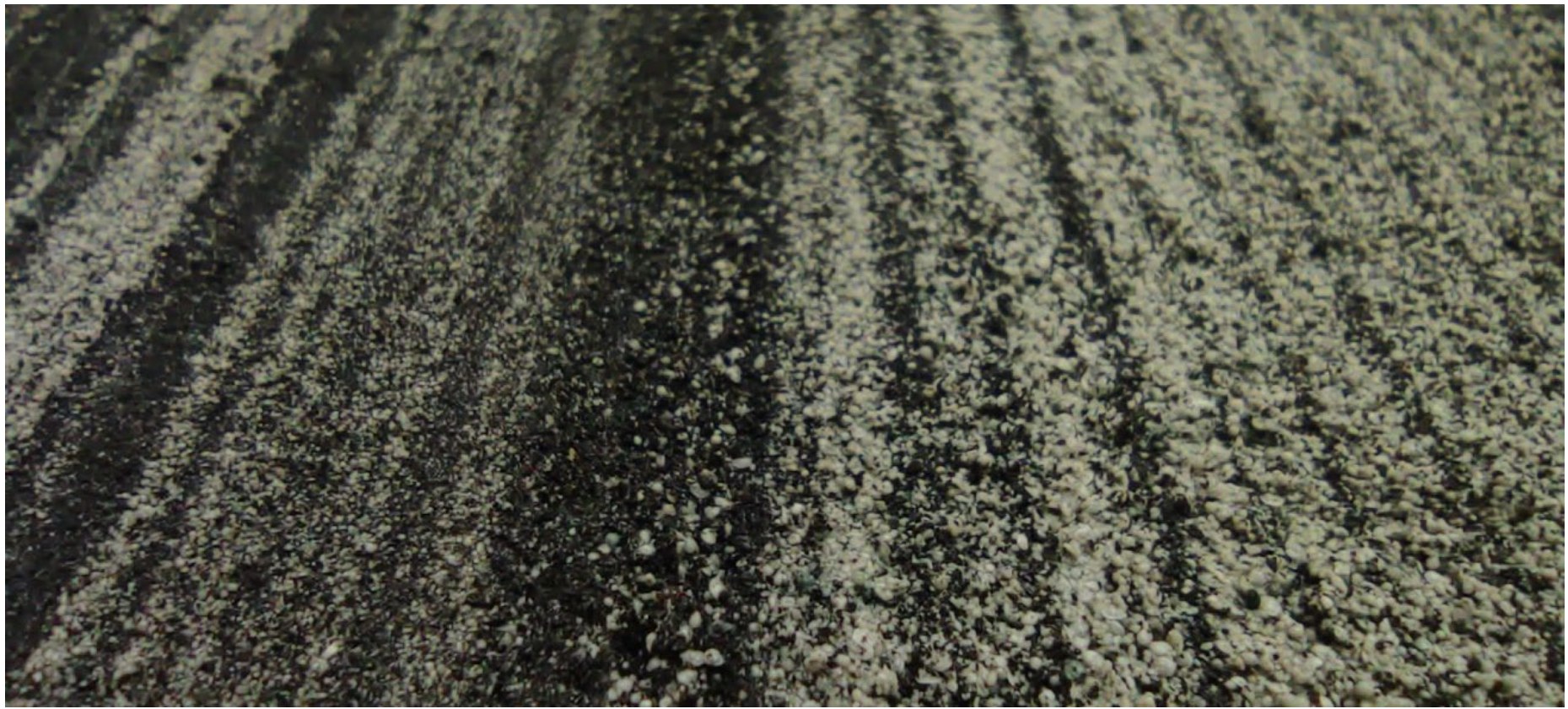


# SCRATCH MD21-3604 Sections 19 - 35



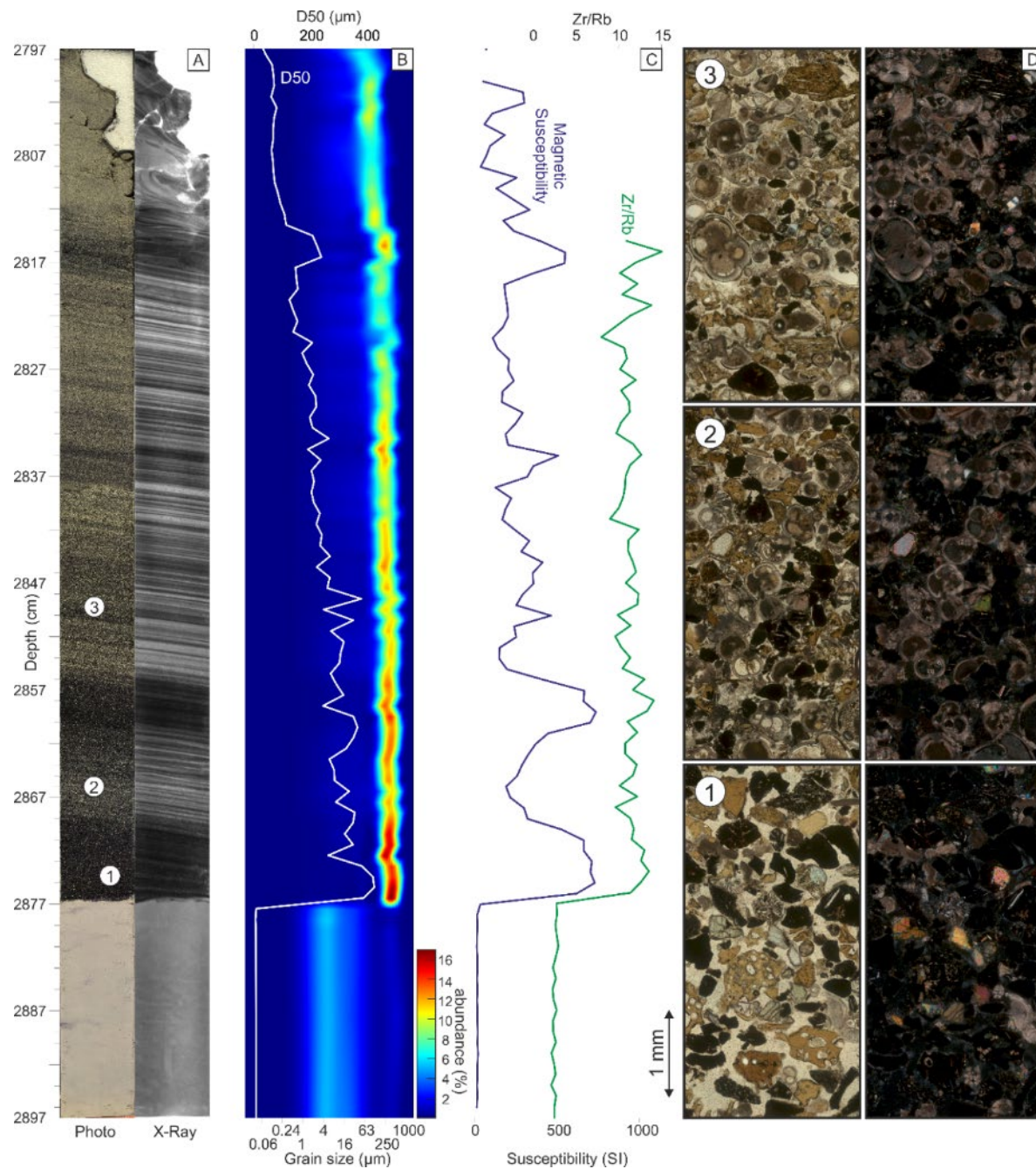






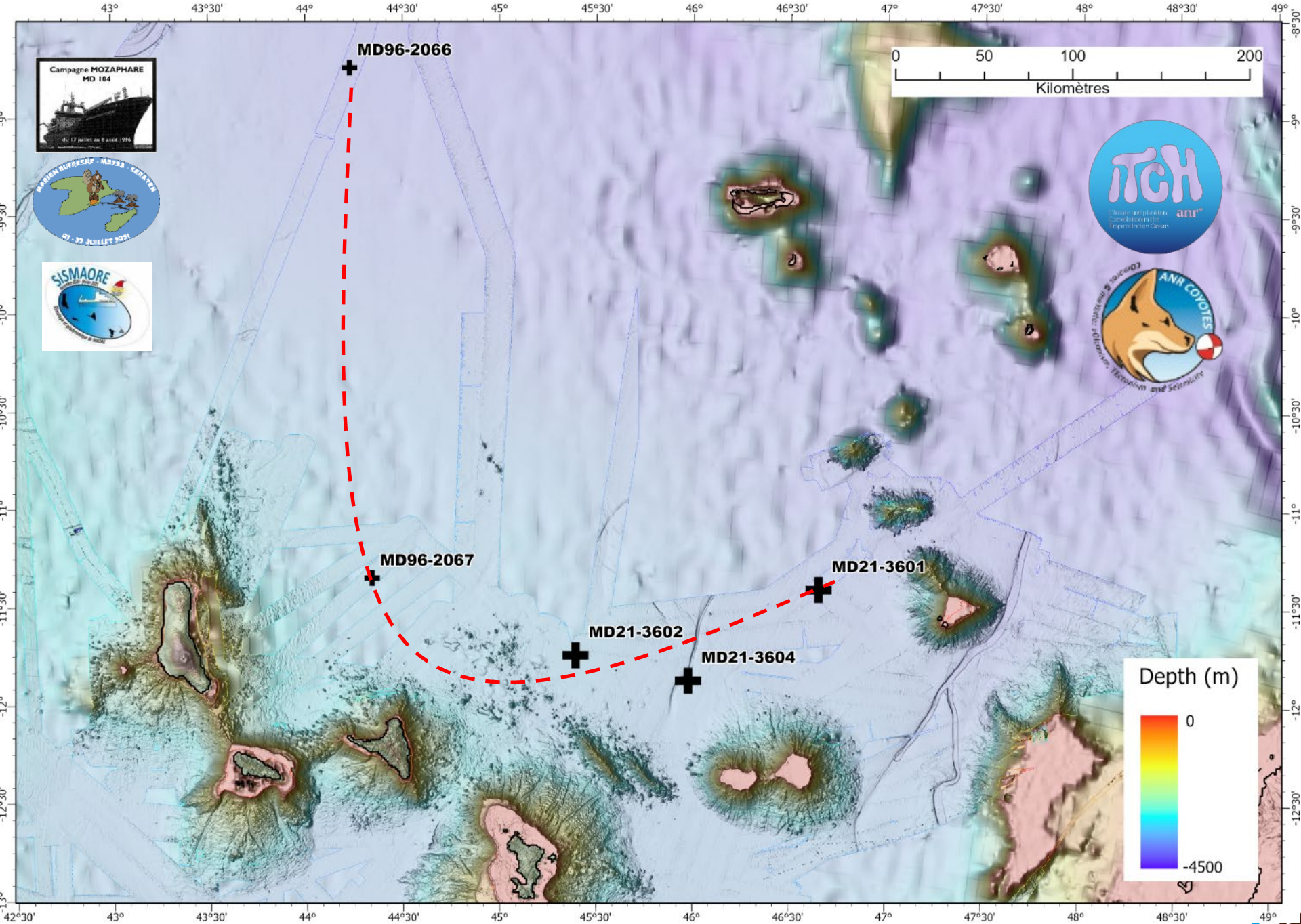
**10 cm**



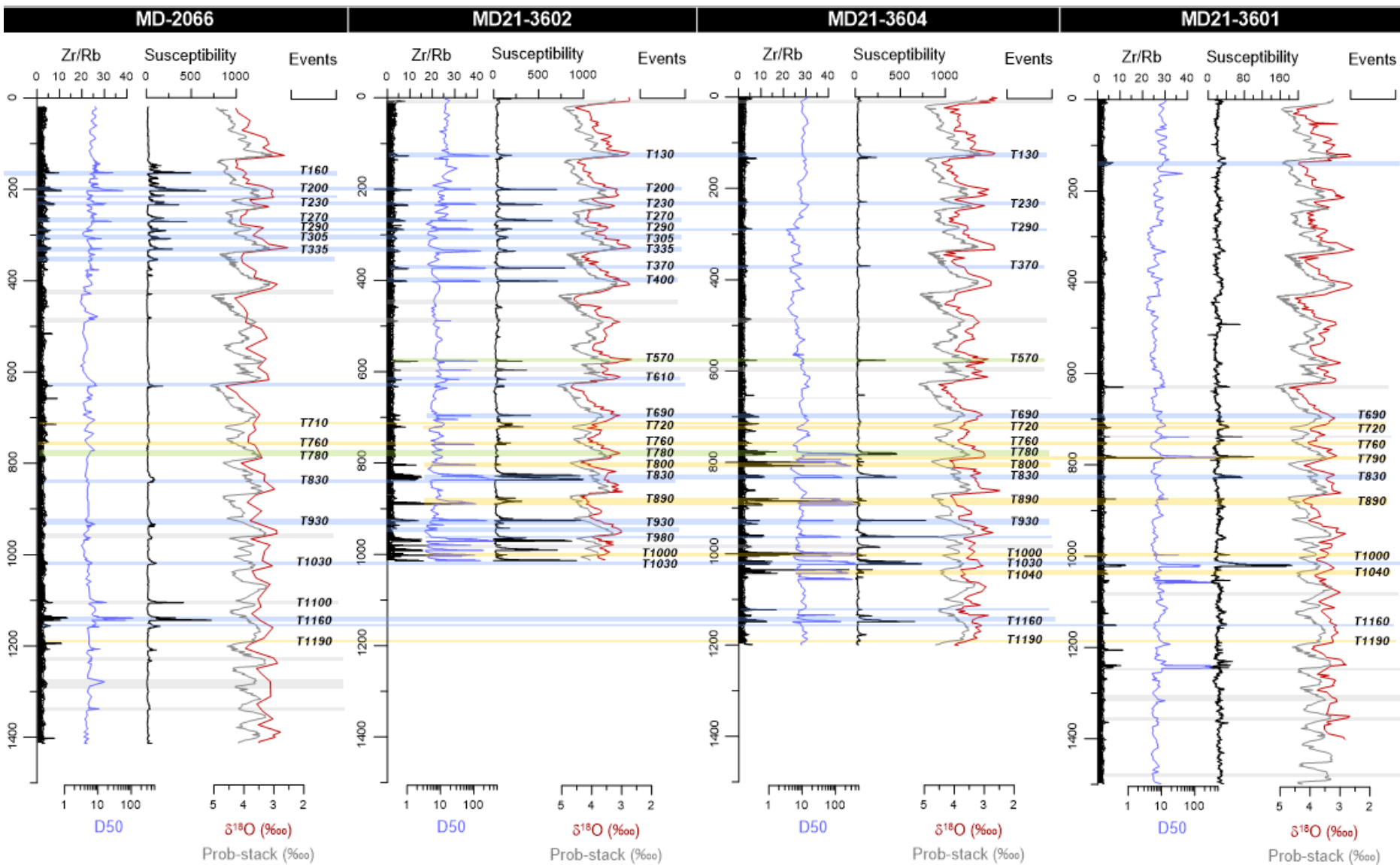


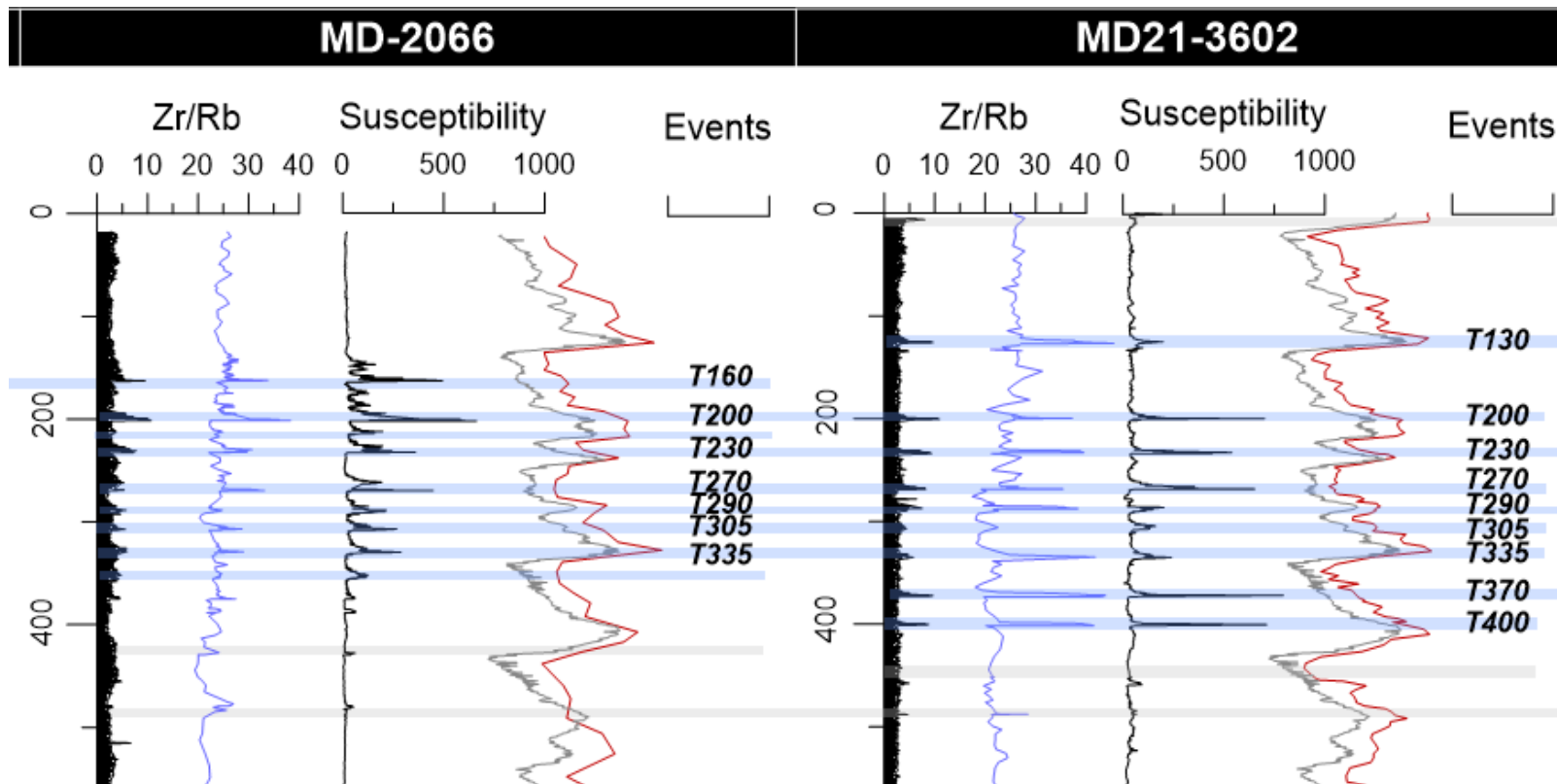
Tzevahirtzian, A. et al, Evidence of intense volcanoclastic sedimentary activity over the last 1.5 Ma north of the Comoros Archipelago, *to be submitted in 2025 in Marine Geology*



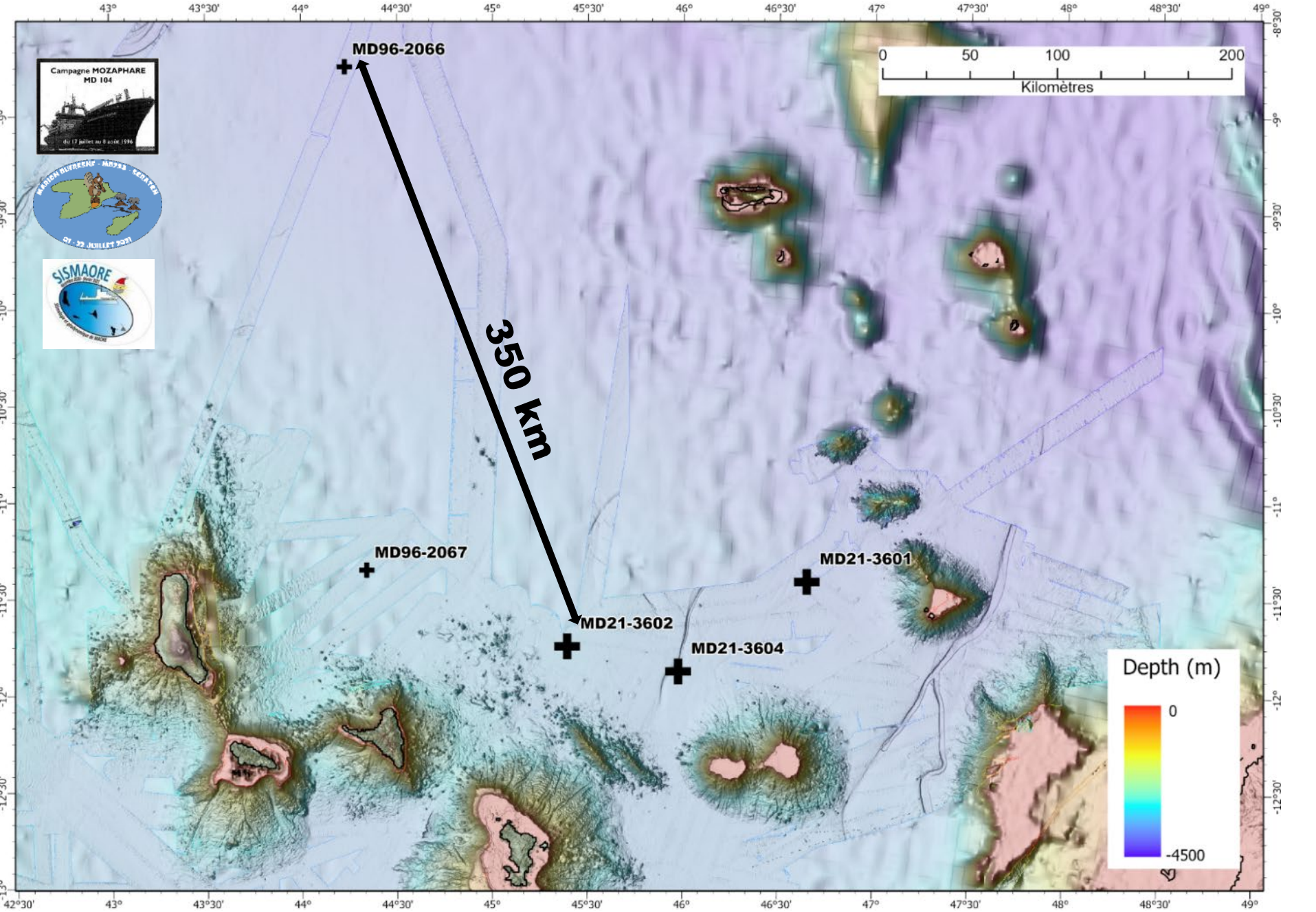




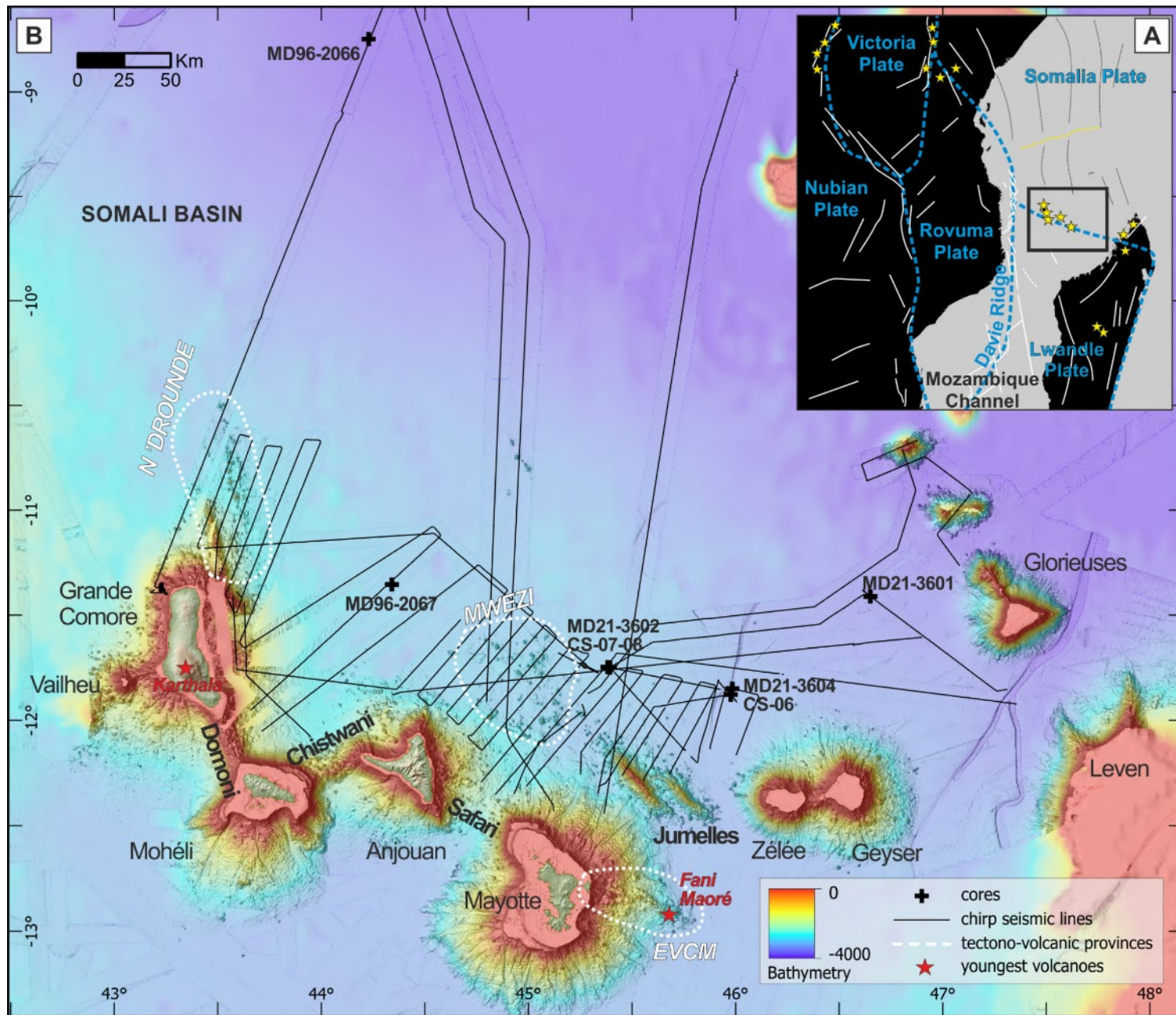




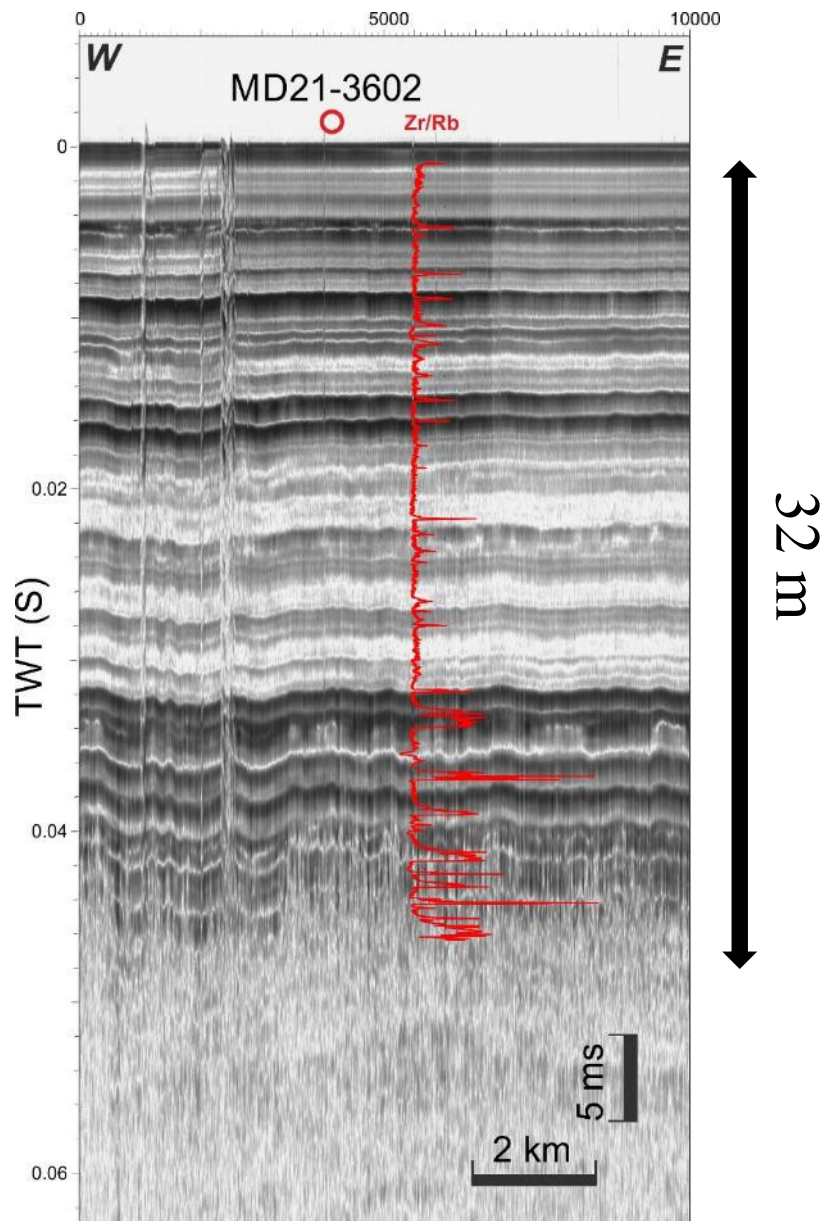






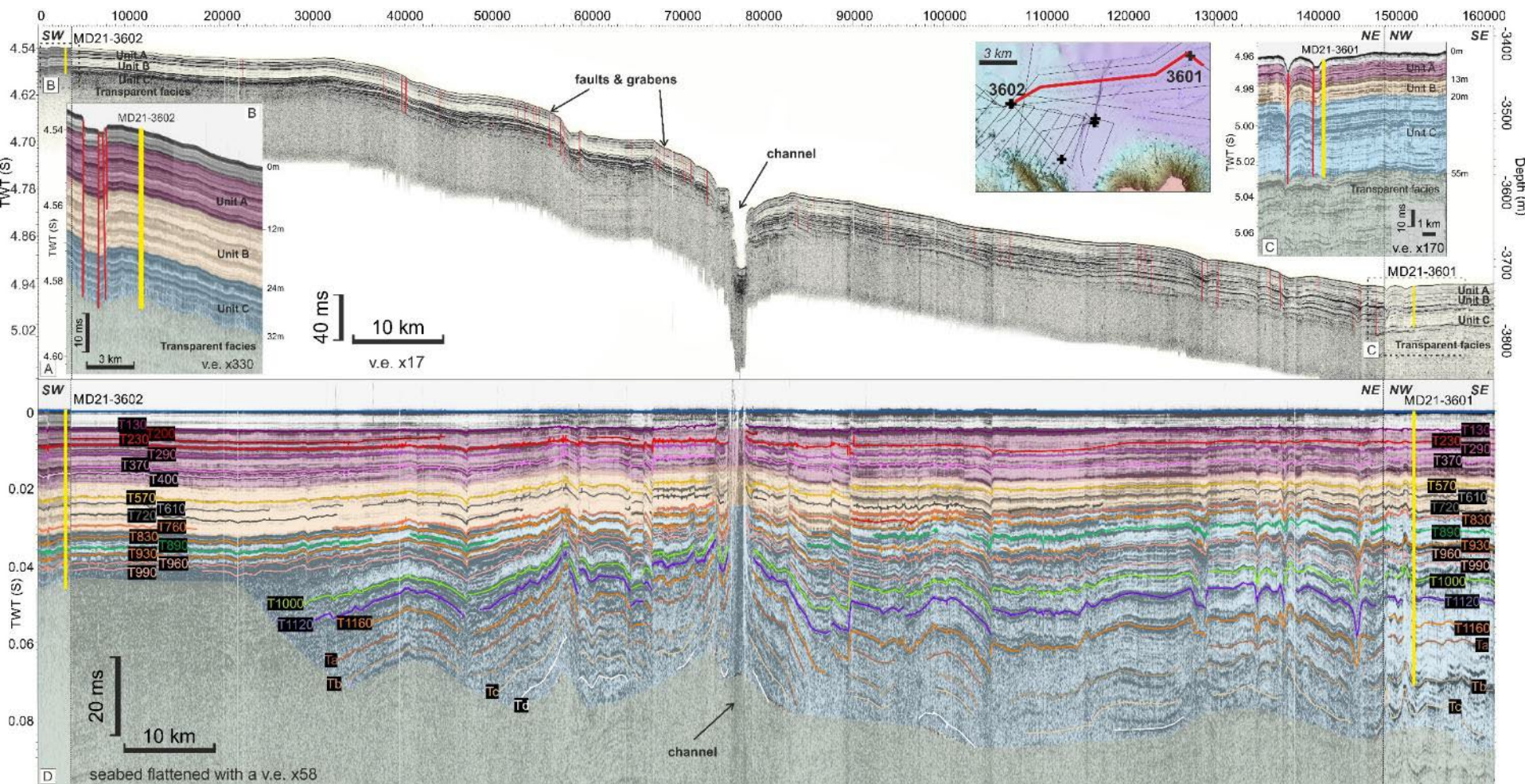




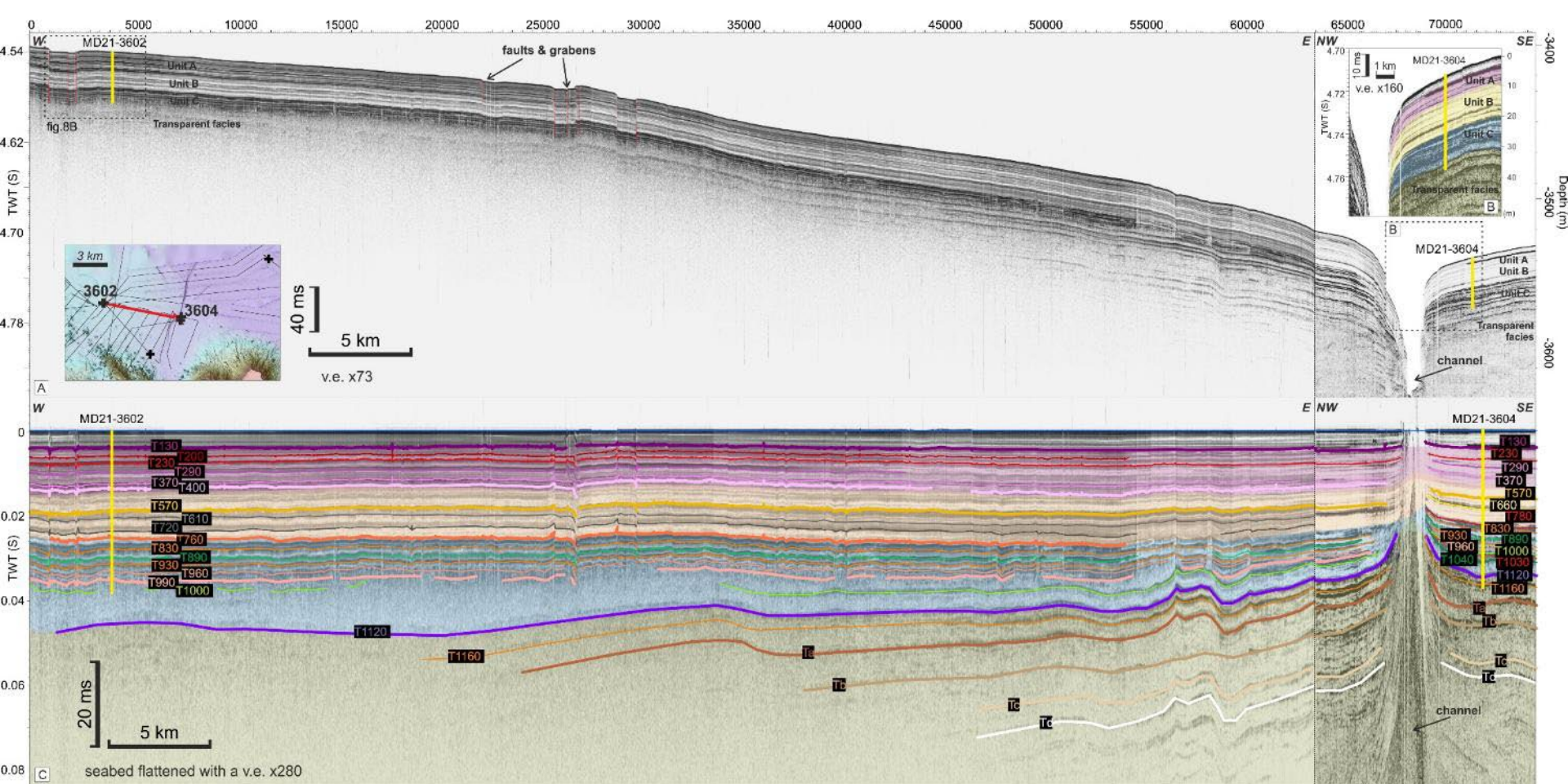




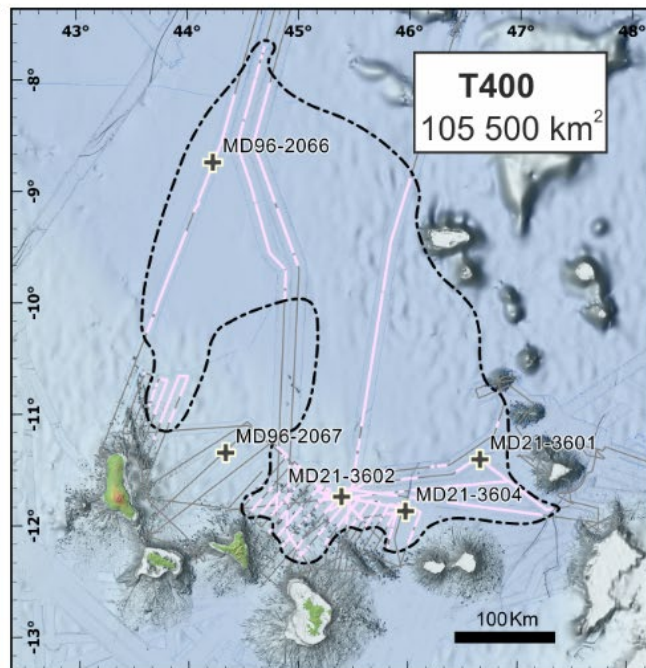
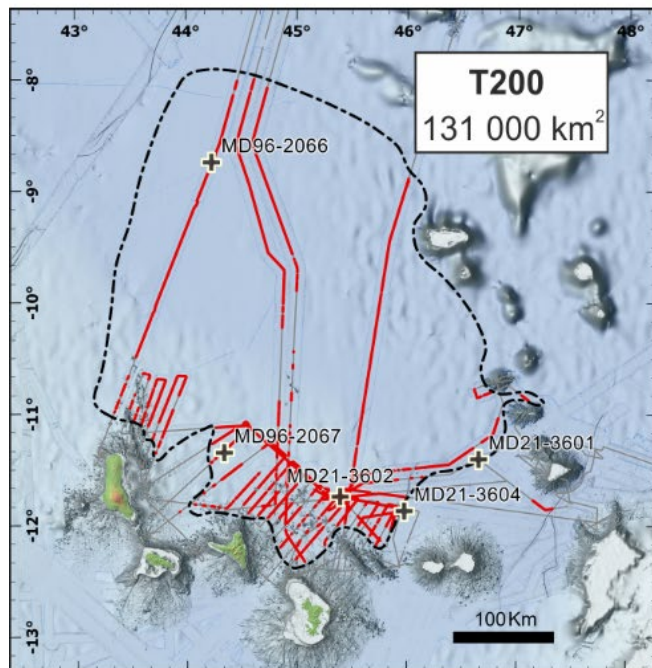
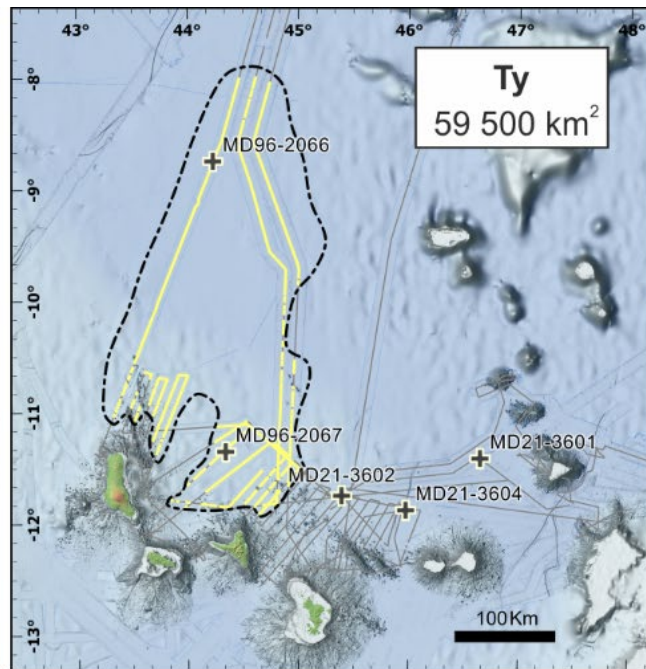
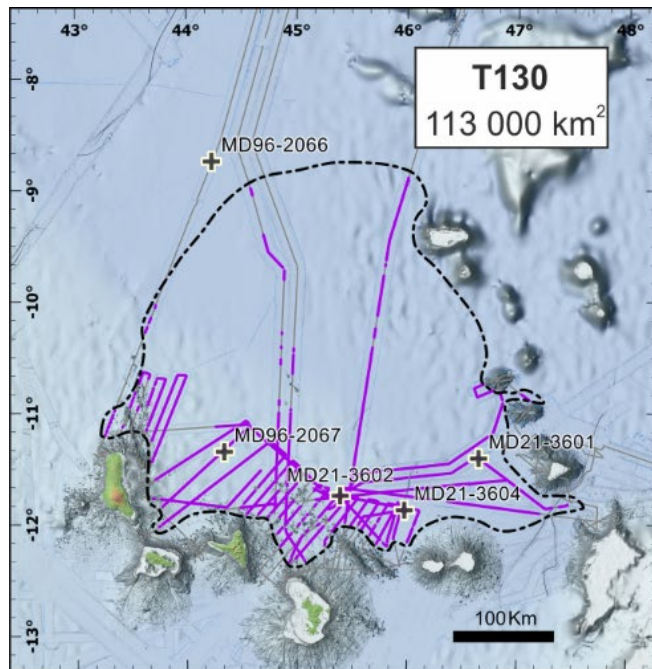




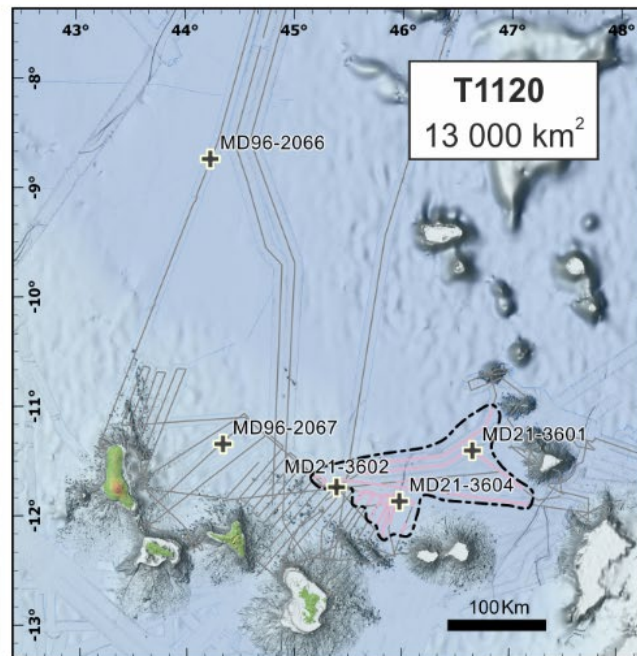
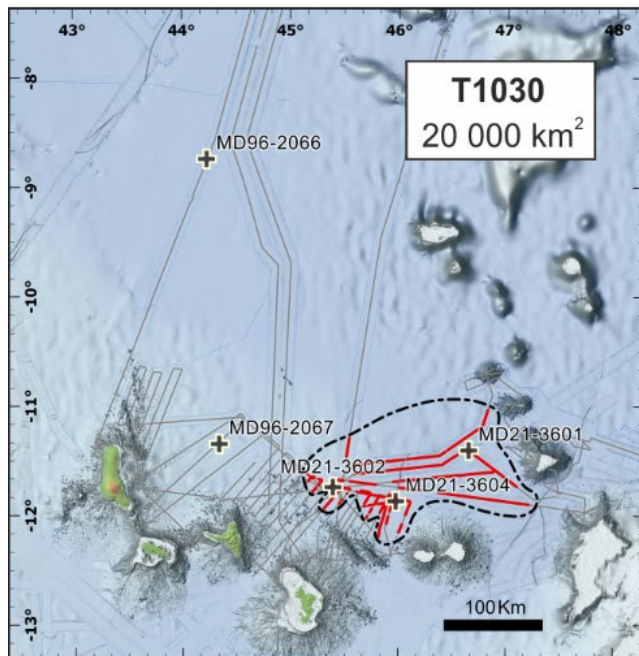
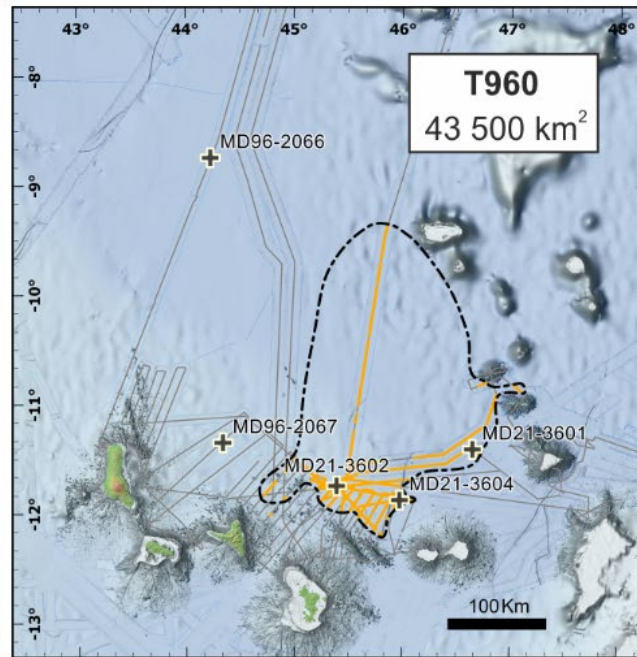
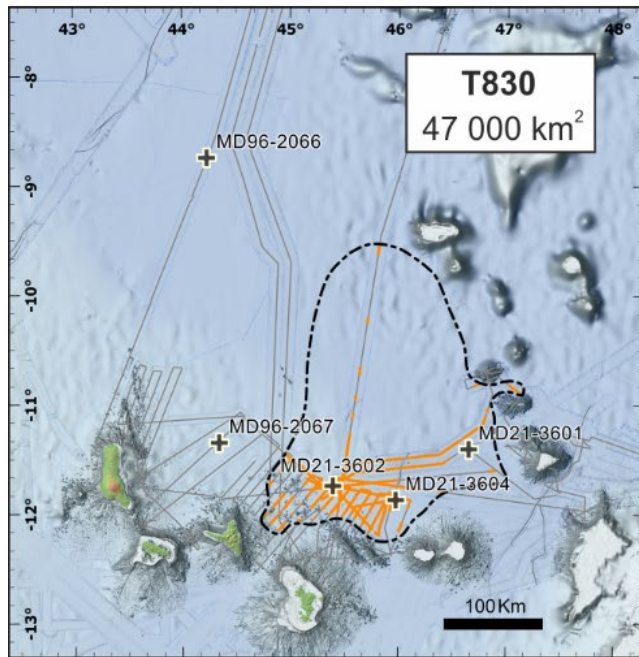




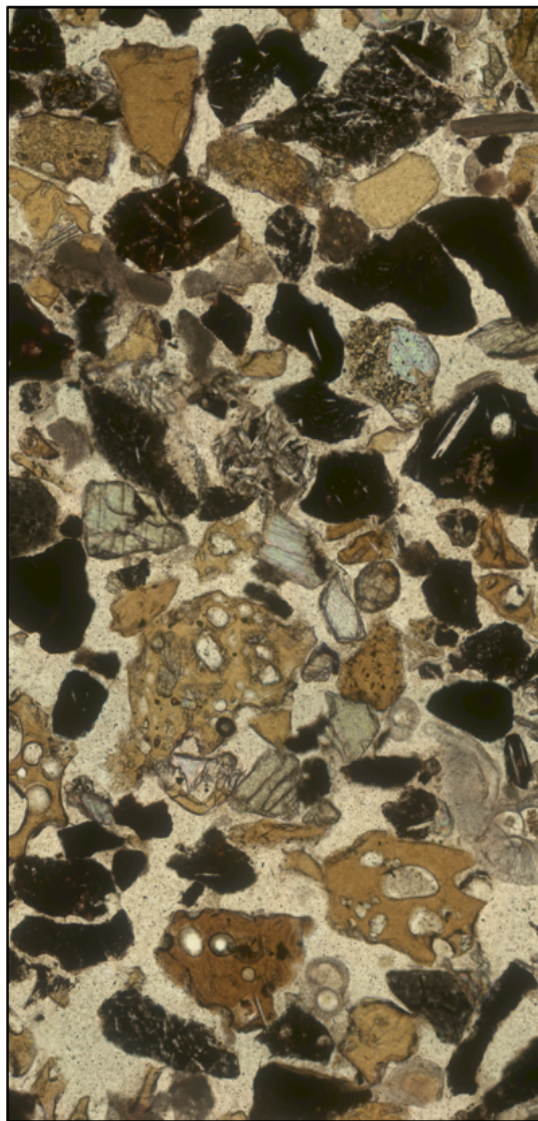




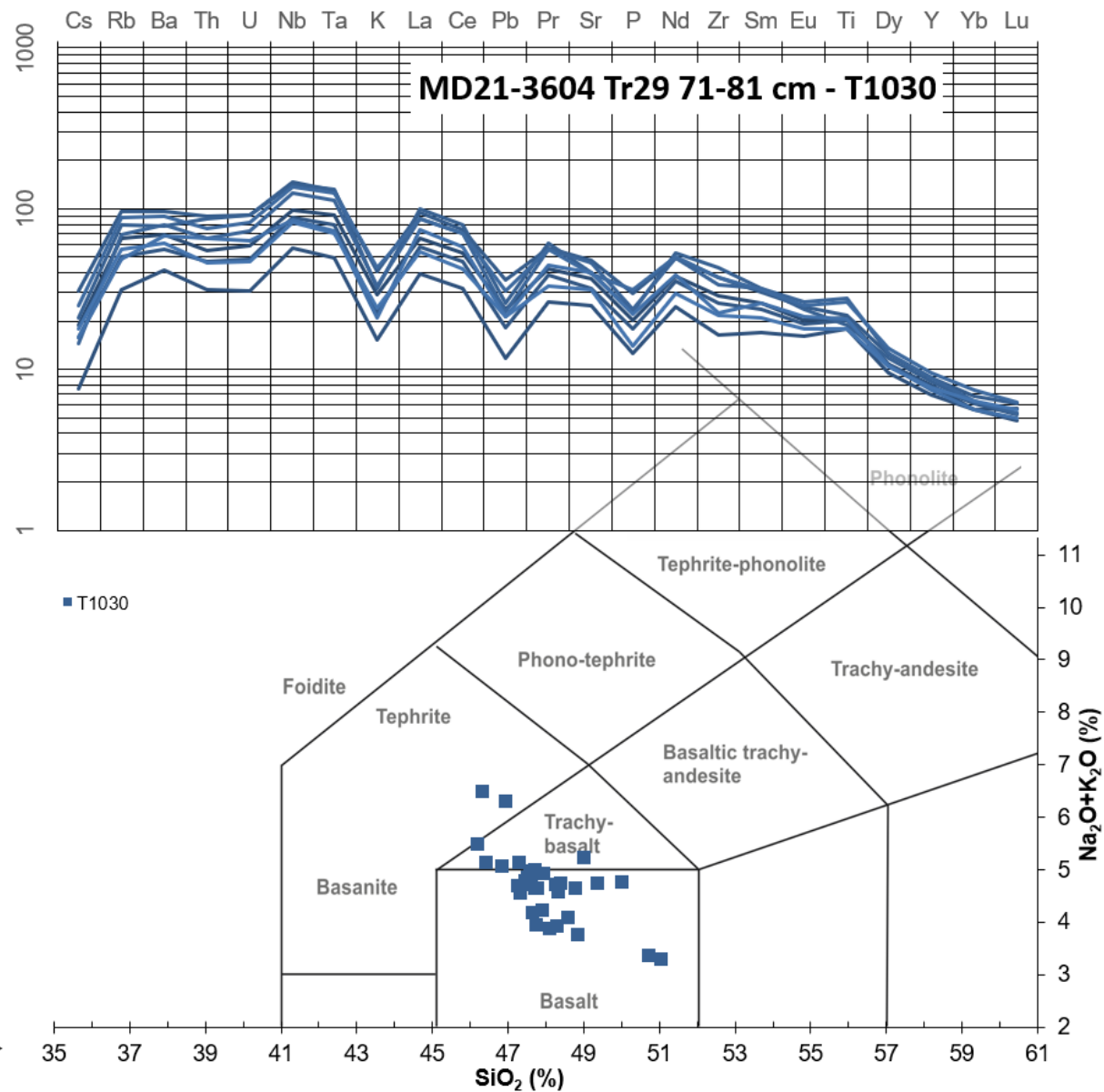








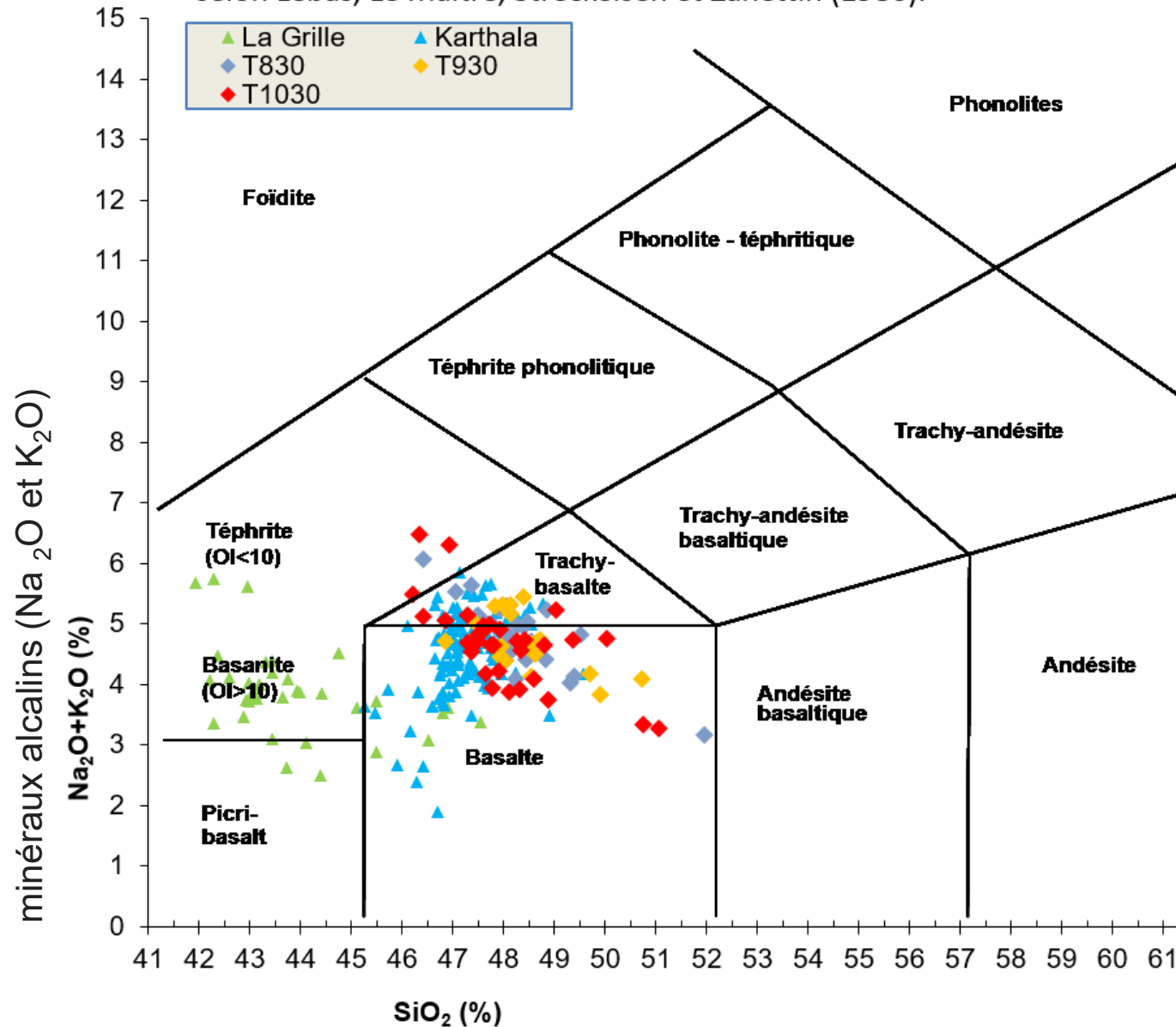
2 mm



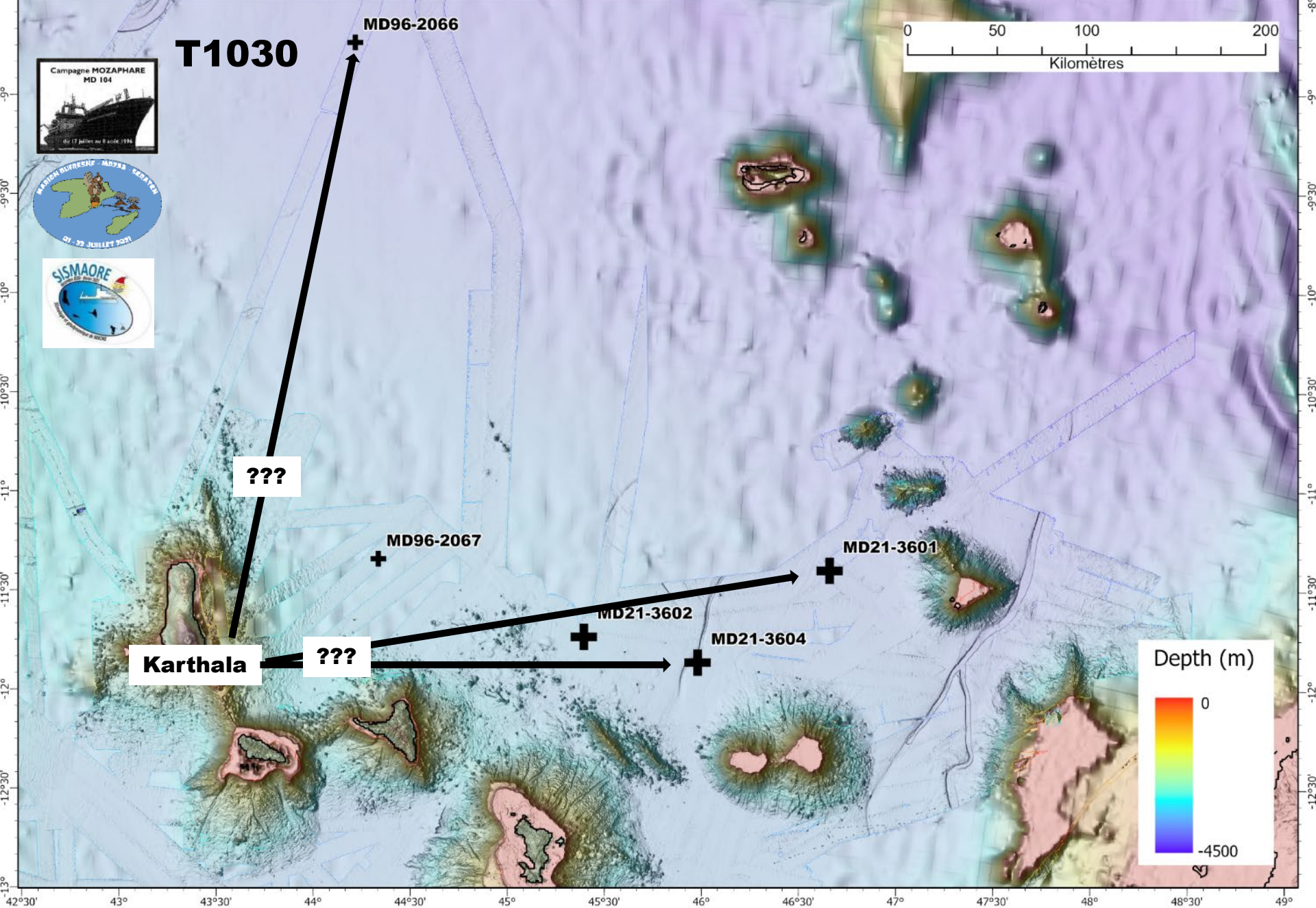
## Classification TAS (pour Total Alkali Silica)

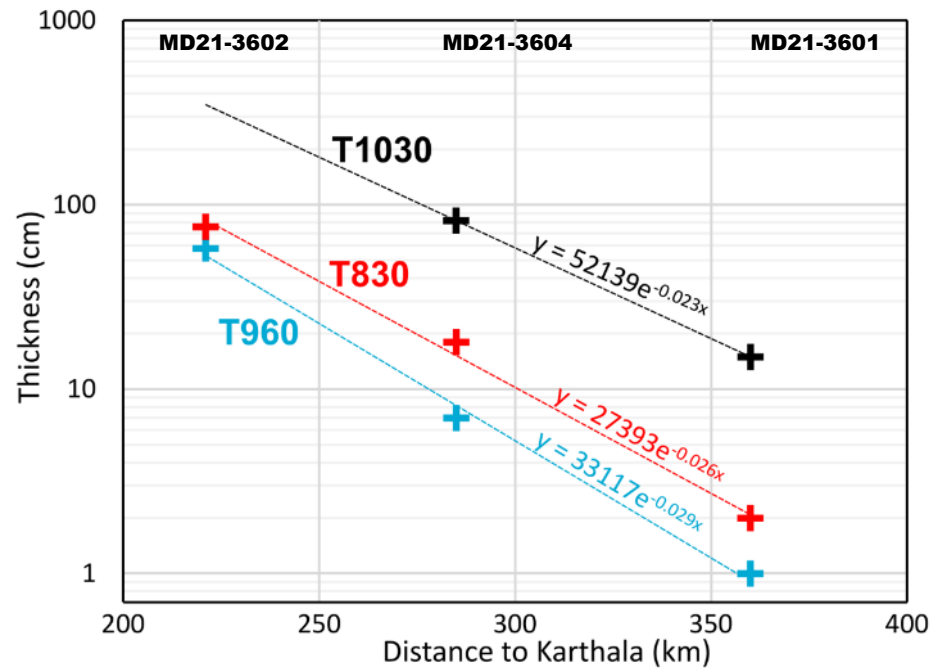
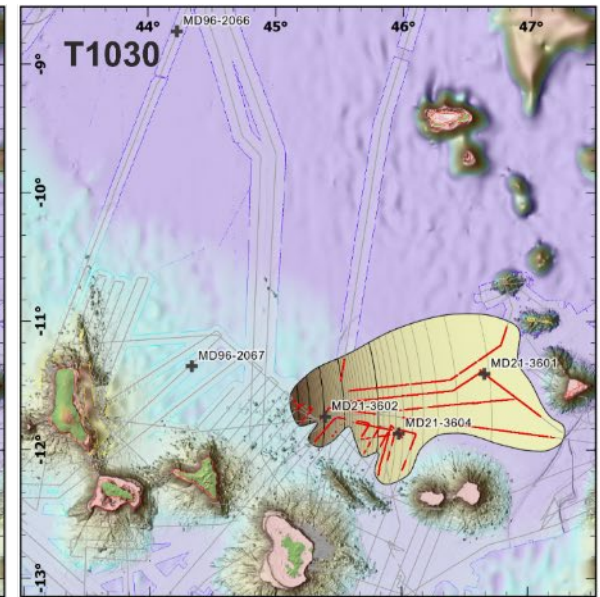
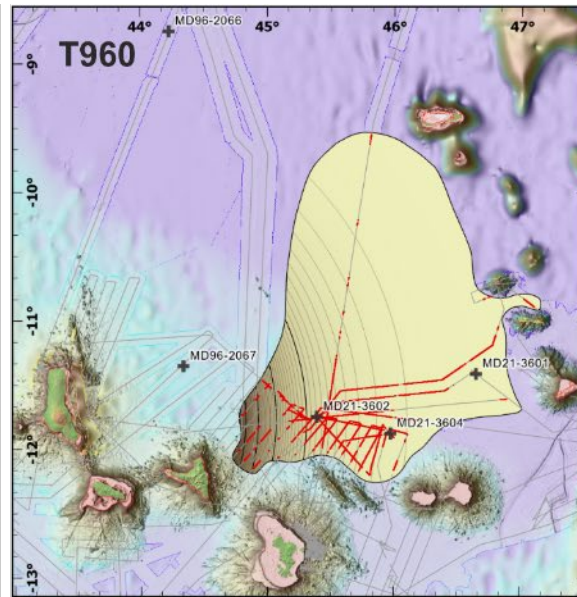
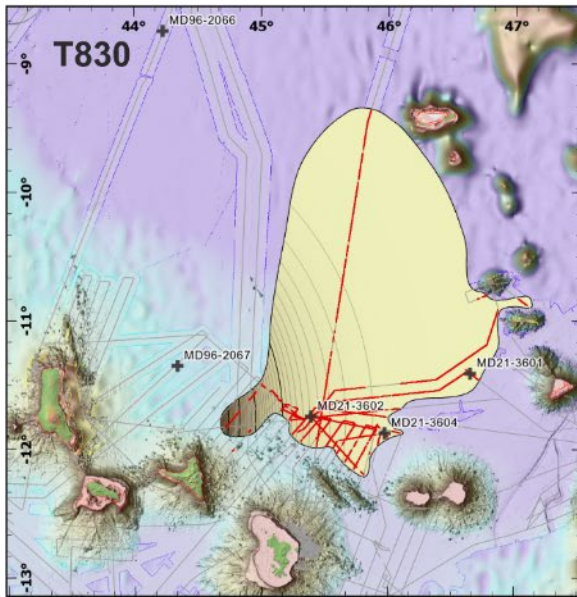
### Classification des laves

selon Lebas, Le Maître, Streckeisen et Zanettin (1986).

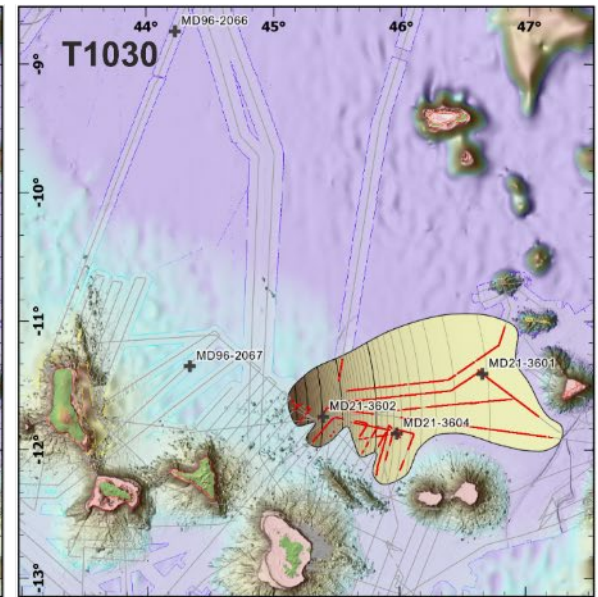
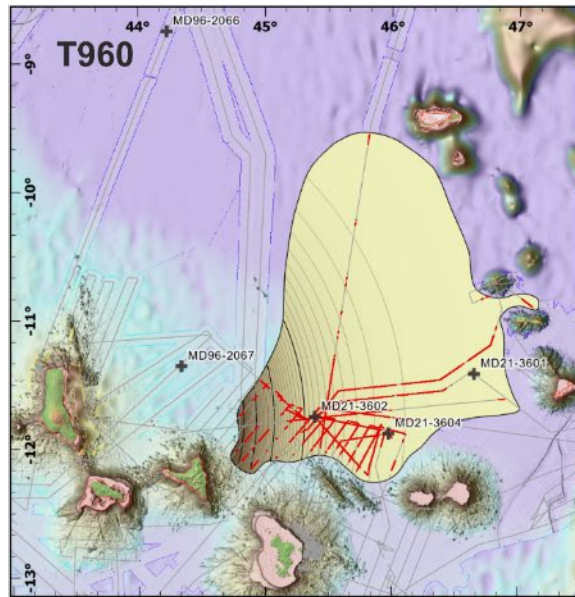
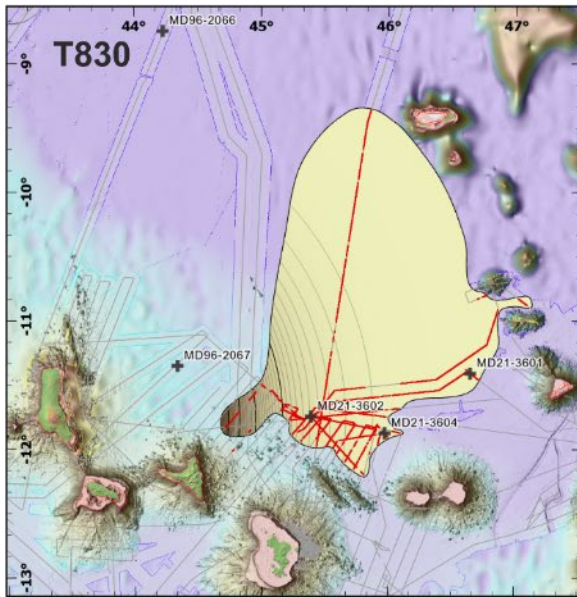










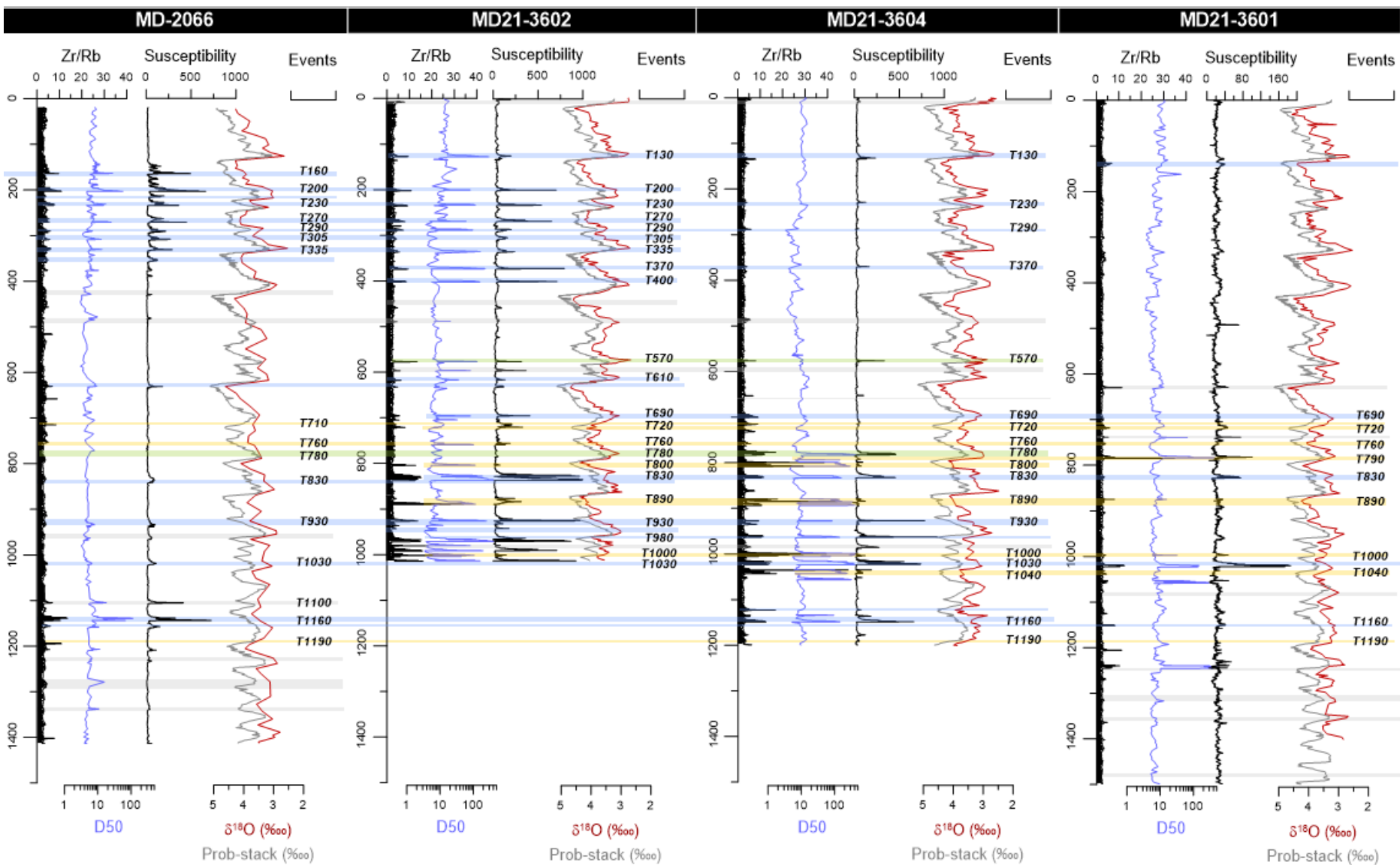


Estimated tephra volumes based on deposits in core MD21-3601, 3602 and 3604

|                                                                              | T830    | T960    | T1030   |
|------------------------------------------------------------------------------|---------|---------|---------|
| Tephra density in sediment (g/cm3)                                           | 0.557   | 0.856   | 0.606   |
| Mean deposit thickness (cm)                                                  | 36.75   | 20.50   | 79.32   |
| Deposit weight, taking into account deposit thickness (tonnes/km2 of seabed) | 204 599 | 175 466 | 481 055 |
| Surface area of deposits (km2)                                               | 46 996  | 43 327  | 20 296  |
| Glass density                                                                | 2.5     | 2.5     | 2.5     |
| Volume of tephra deposited (km3)                                             | 3.85    | 3.04    | 3.91    |













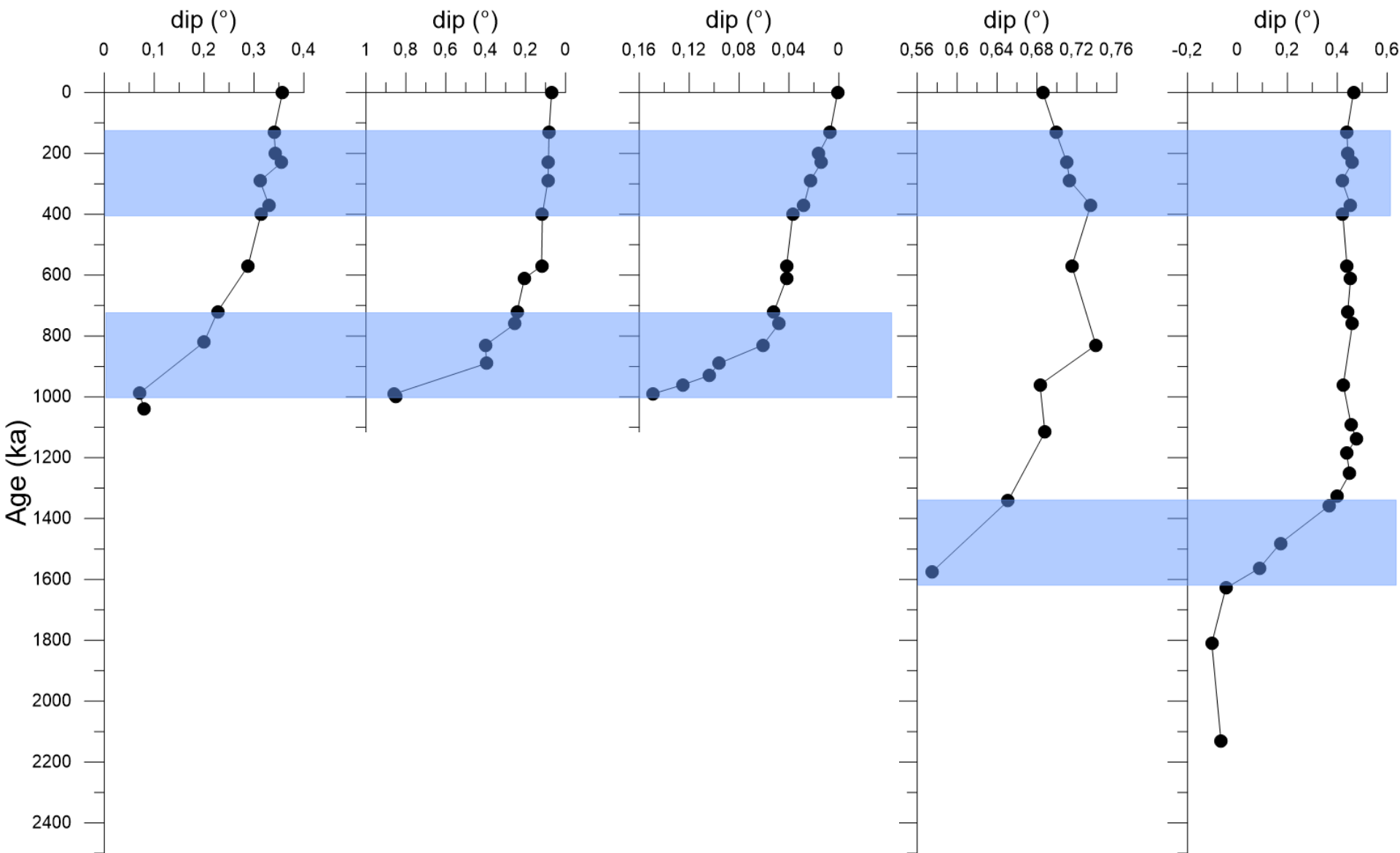
NW Jumelles

3604-3603

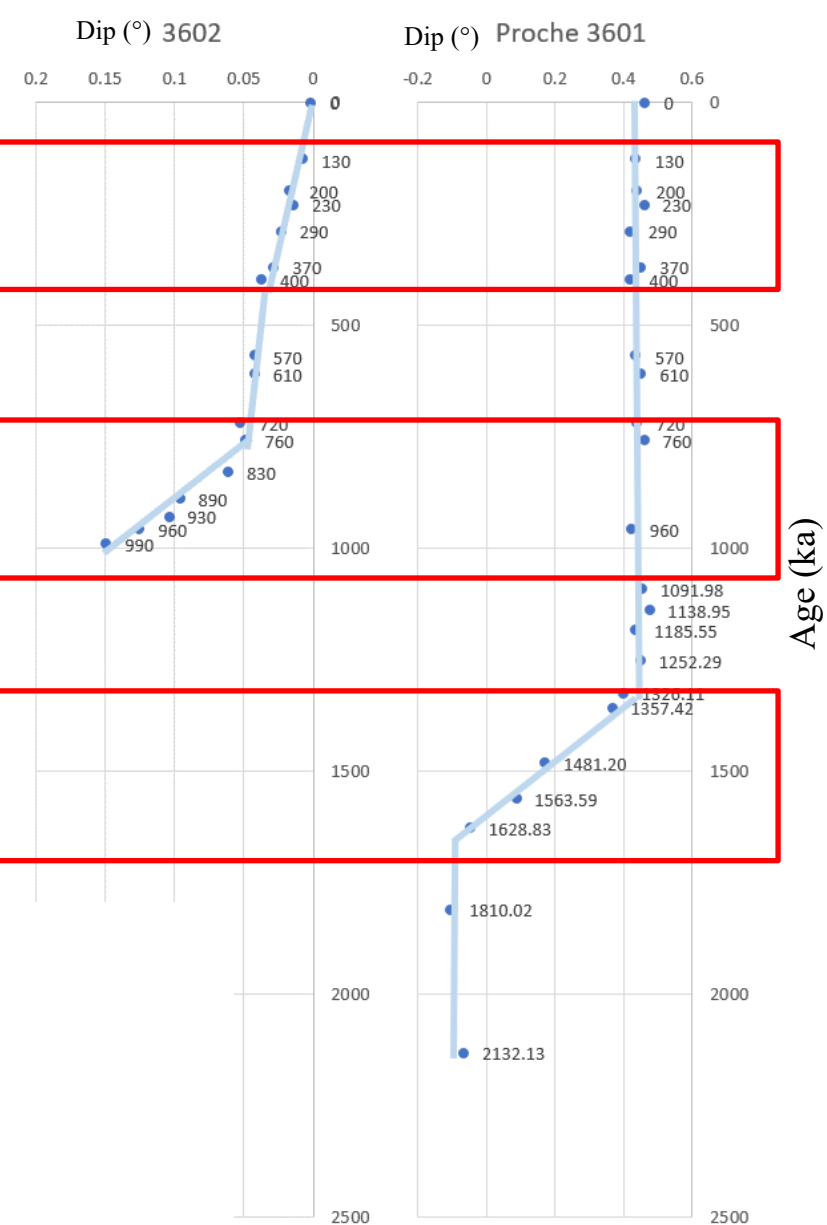
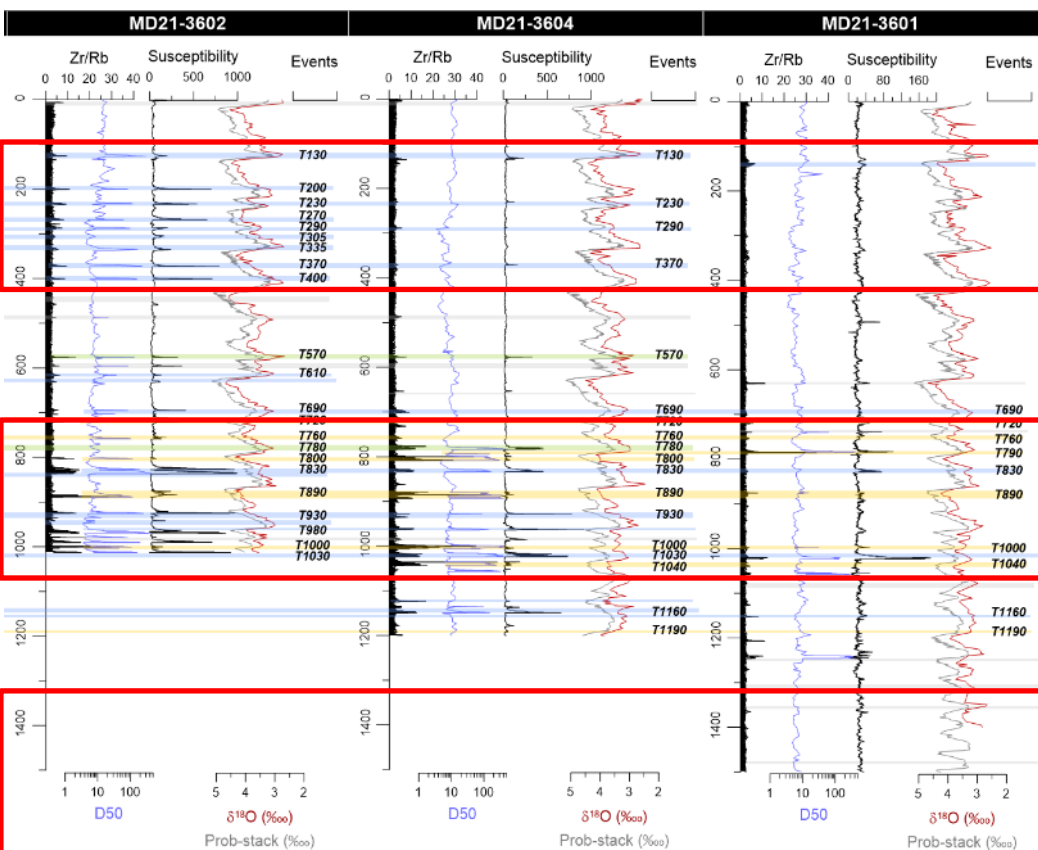
3602

3604 - 3601

Near 3601







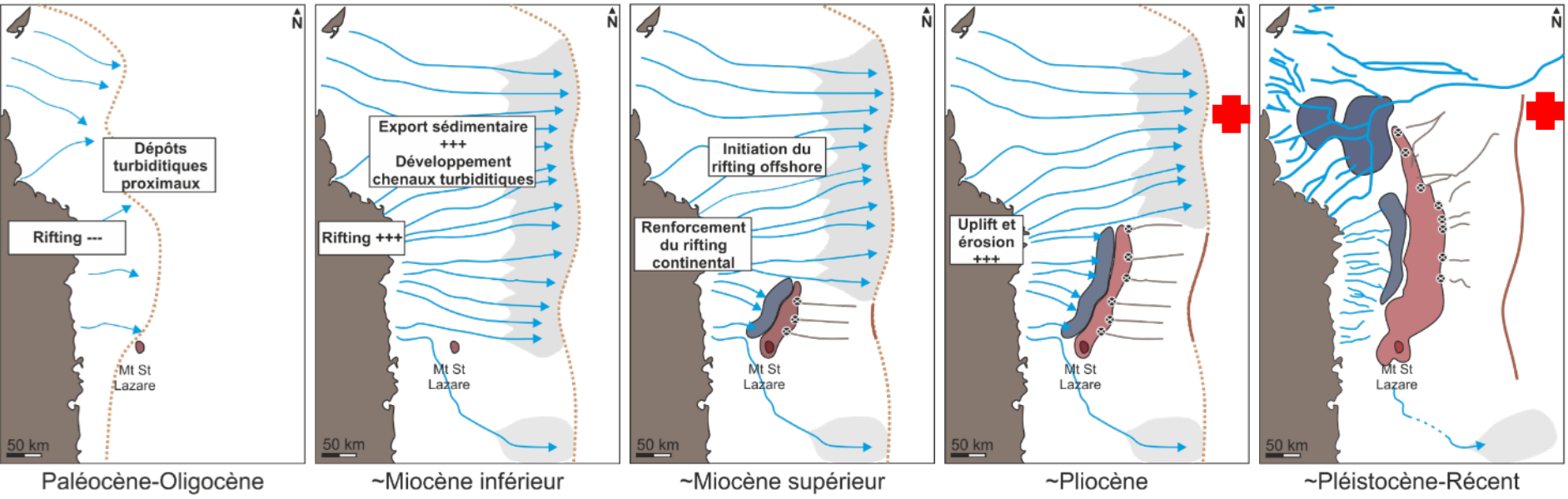
**Actif : 130 – 400 ka -> 270 ka**

**Inactif : 400-720 ka -> 320 ka**

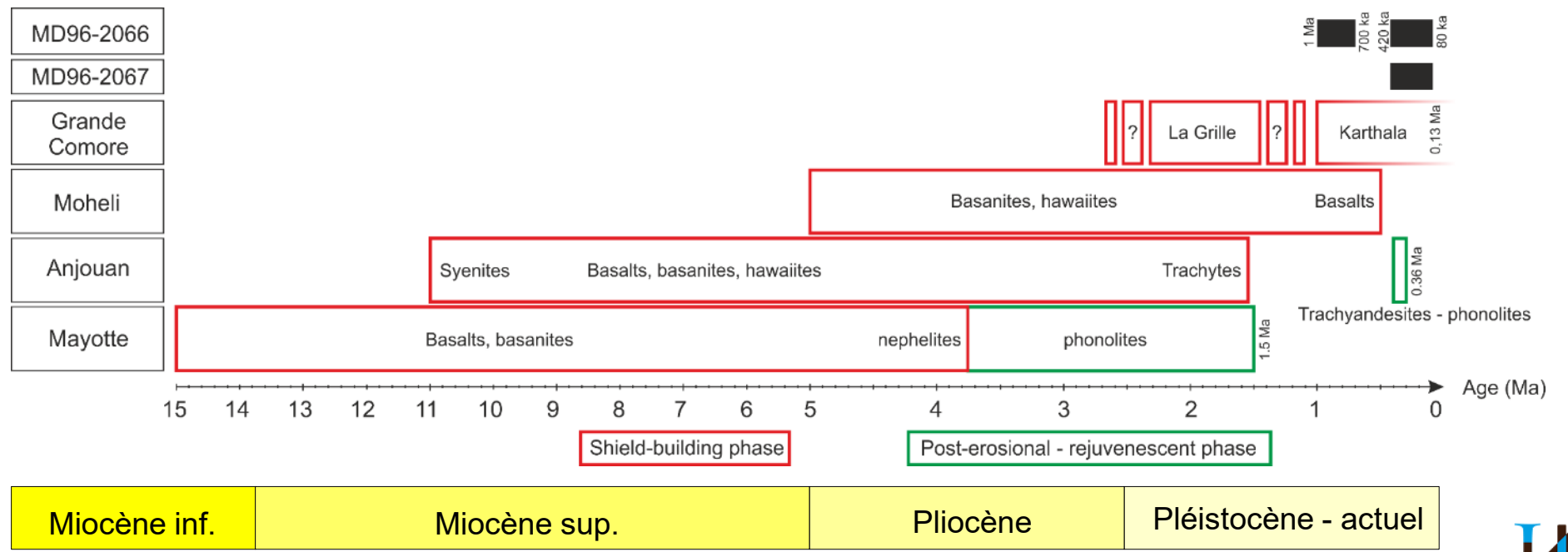
**Actif : 720 – 1030 ka -> 280 ka**

**Inactif : 1030 – 1350 ka -> 350 ka**

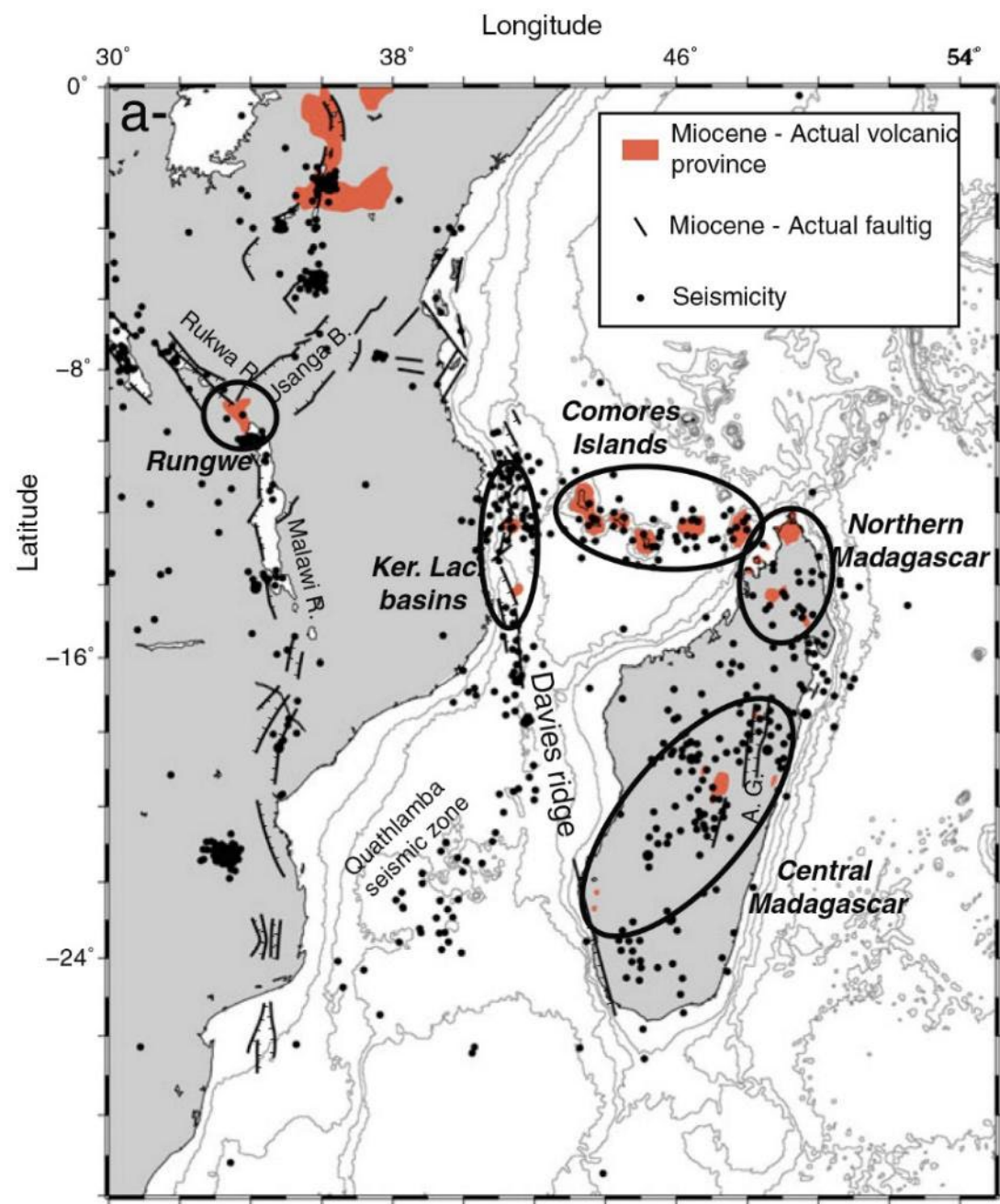
**Actif : 1350 – 1630 ka -> 280 ka**



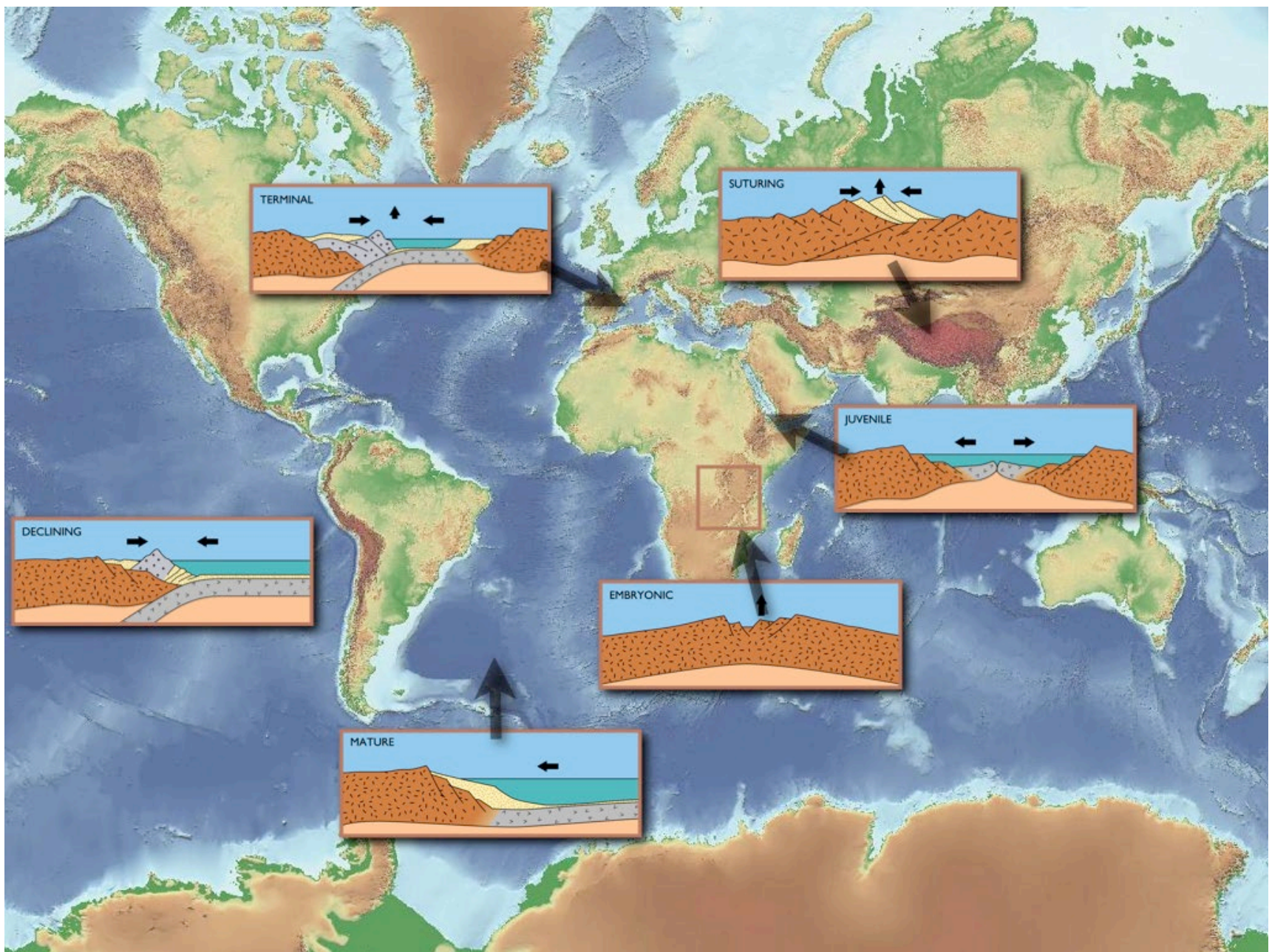
Fournier 2016





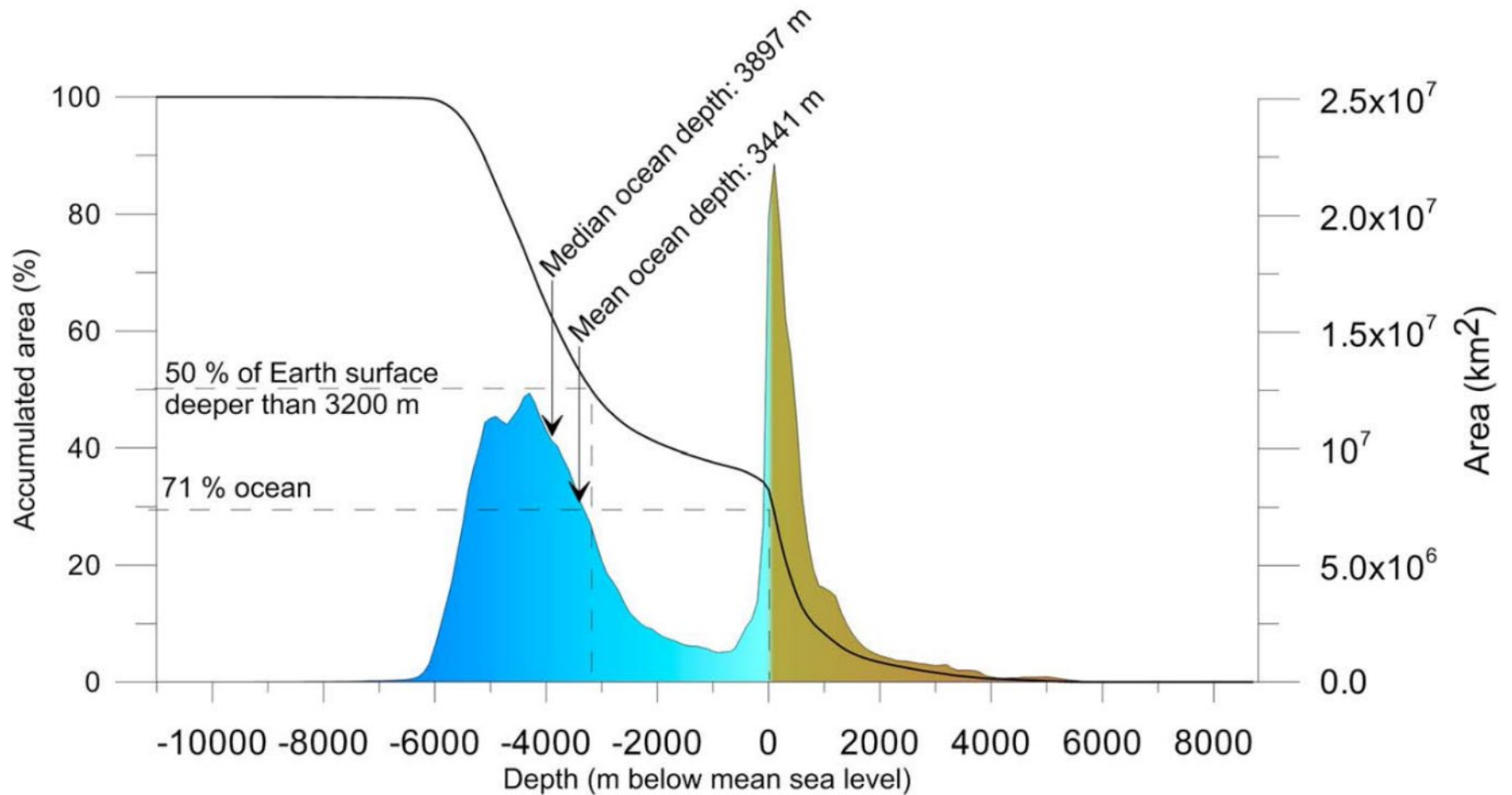


Bachelery, Patrick, Jean-François Lenat, Andrea Di Muro, et Laurent Michon, éd. Active Volcanoes of the Southwest Indian Ocean. Active Volcanoes of the World. Berlin, Heidelberg: Springer Berlin Heidelberg, 2016.



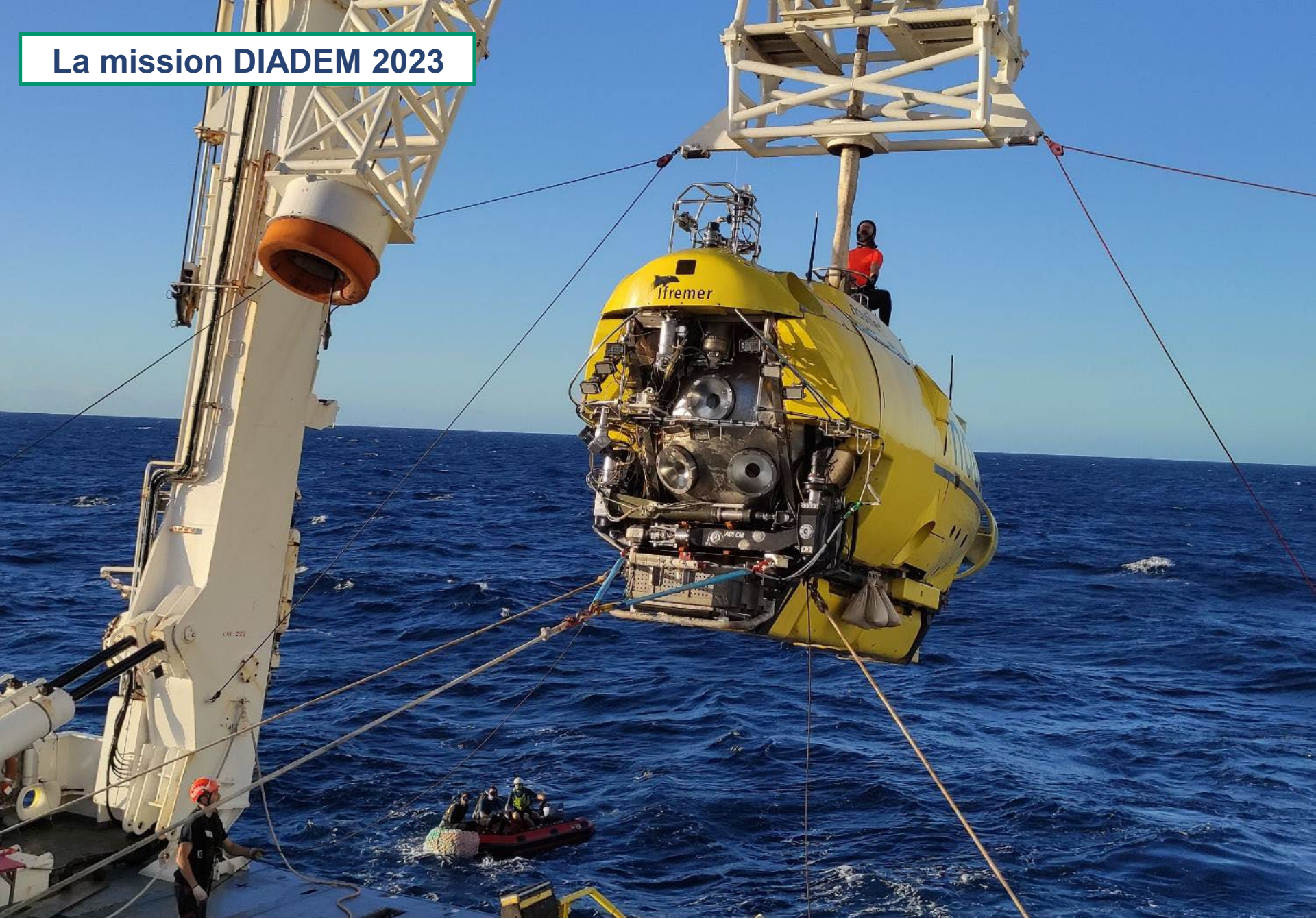
[http://commons.wikimedia.org/wiki/File:Wilson-stages\\_hg.png](http://commons.wikimedia.org/wiki/File:Wilson-stages_hg.png)



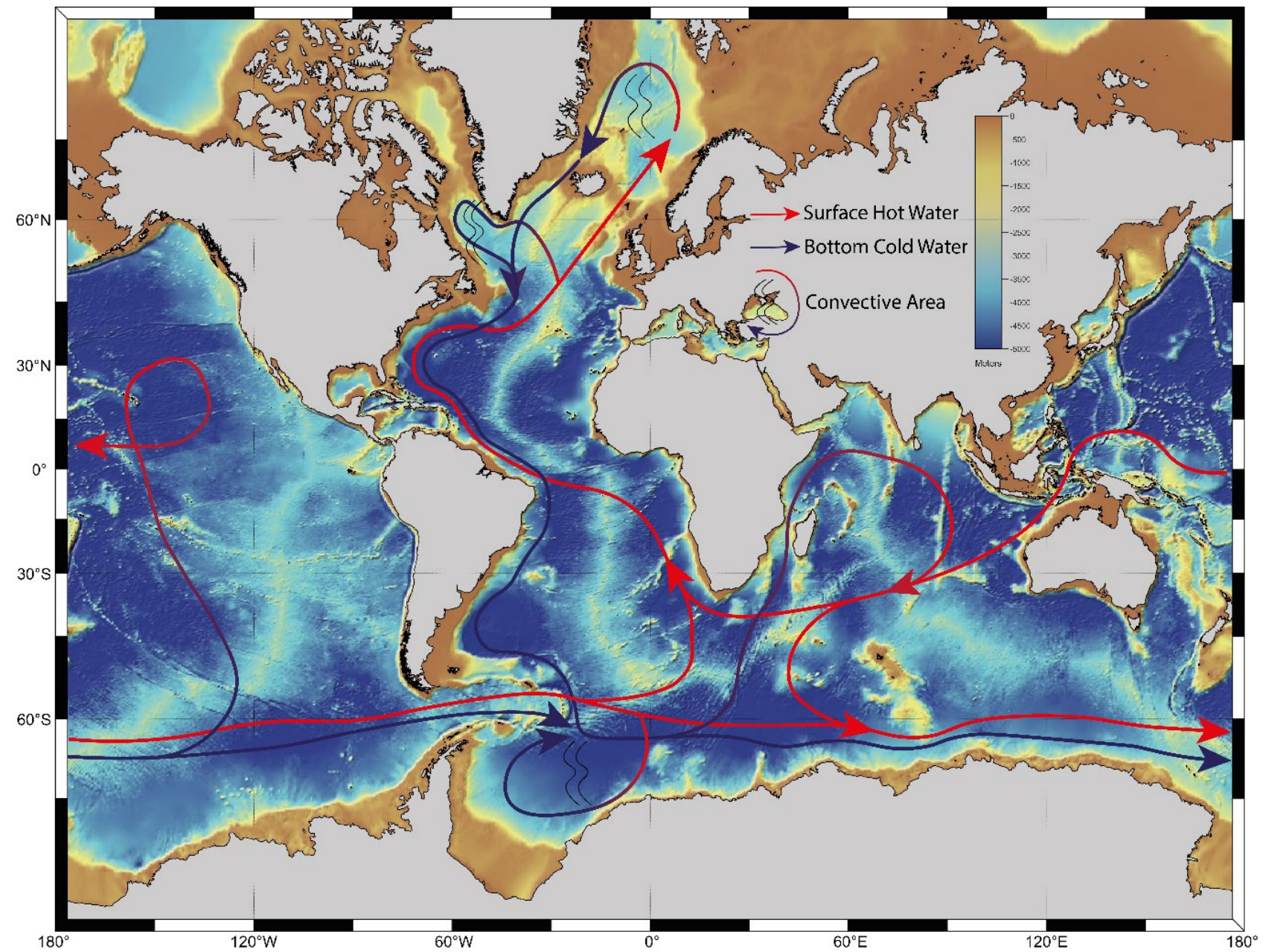


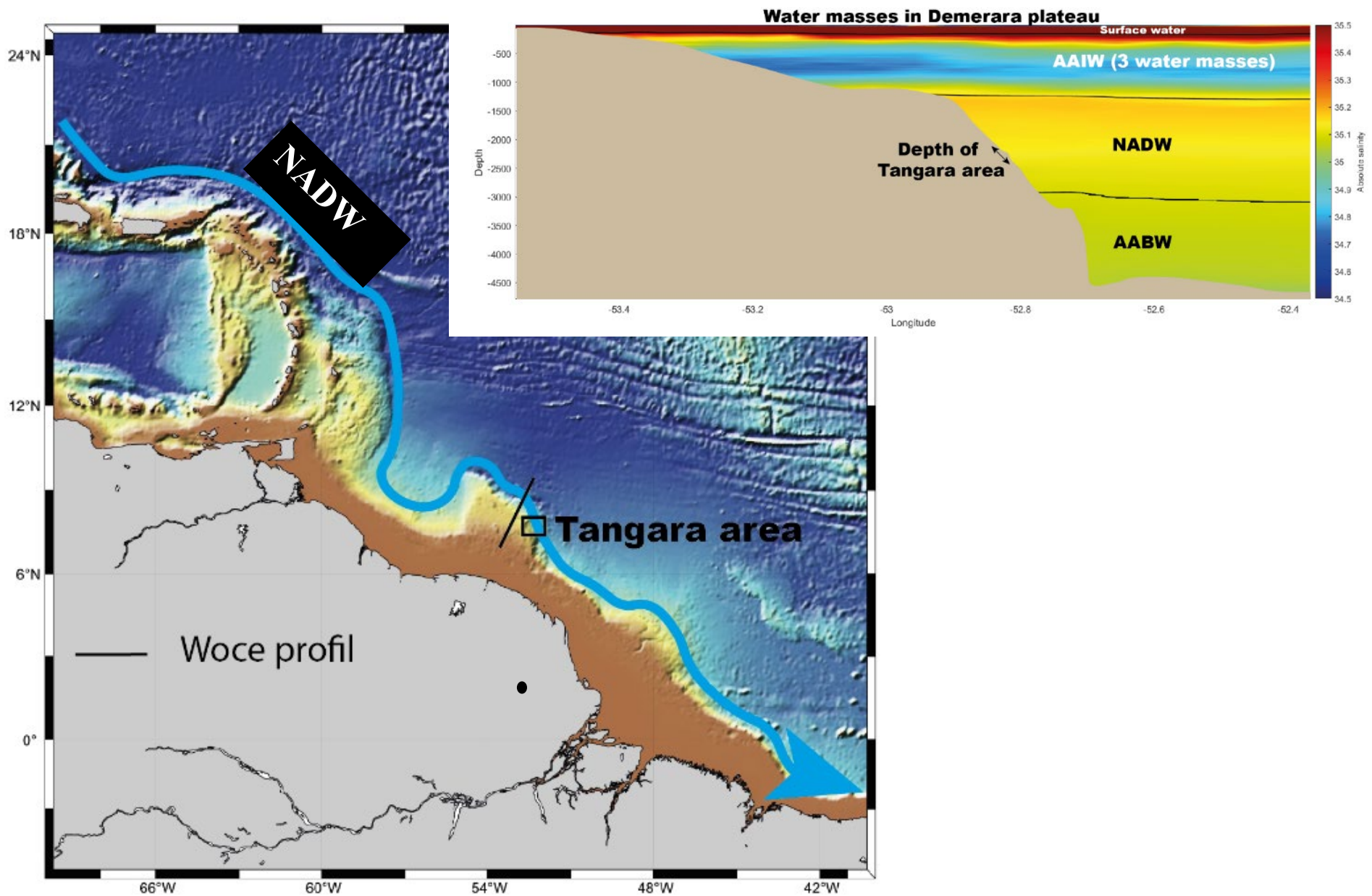
Weatherall, Pauline, K. M. Marks, Martin Jakobsson, Thierry Schmitt, Shin Tani, Jan Erik Arndt, Marzia Rovere, Dale Chayes, Vicki Ferrini, et Rochelle Wigley. « A New Digital Bathymetric Model of the World's Oceans ». *Earth and Space Science* 2, n° 8 (août 2015): 331-45.

## La mission DIADEM 2023

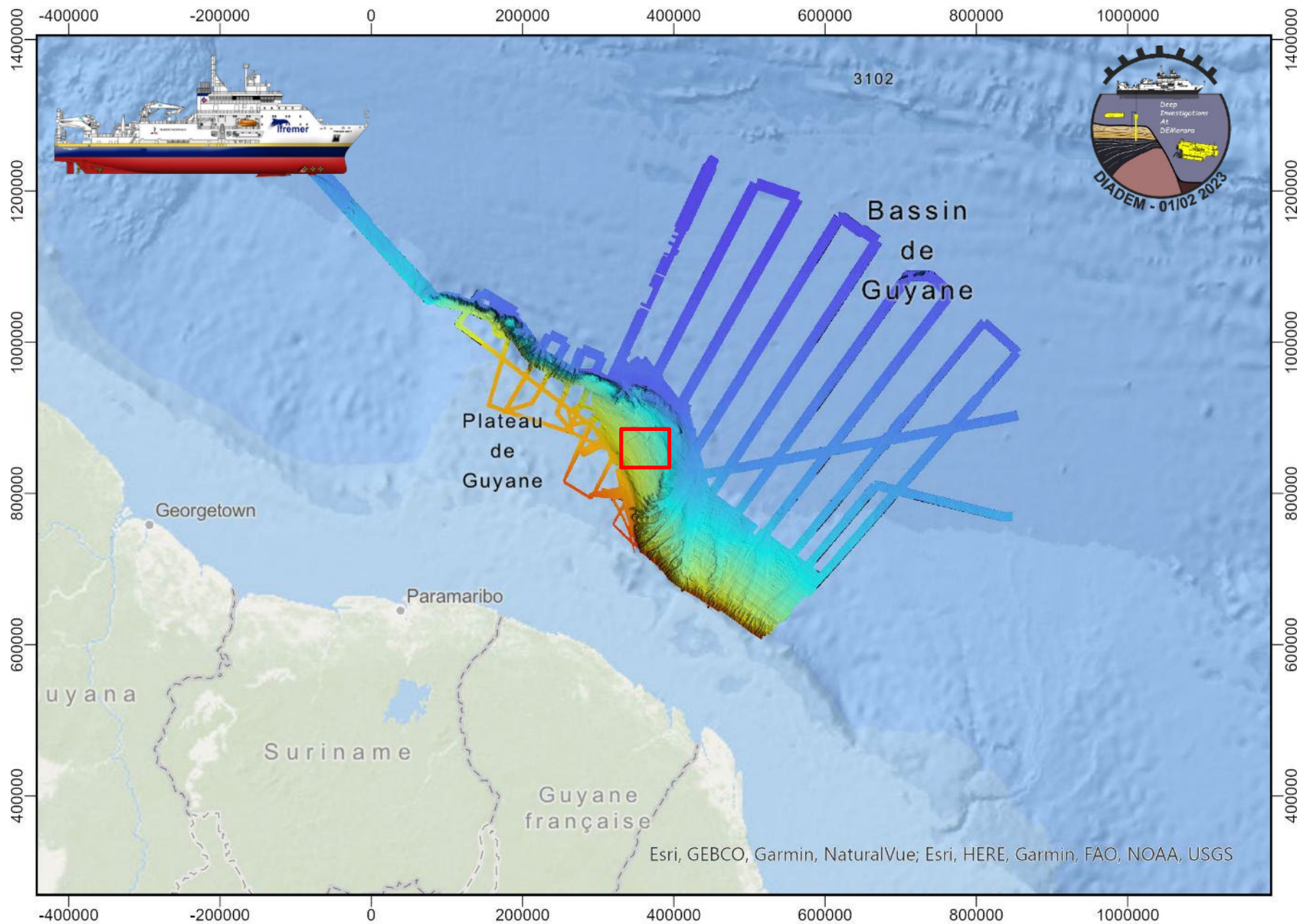




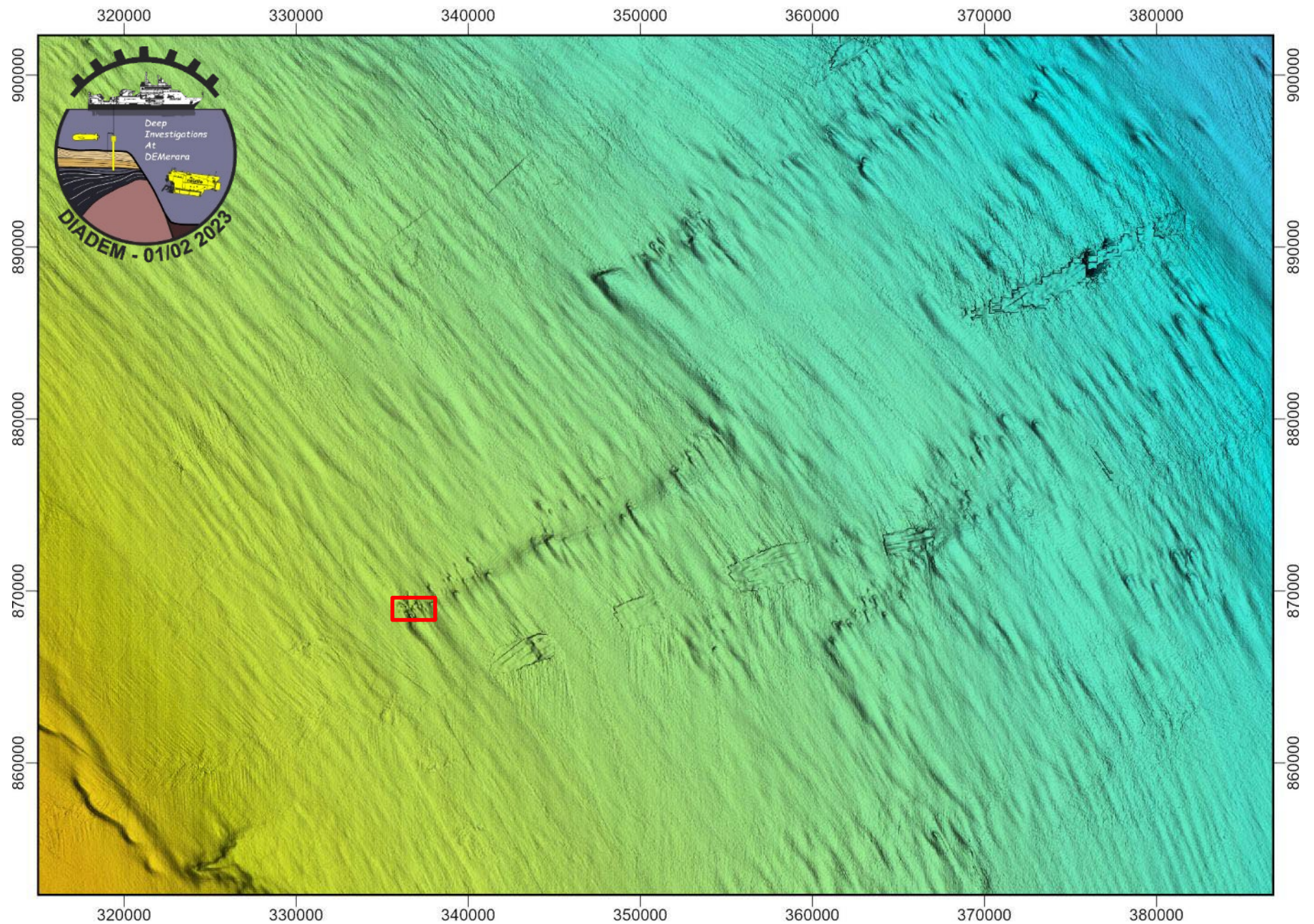








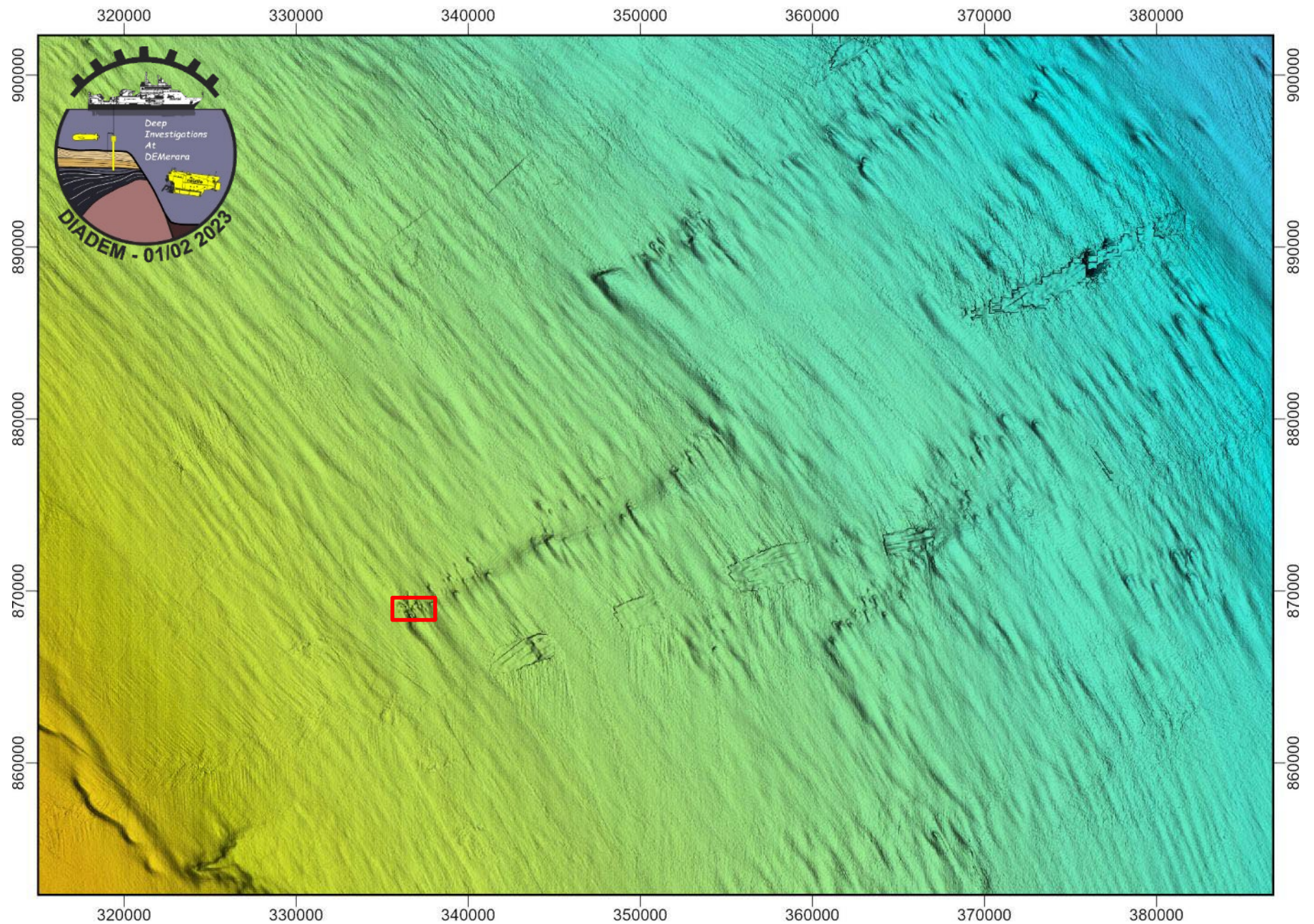




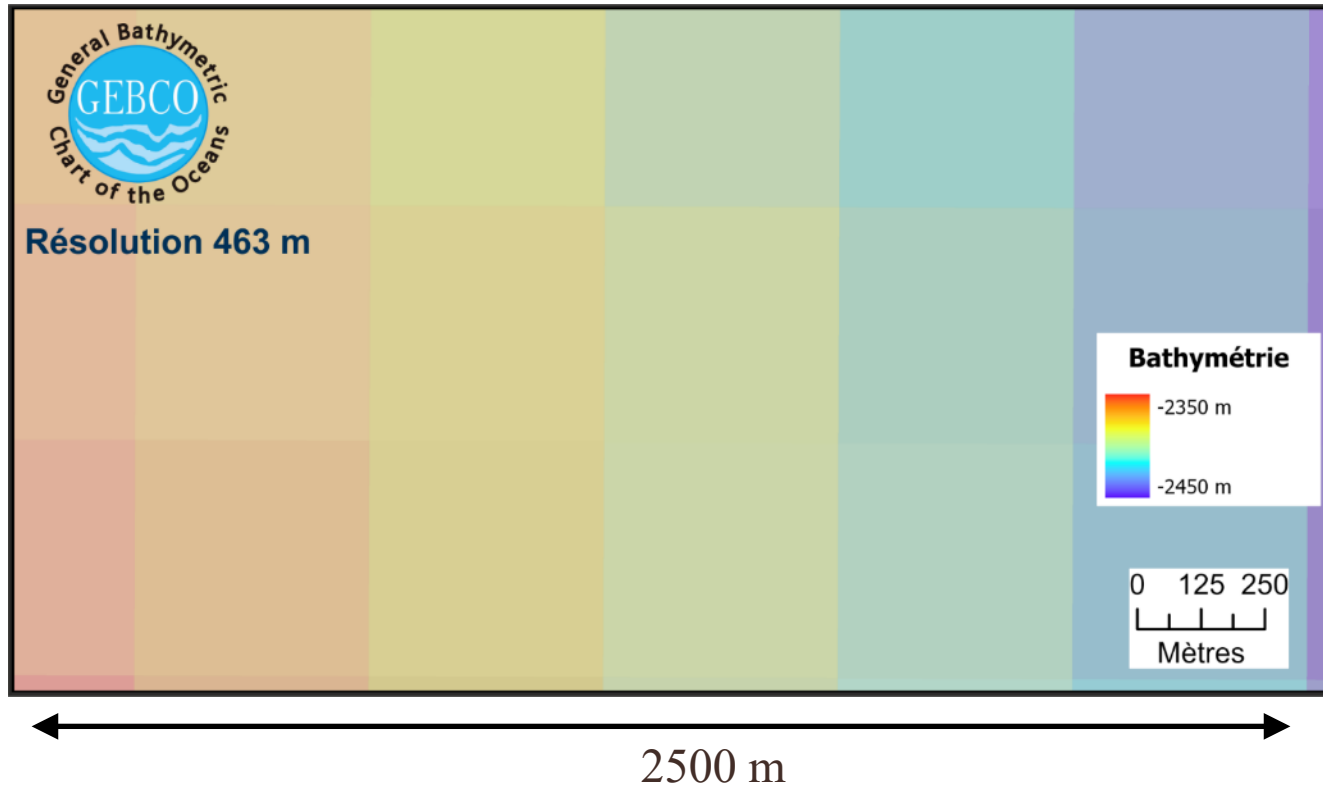


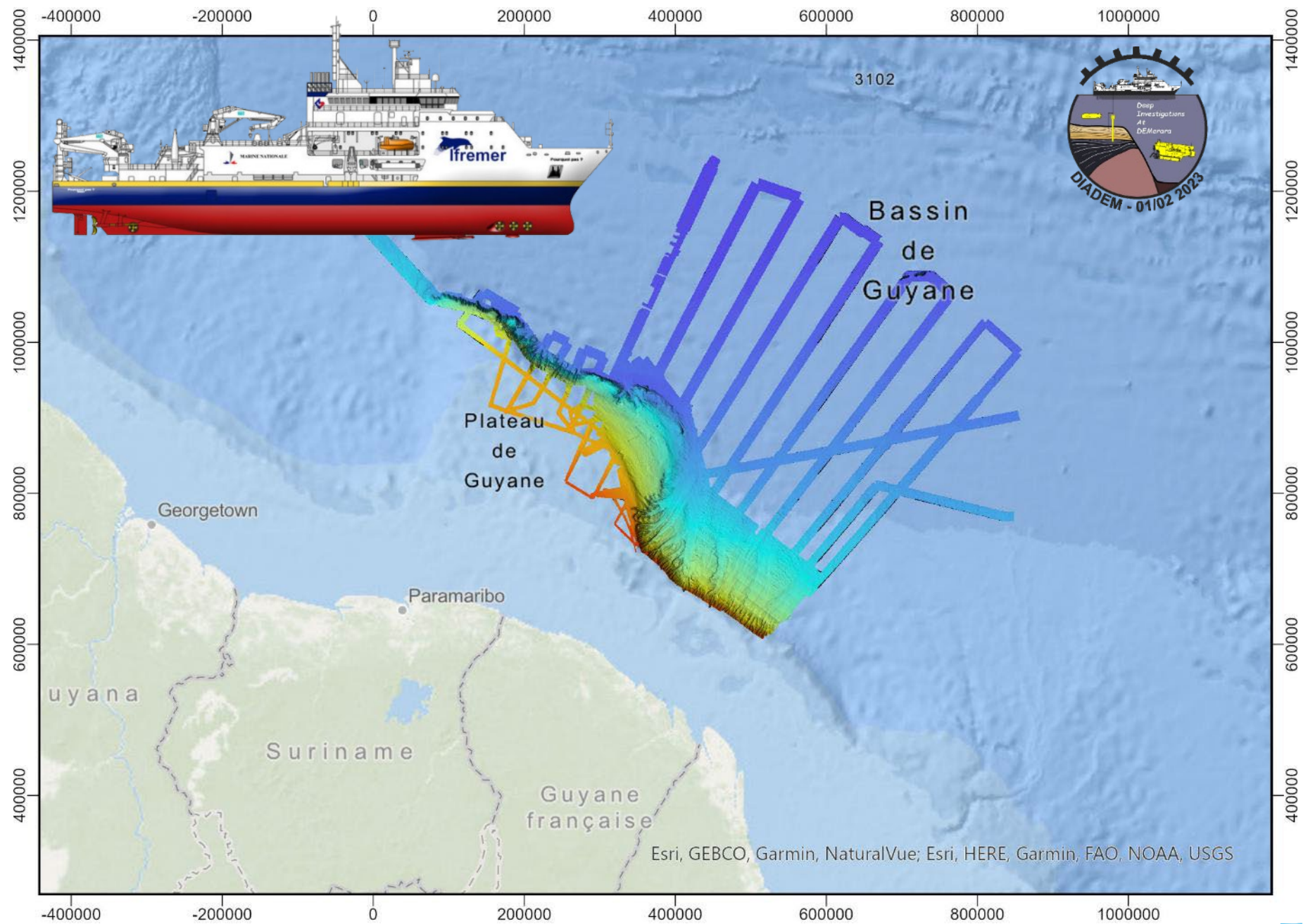




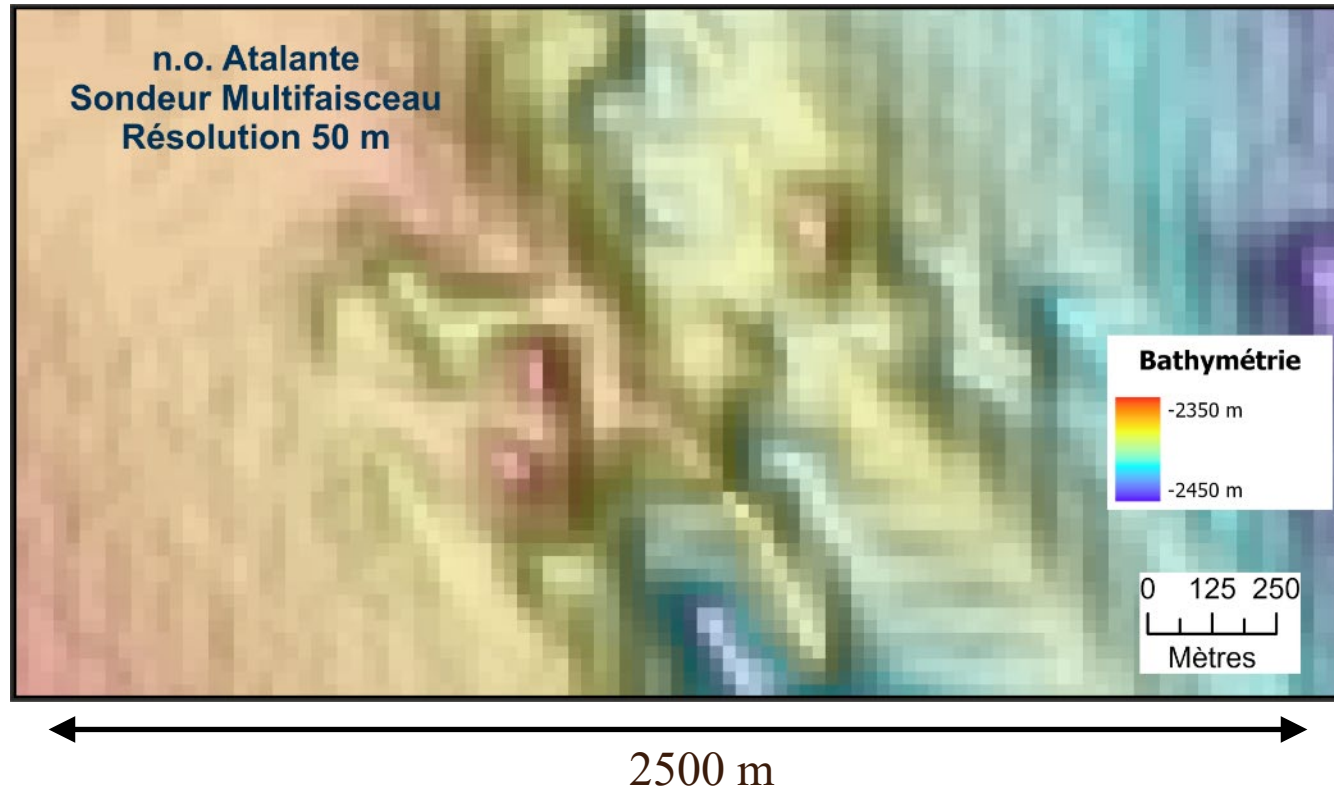


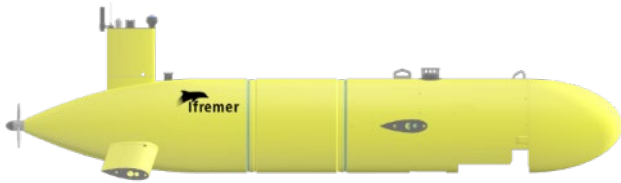




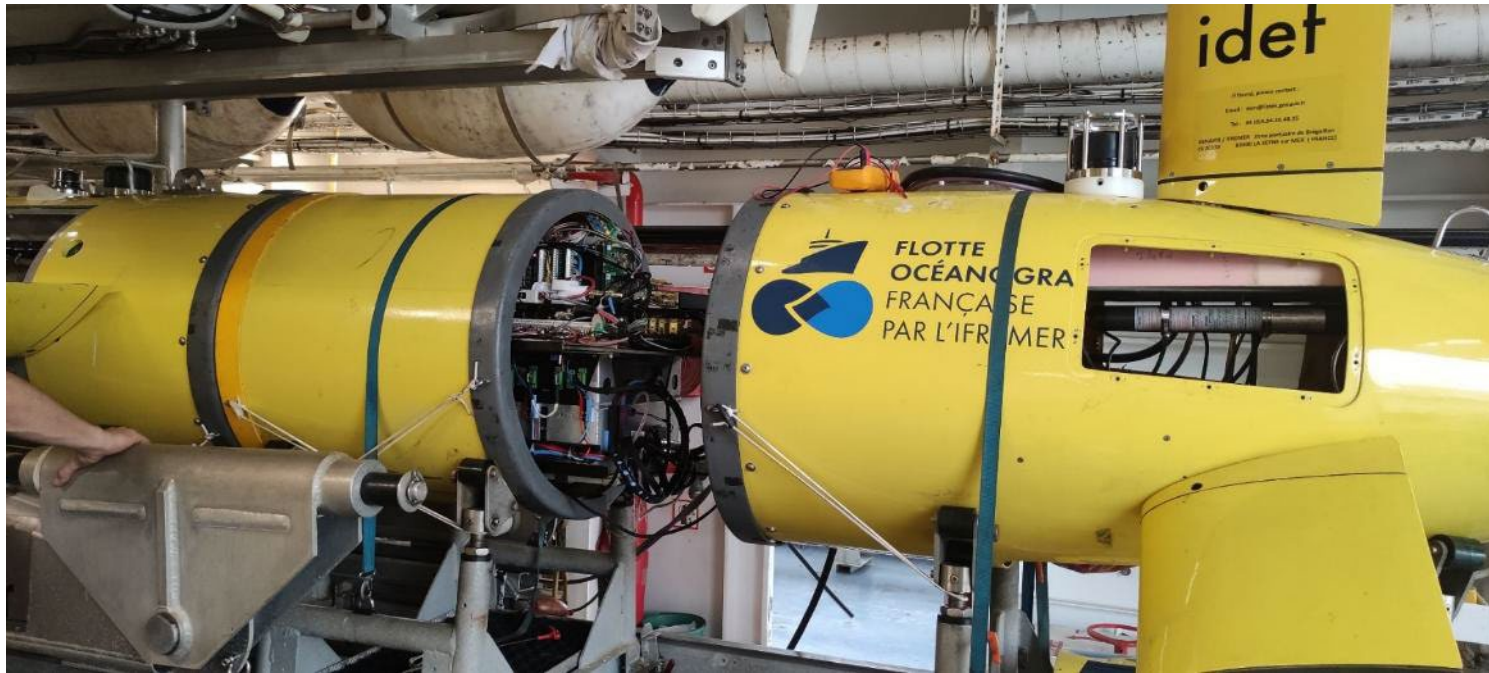




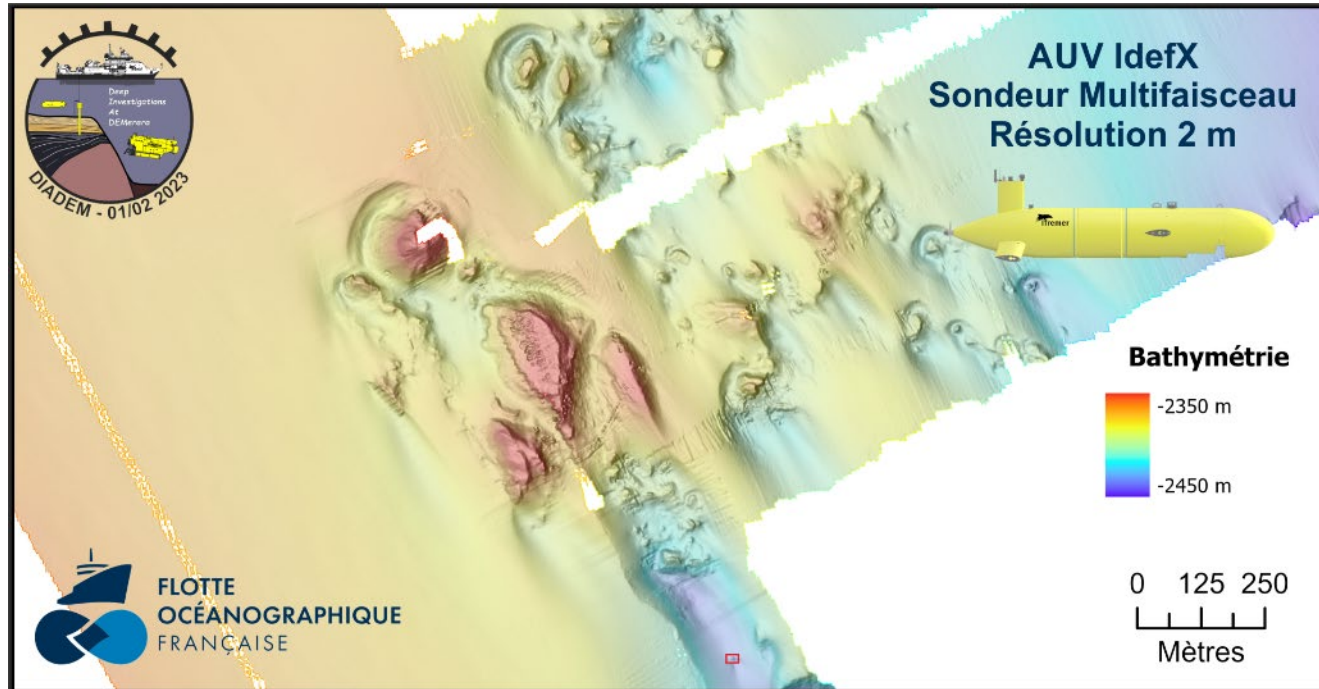




## AUV IdefX Sondeur Multifaisceau Résolution 2 m







2500 m



Résolution 463 m

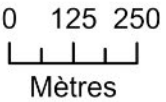
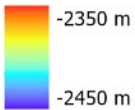
n.o. Atalante  
Sondeur Multifaisceau  
Résolution 50 m



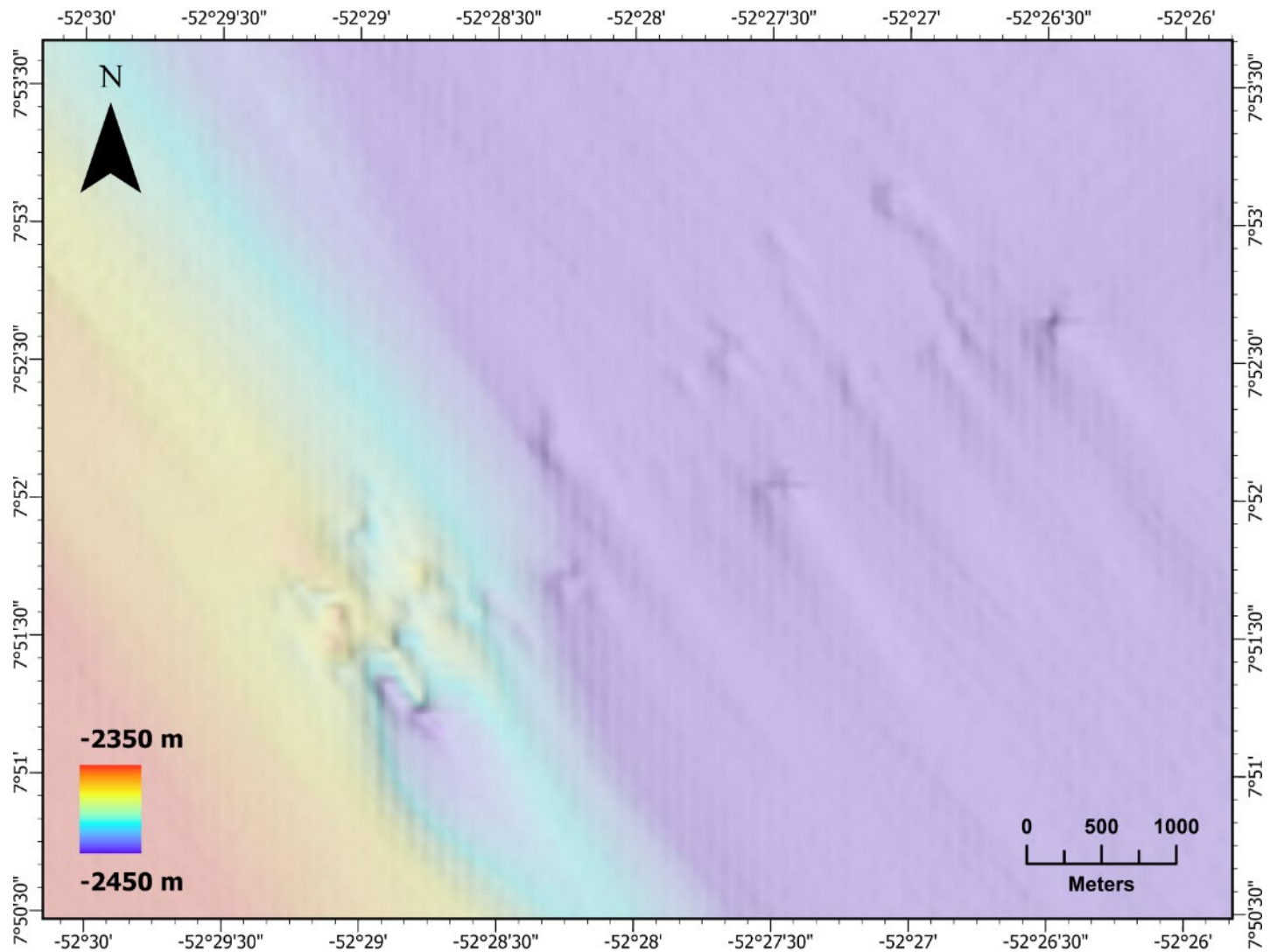
AUV IdefX  
Sondeur Multifaisceau  
Résolution 2 m

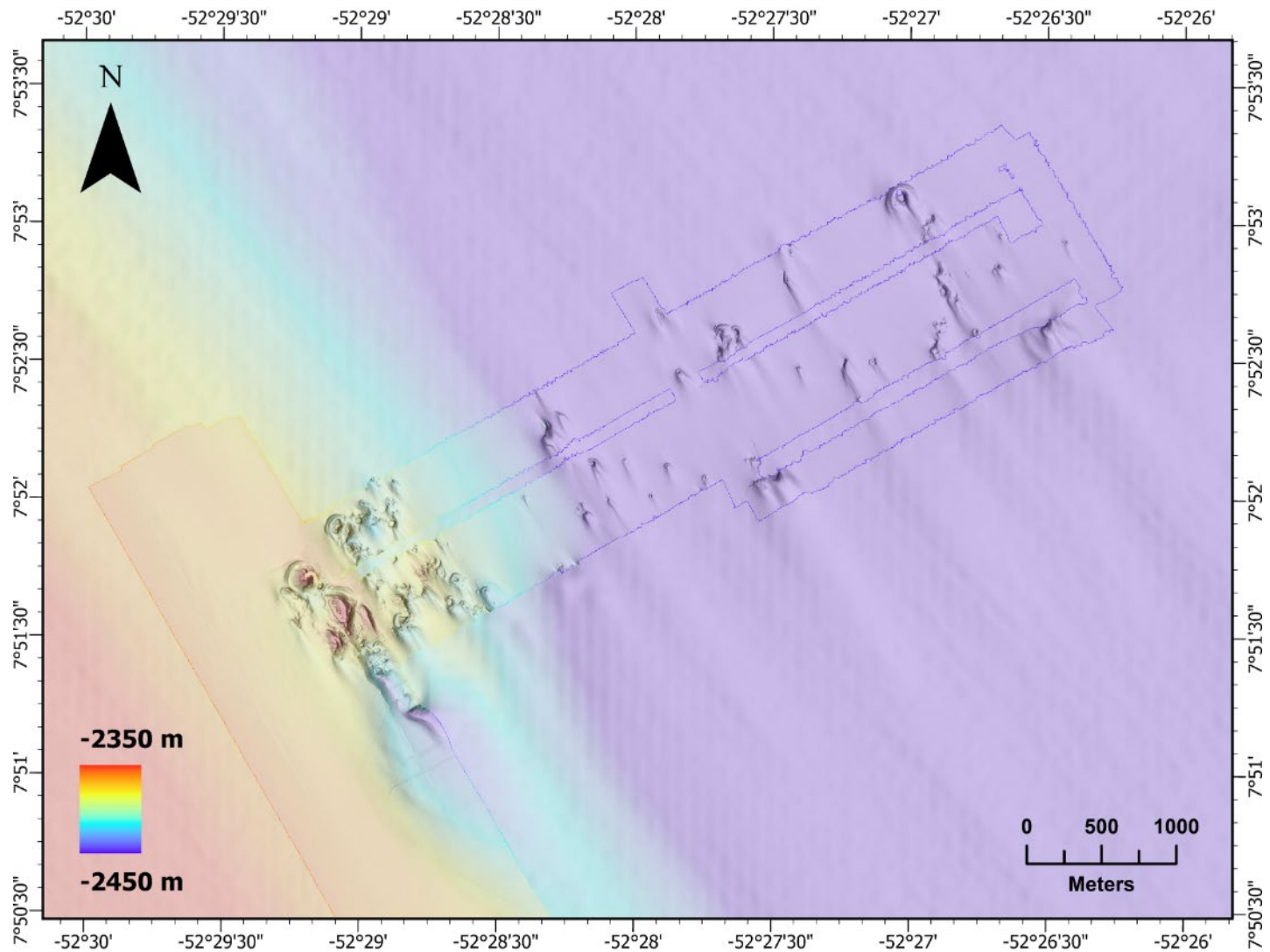


Bathymétrie

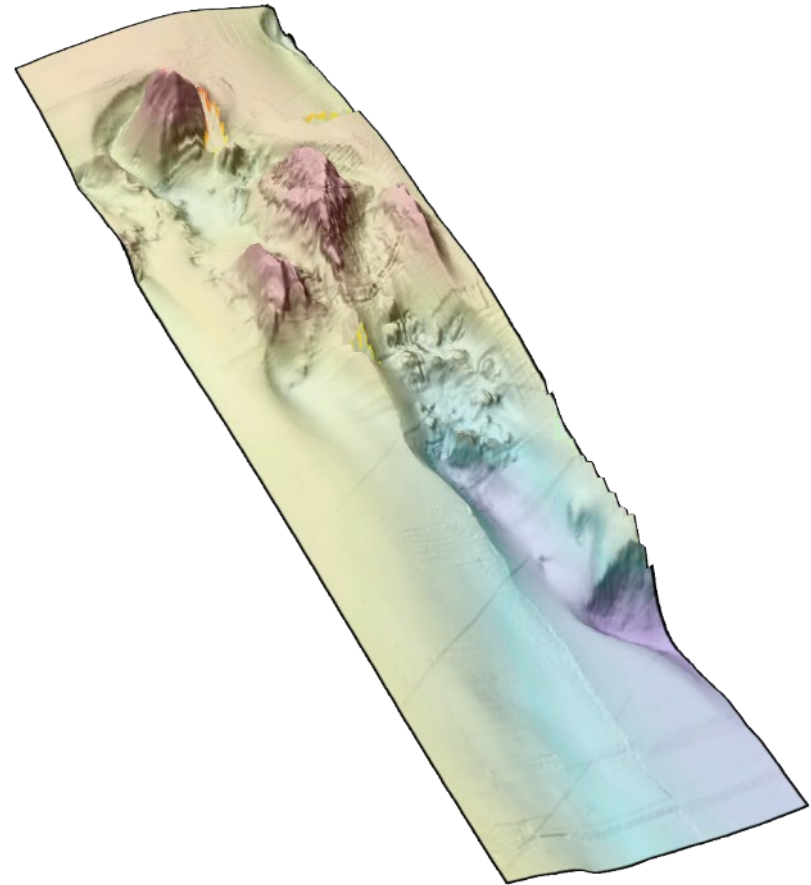
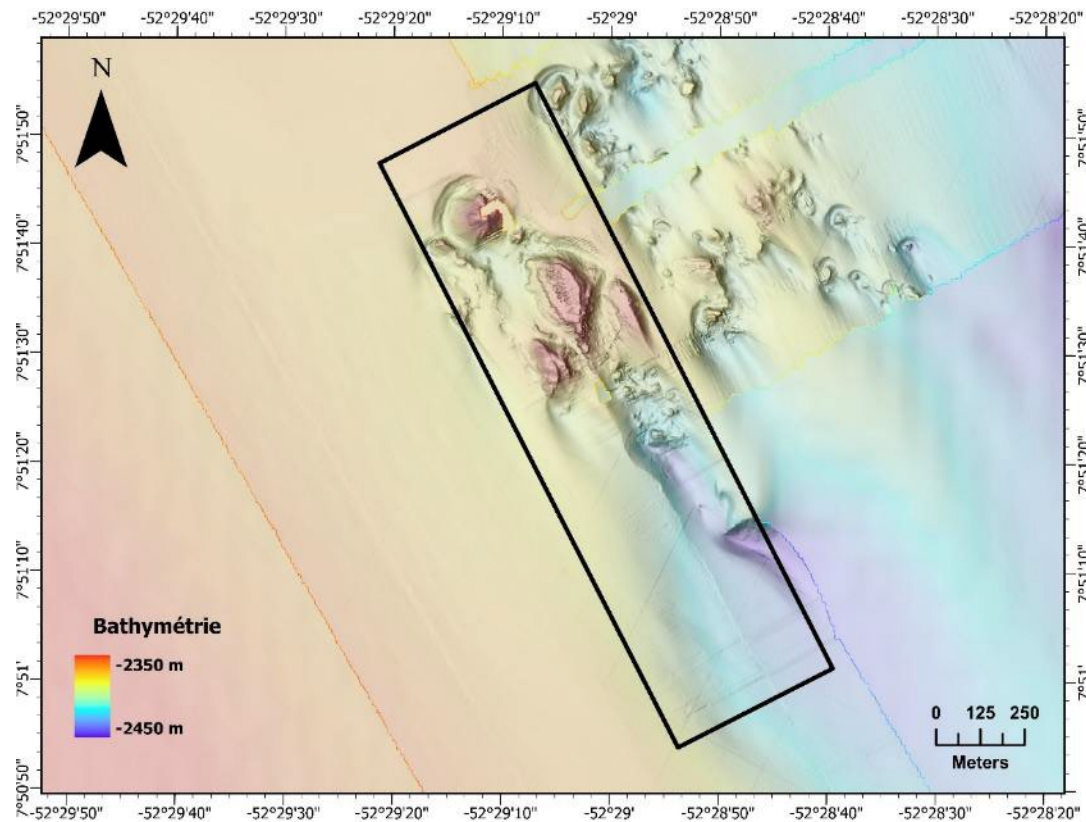






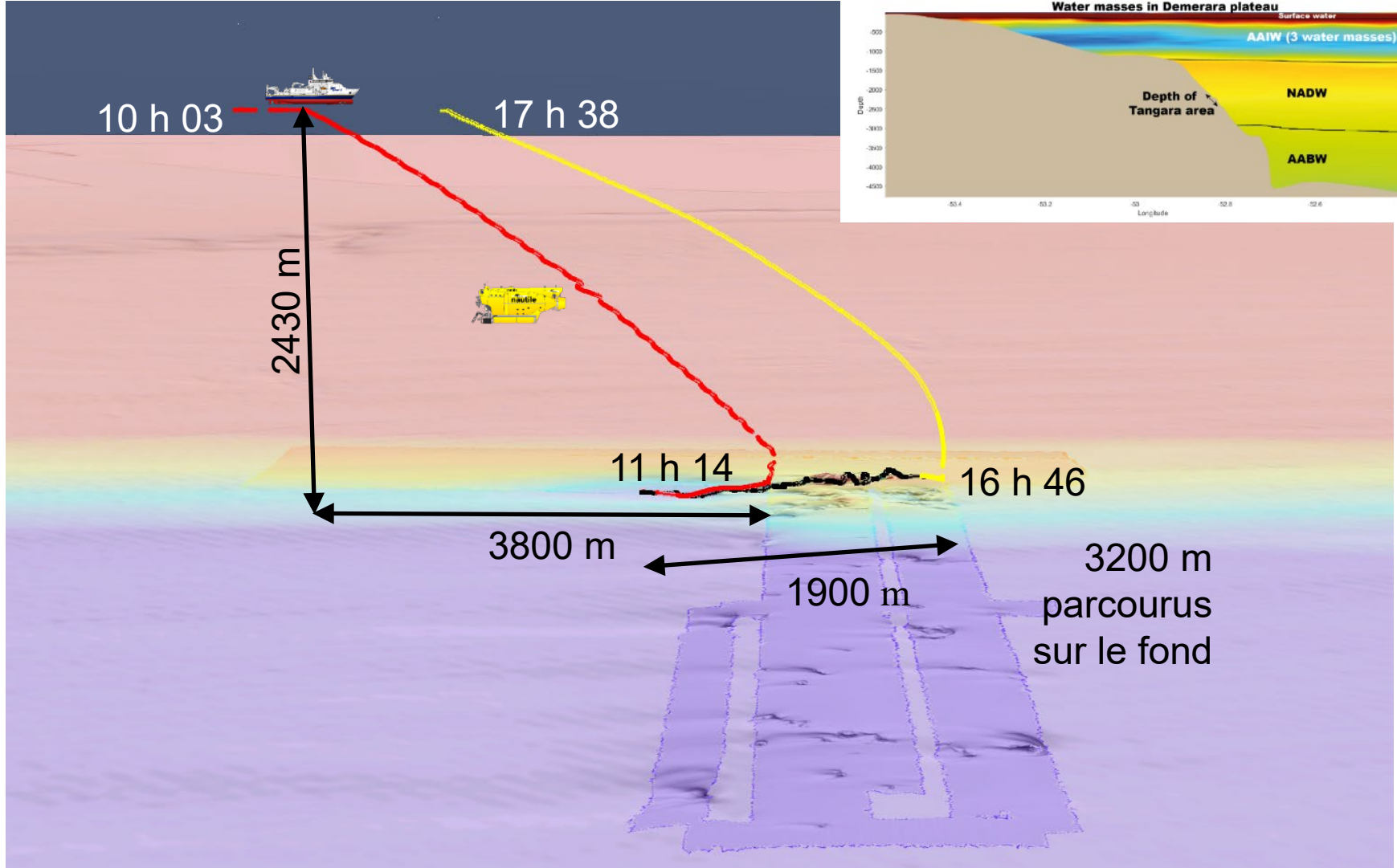


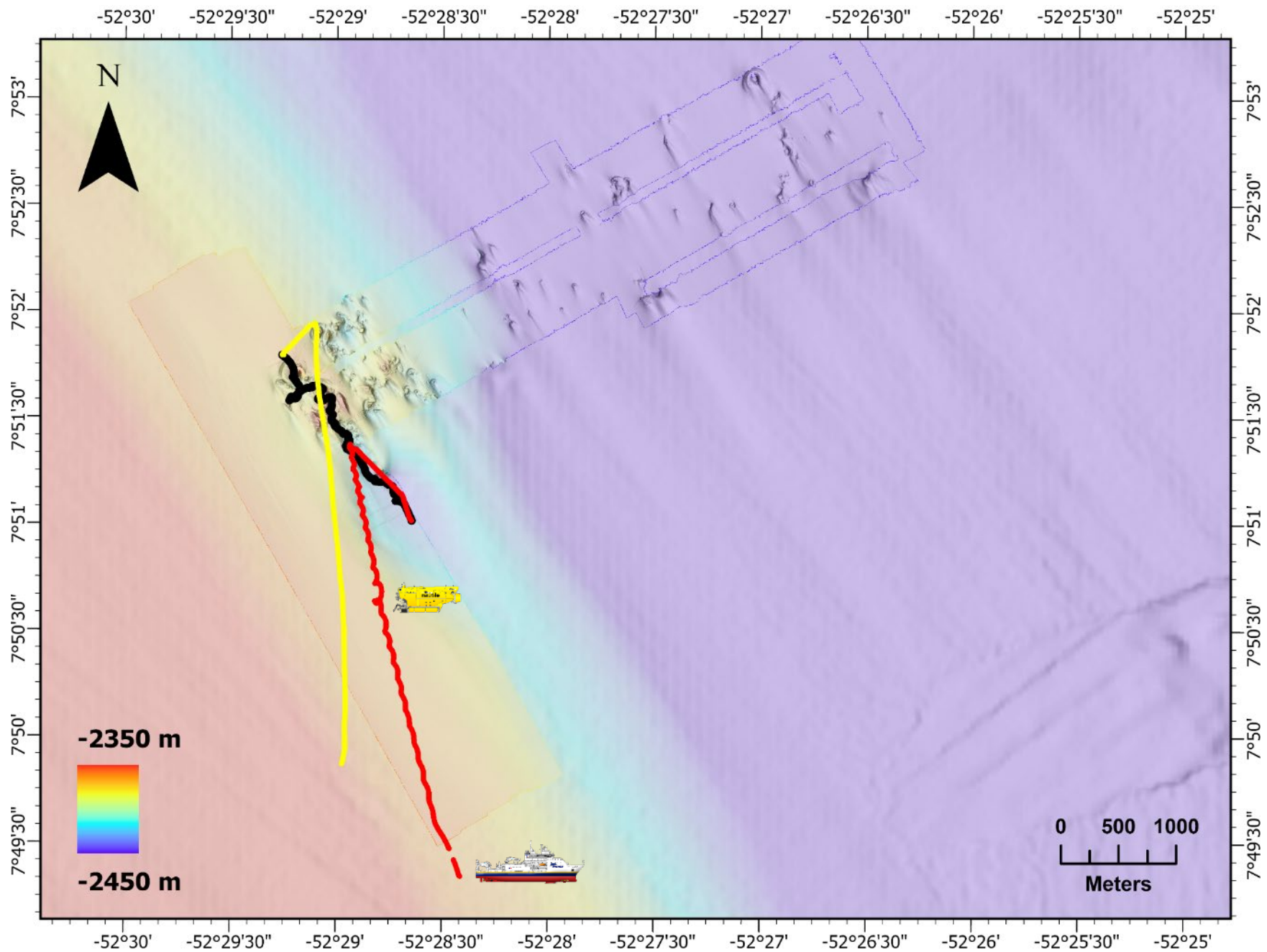




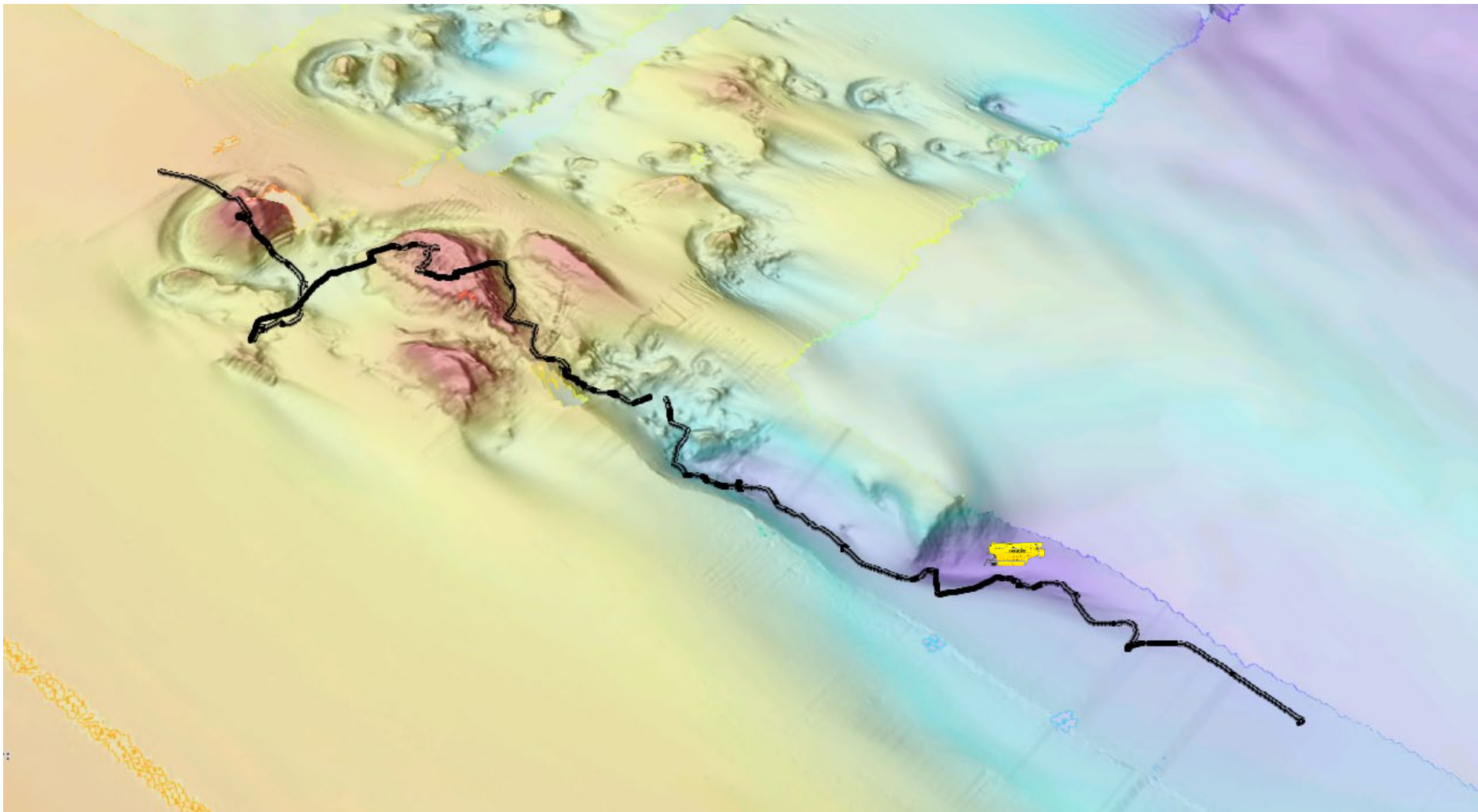




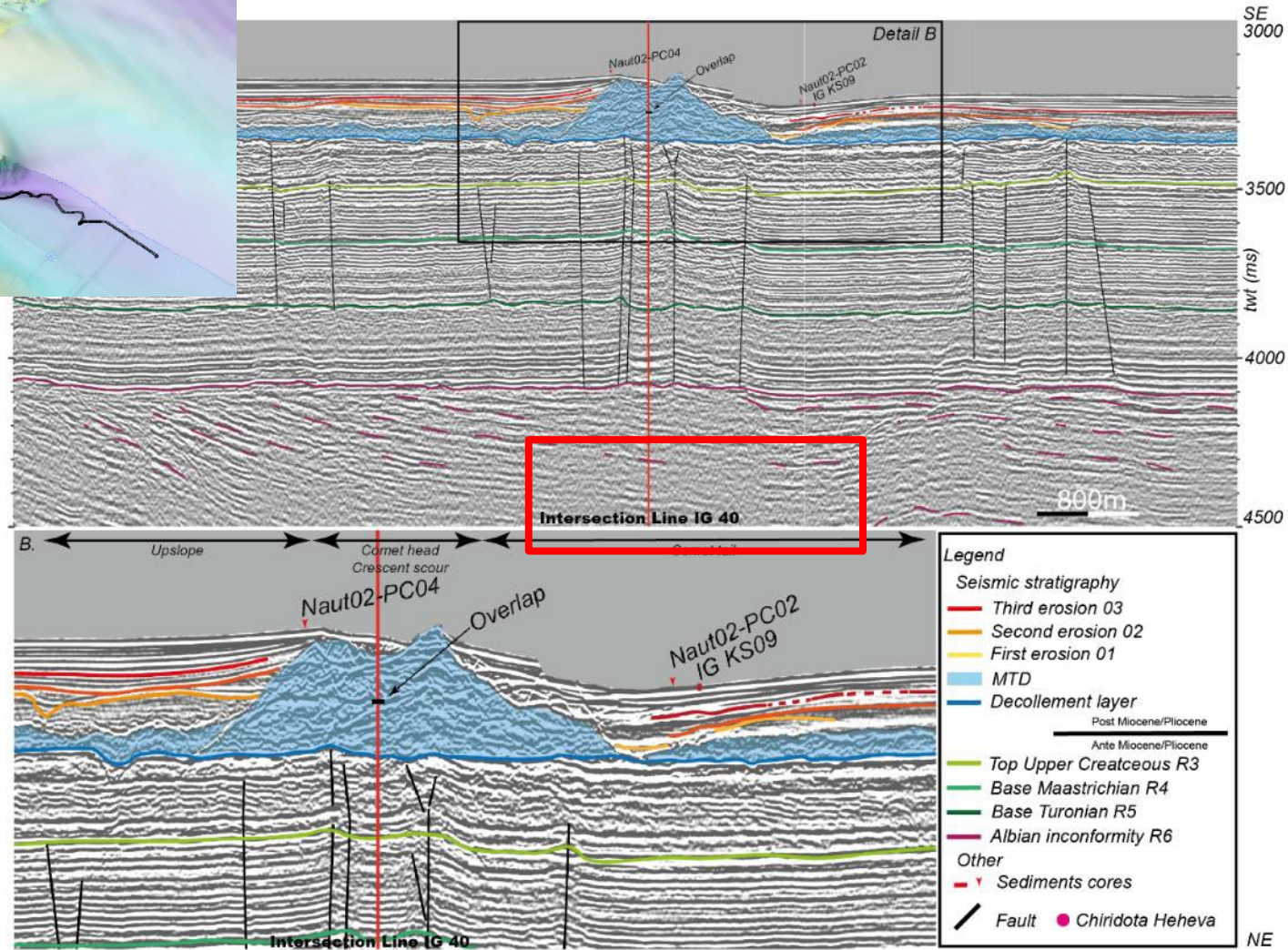
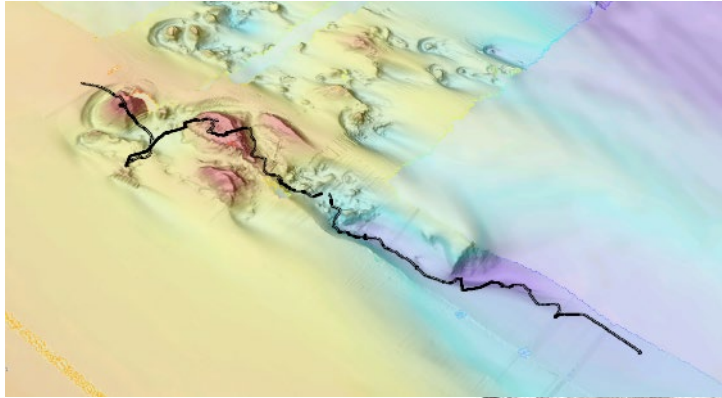








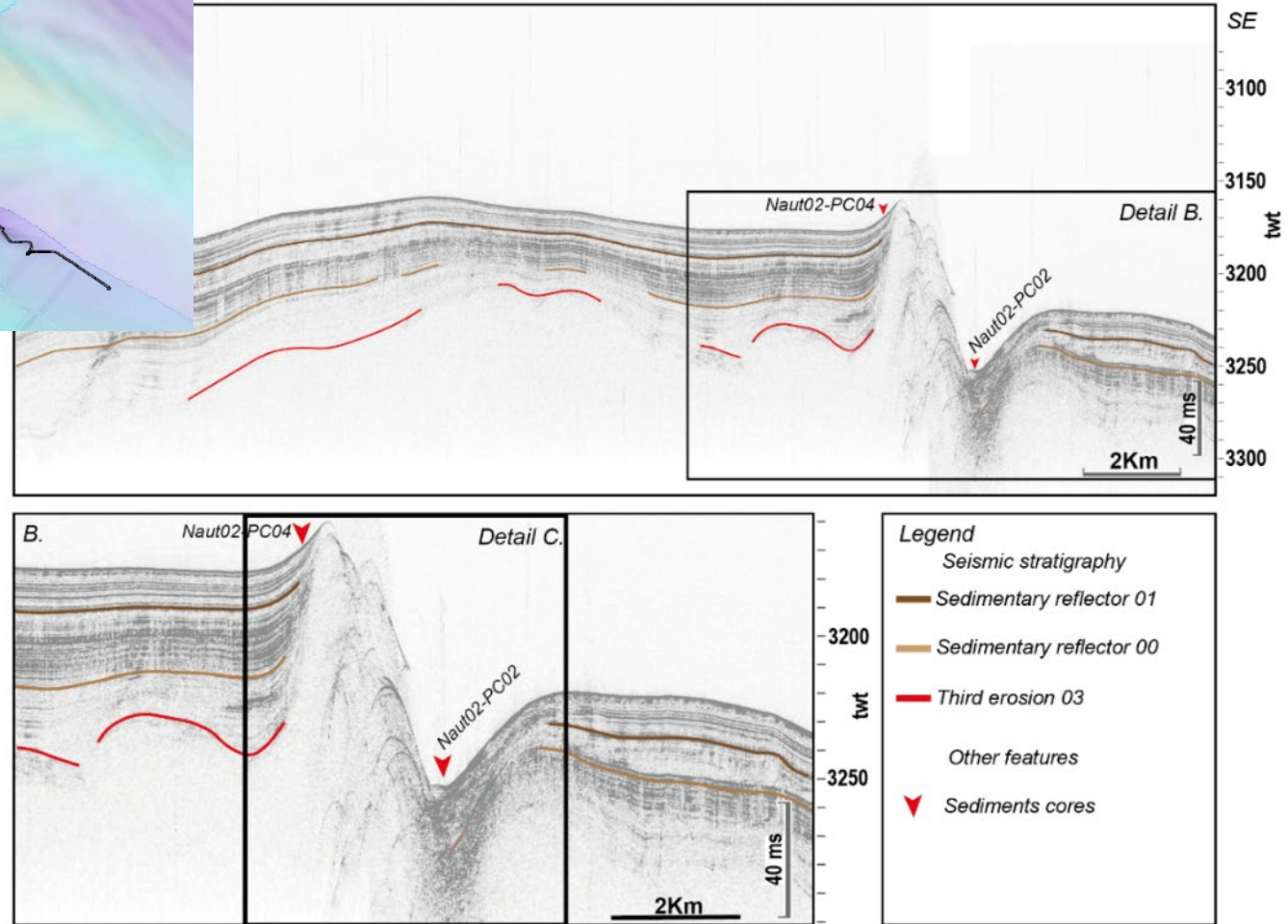
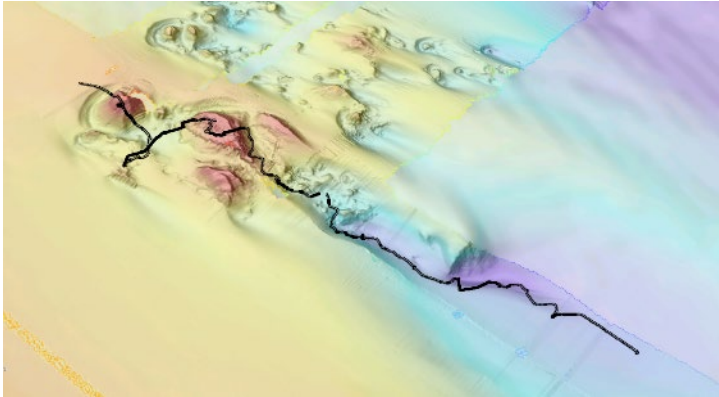
# Sismique HR



Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. Marine Geology 493, 107717.

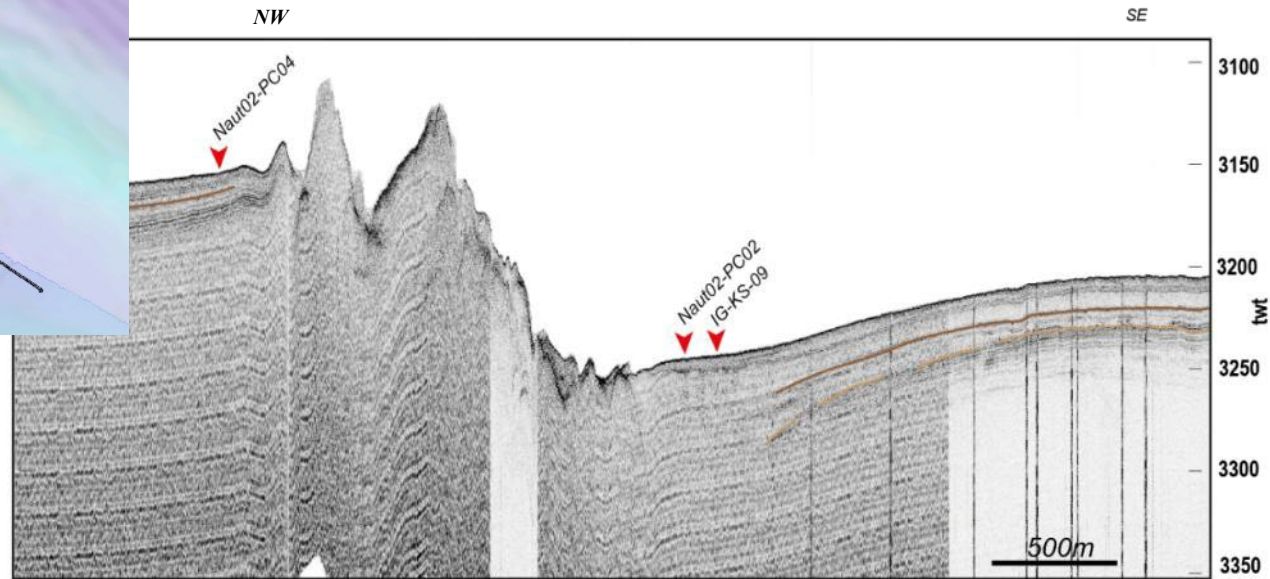
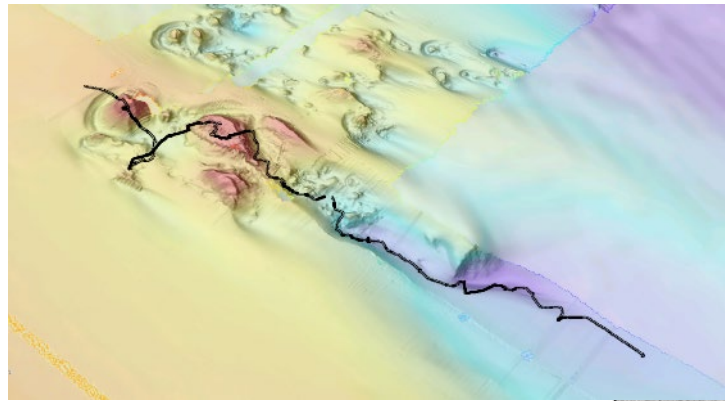


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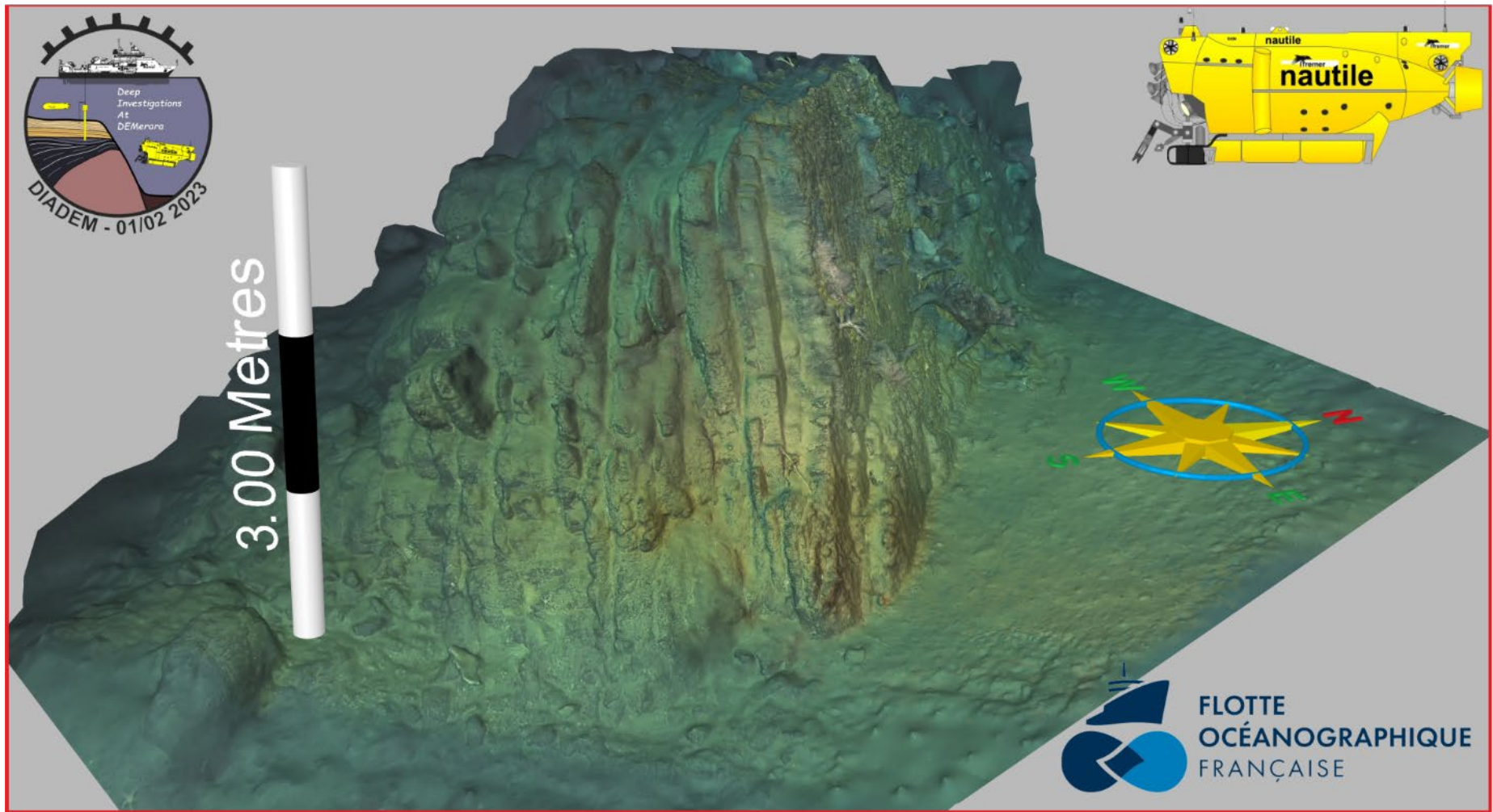
Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. *Marine Geology* 493, 107717.

# Sondeur de sédiment Chirp AUV

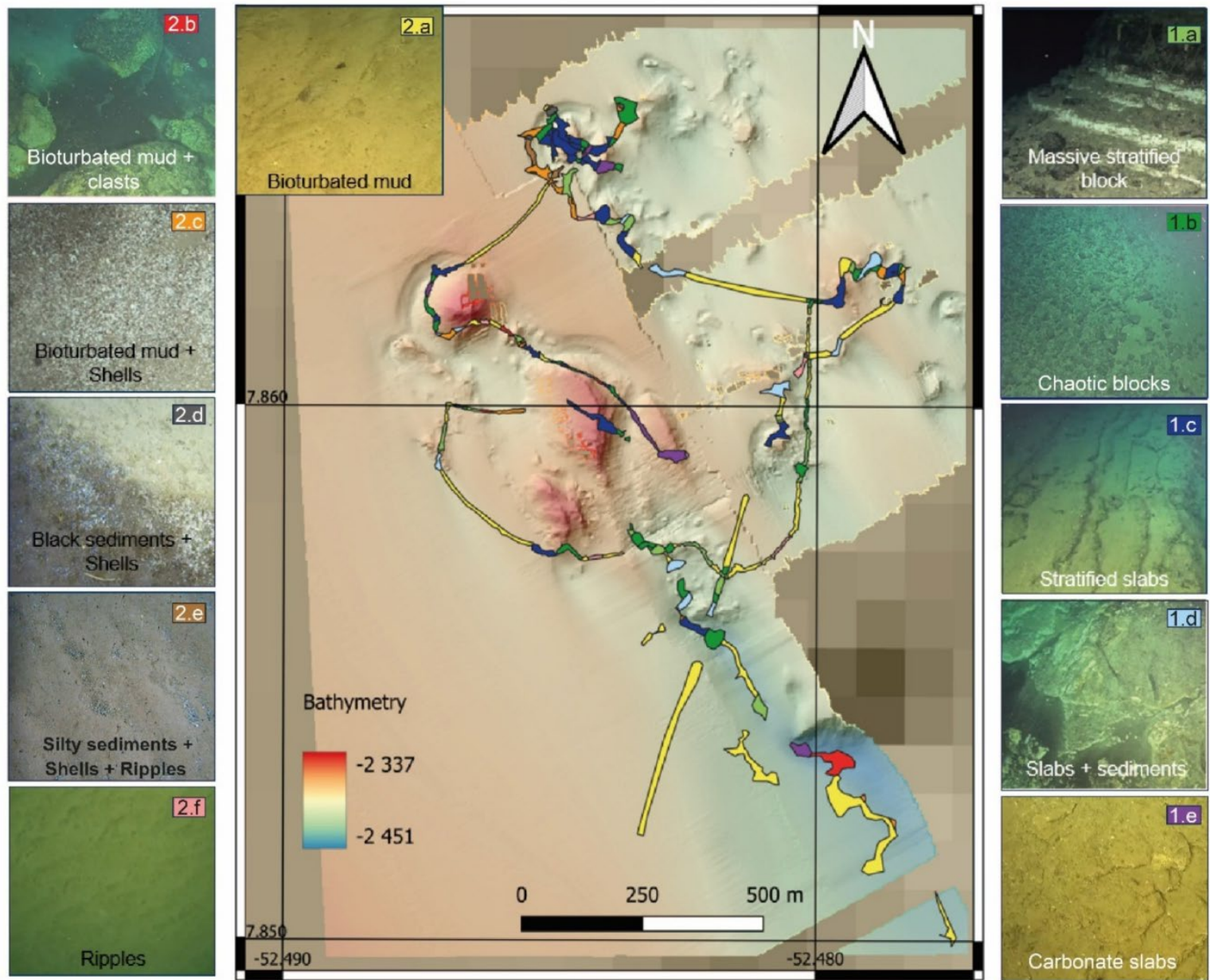


Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. Marine Geology 493, 107717.



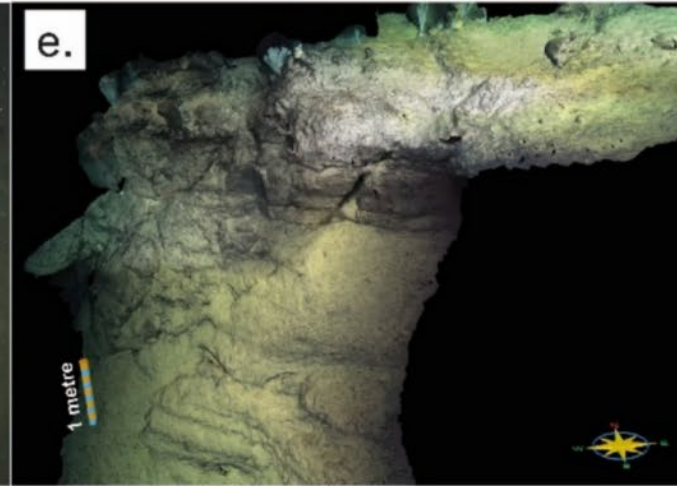
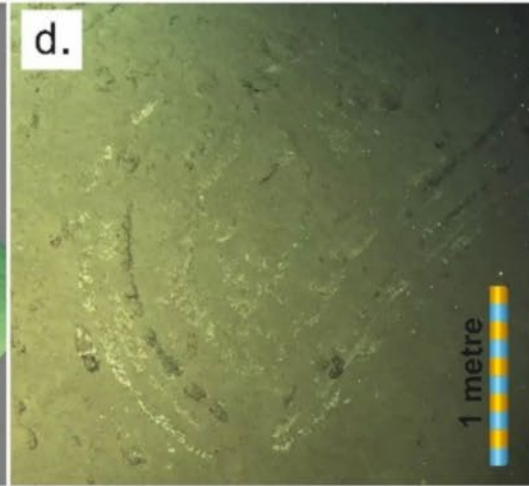
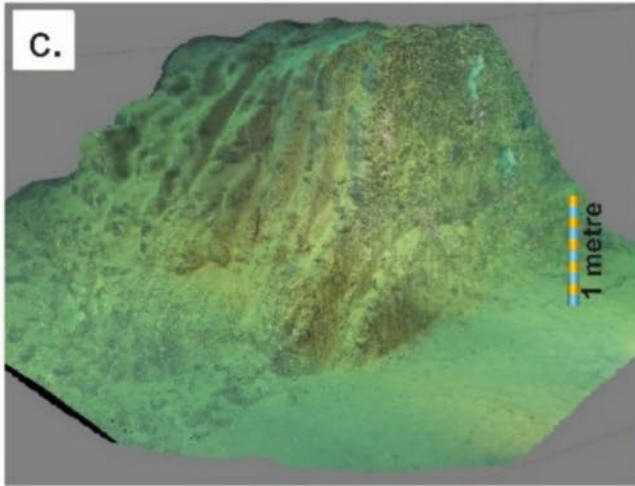
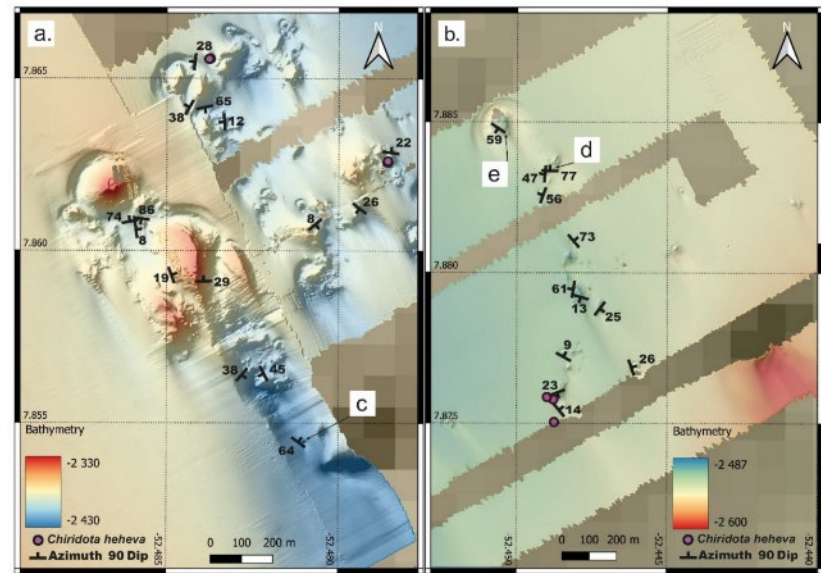


Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. *Marine Geology* 493, 107717.



Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. *Marine Geology* 493, 107717.





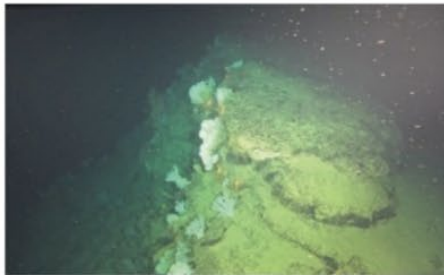
Blin, P., Loncke, L., Durrieu De Madron, X., Zaragosi, S., Fauquembergue, K., Gontharet, S., Pairaud, I., Dupont, P., Caquineau, S., Charriere, B., Lagarde, R., Basile, C., 2026. Origin and evolution of giant comet marks along the North Atlantic Deep-Water flow on the Demerara plateau. *Marine Geology* 493, 107717.



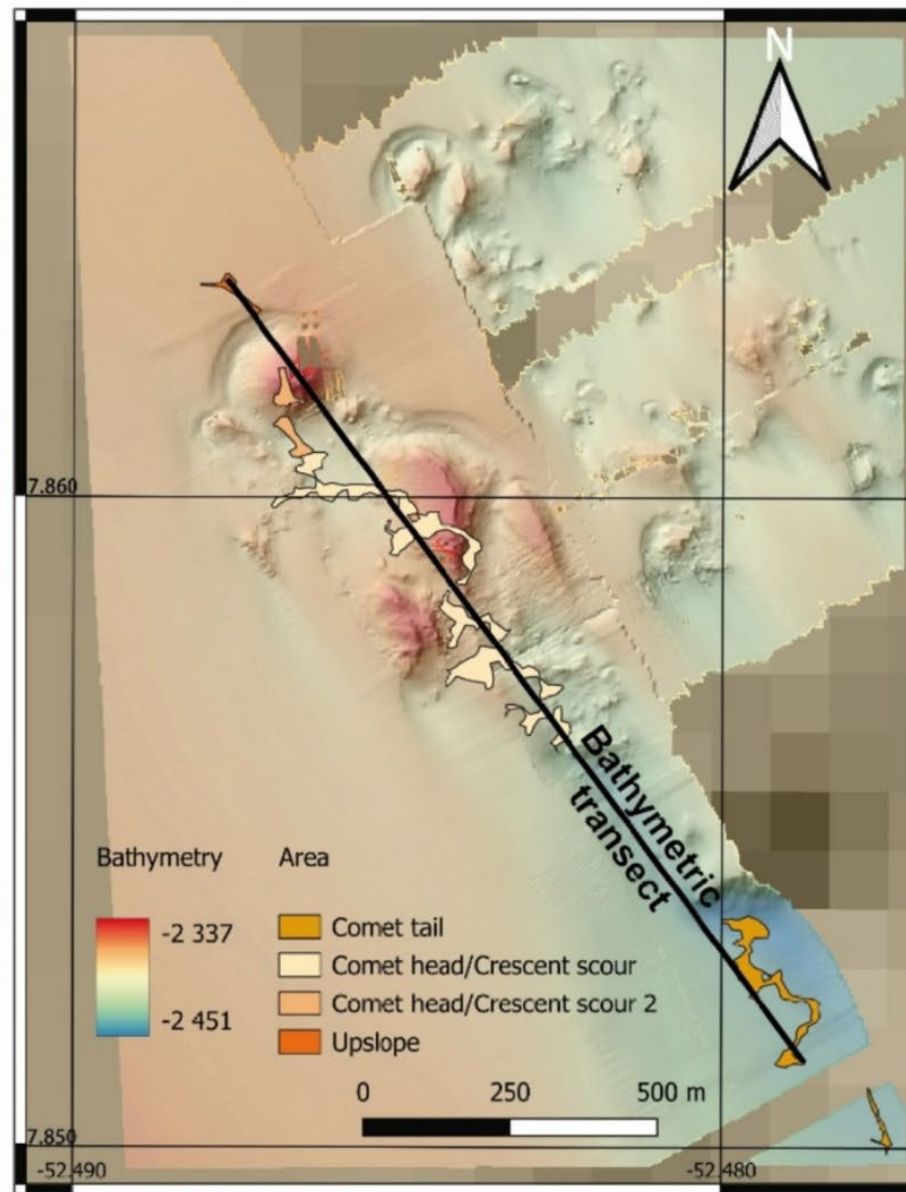
Chondrichty : *Hydroalgaus affinis*



Osteichthyes: *Bathyonus pectoralis*  
Arthropods : *Ceratopsis* sp.



Fixed life in indurated outcrops  
Sponges : *Pachastrella monilifera*  
Cnidarians : *Chysogorgia*,  
*Villogorgia* sp., *Paragorgia arborea*



Cnidarians :  
*Iridogorgia magnispiralis*



Cephalopod :  
*Grimpotheuthis imperator*



Echinoderms : *Chiridota heheva*