**SEALEX : The SEA as a Long term socio-ecological Experiment** - Coord. P. Stéphan, LETG-IUEM

**WP 1** Construction of a cultural geodatabase
Coord. Y. Pailler
INRAP

**WP 2** Holocene environmental coastal changes
Coord. A. Penaud
LGO-IUEM

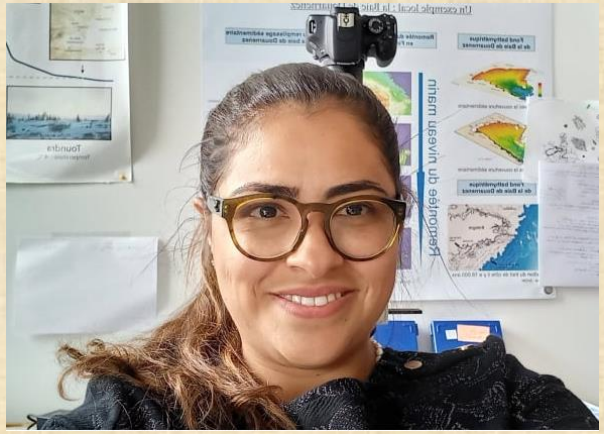
**WP 3** Numerical models of past coastal hydrological processes
Coord. G. Charria
LOPS-IUEM-Ifremer

**WP 4** Development of virtual reality tools
Coord. R. Querrec
CERV

**Synthesis : Chrono-systemic approaches : pre/proto/historical timelines for understanding socio-ecosystemic trajectories under natural climate changes** - All Wps

**Evol'Iroise : Innovative numerical tool dedicated to the transfer of interdisciplinary results to society**

**Etude des changements et forçages environnementaux côtiers : reconstitutions à partir d'archives sédimentaires**



**Wiem FERSI**

**2016:** Docteur en météorologie, océanographie et physique de l'environnement (Université Paris-Saclay, LSCE, LOCEAN)

**2017:** Post-doctorante au Laboratoire des Sciences du Climat et de l'Environnement (LSCE/CNRS/Gif-sur-Yvette)

**2018-2020**: Post-doctorante LGO, projet CG29-ISblue Emergence : Déglaciation (Fersi et al., 2021, en cours)

**2021-2022**: Post-doctorante LGO, projet ISblue Flagship "Sealex" : Holocène (Fersi et al., en cours)

WP 2 Holocene environmental coastal changes
Coord. A. Penaud
LGO-IUEM

**Paléoclimat: Reconstruction du paléoenvironnement holocène au N-W de l'Europe et dans le Golfe de Gascogne: traceurs palynologiques (Pollen et dinokystes)**

**Fersi. W., Penaud, A et collaborateurs (LGO, EPOC)**

**WP 2** Holocene environmental coastal changes
Coord. A. Penaud
LGO-IUEM

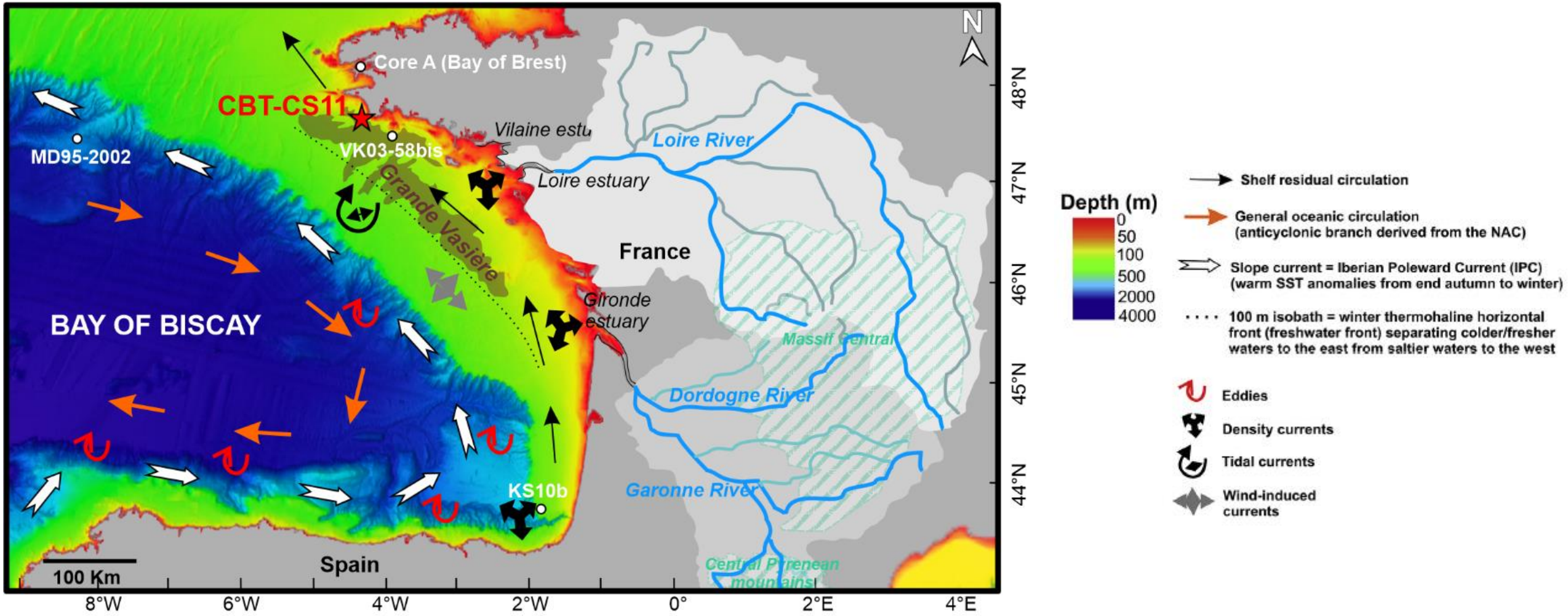
**Paléoclimat**: Reconstruction du paléoenvironnement holocène au N-W de l'Europe et dans le Golfe de Gascogne: traceurs palynologiques (Pollen et dinokystes)
Fersi. W., Penaud, A et collaborateurs (LGO, EPOC)

**WP 3** Numerical models of past coastal hydrological processes
Coord. G. Charria
LOPS-IUEM-Ifremer

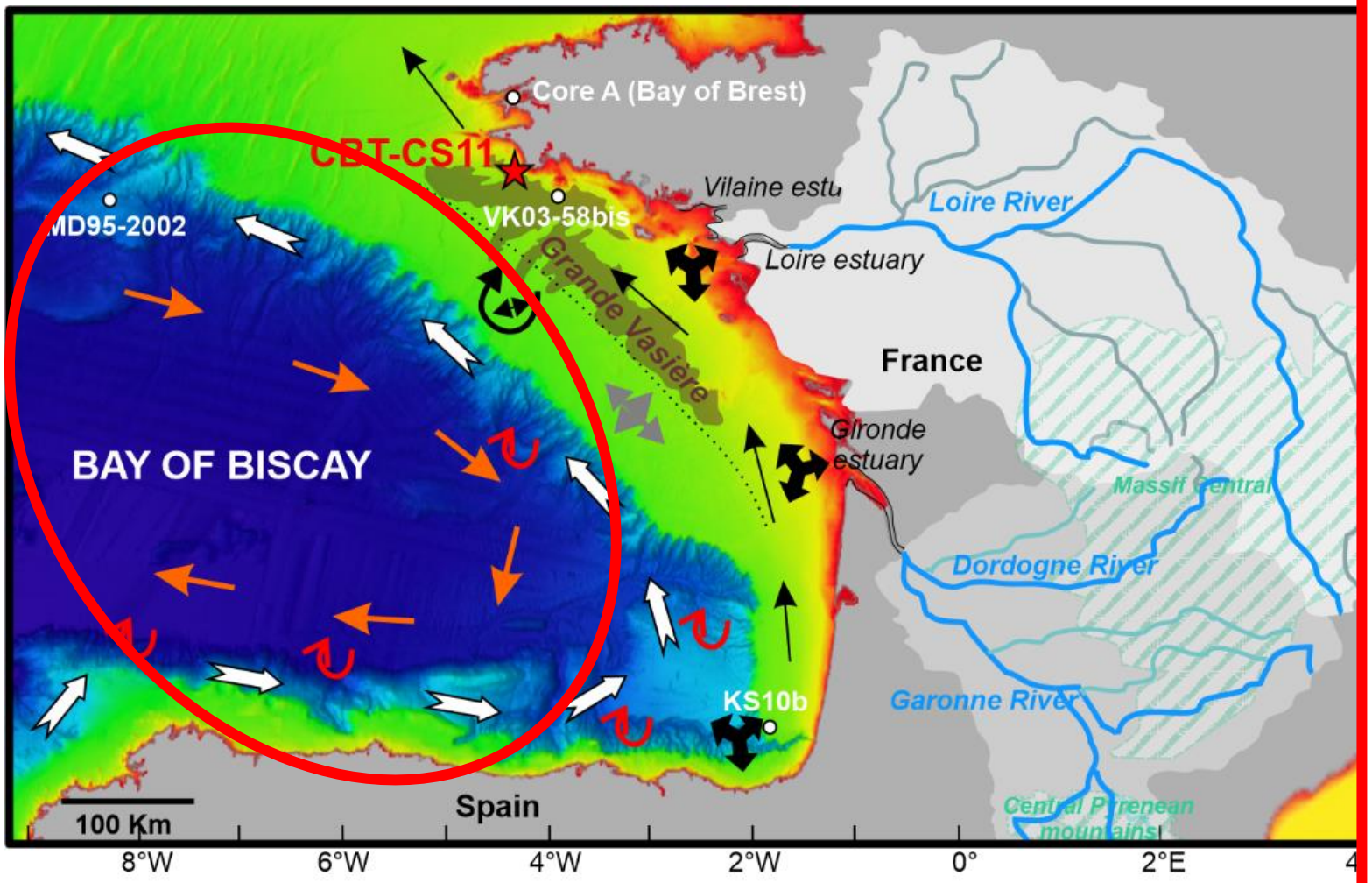
**Modélisation**: Simulations numériques des conditions hydrologiques dans le Golfe de Gascogne au passé (3, 5 et 9 ka BP)

Ayouch. A., Charria. G et collaborateurs (IFREMER)

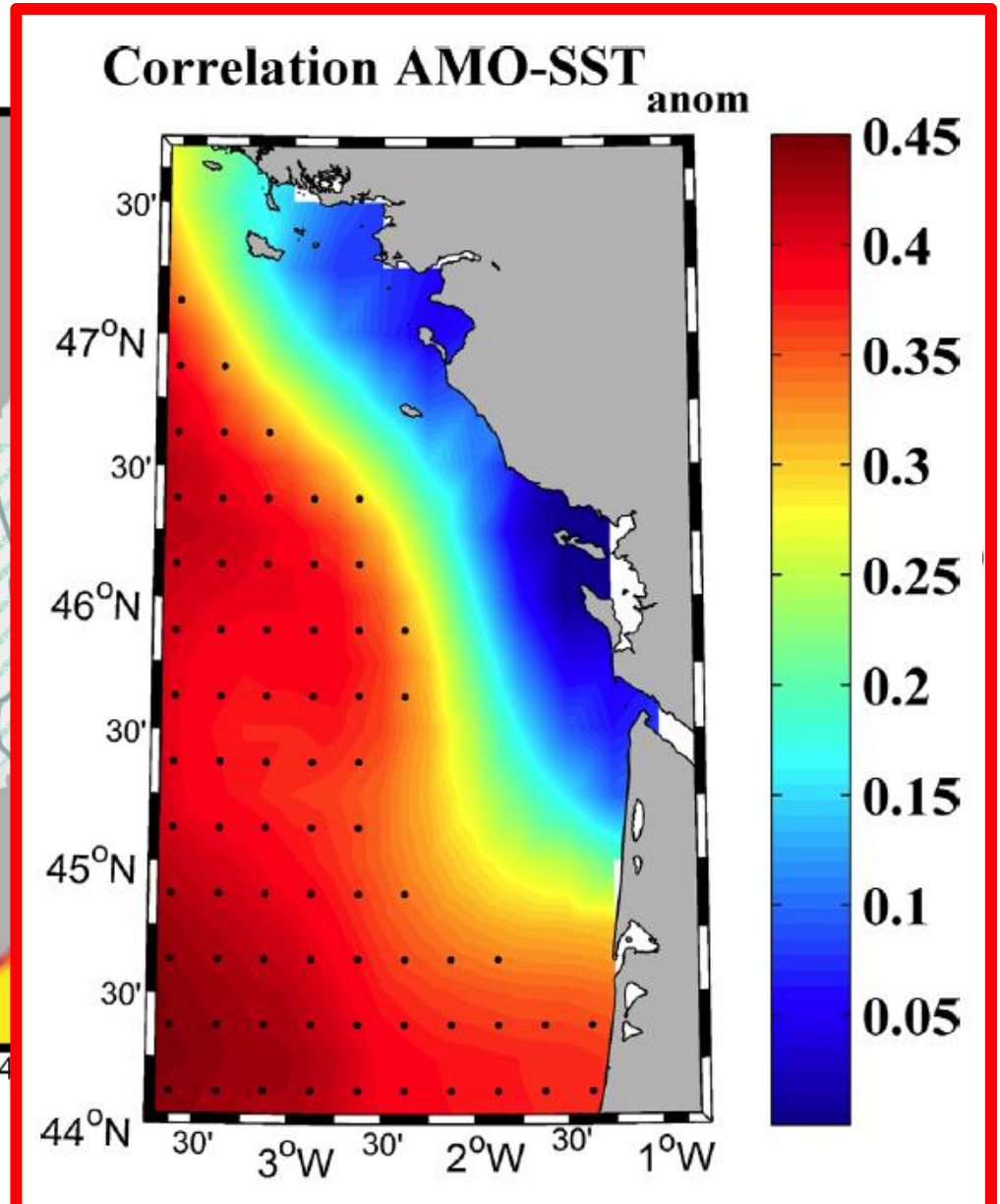
## 1. Présentation de la zone d'étude



## 1. Présentation de la zone d'étude

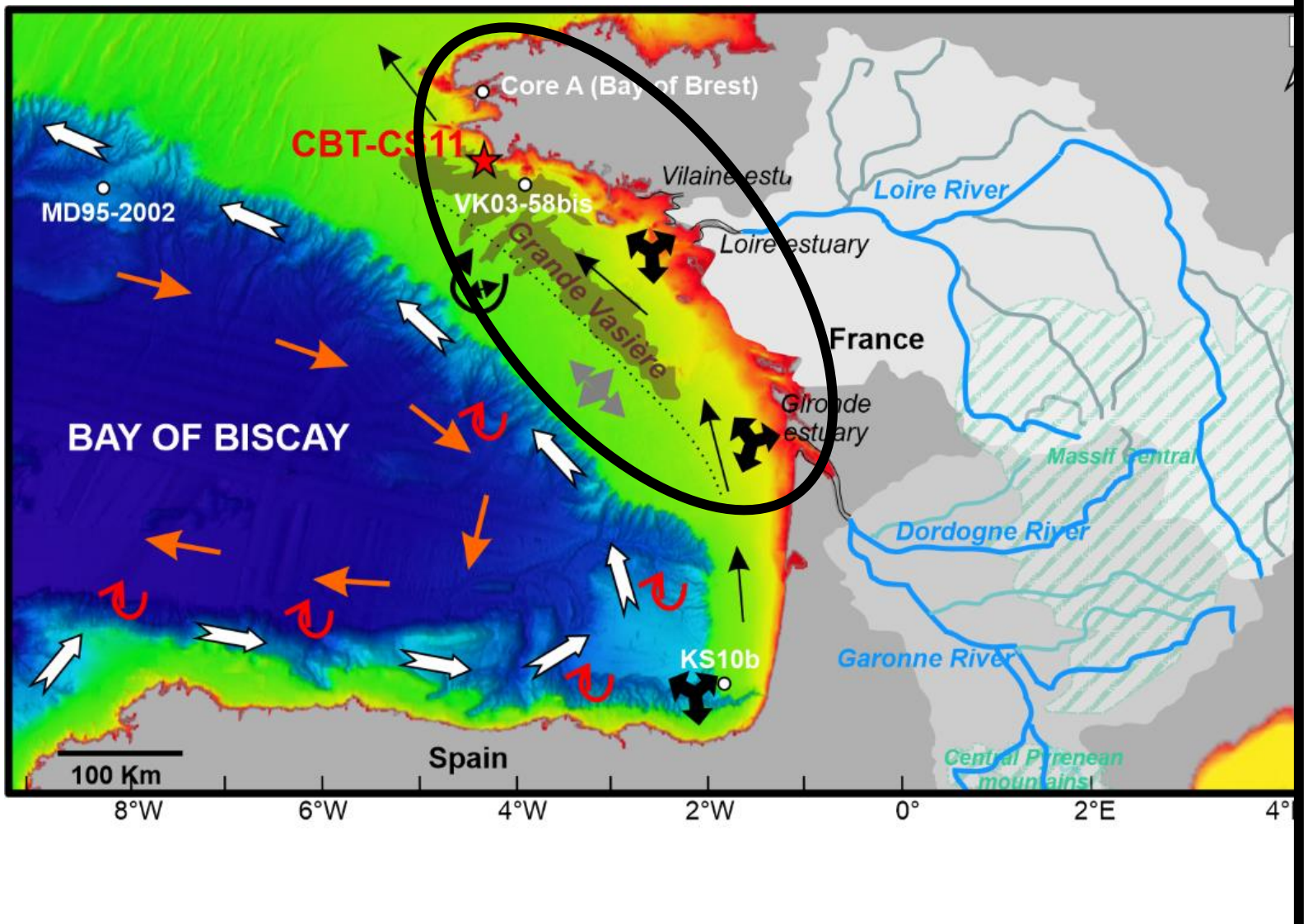



d'après Cassou, 2004

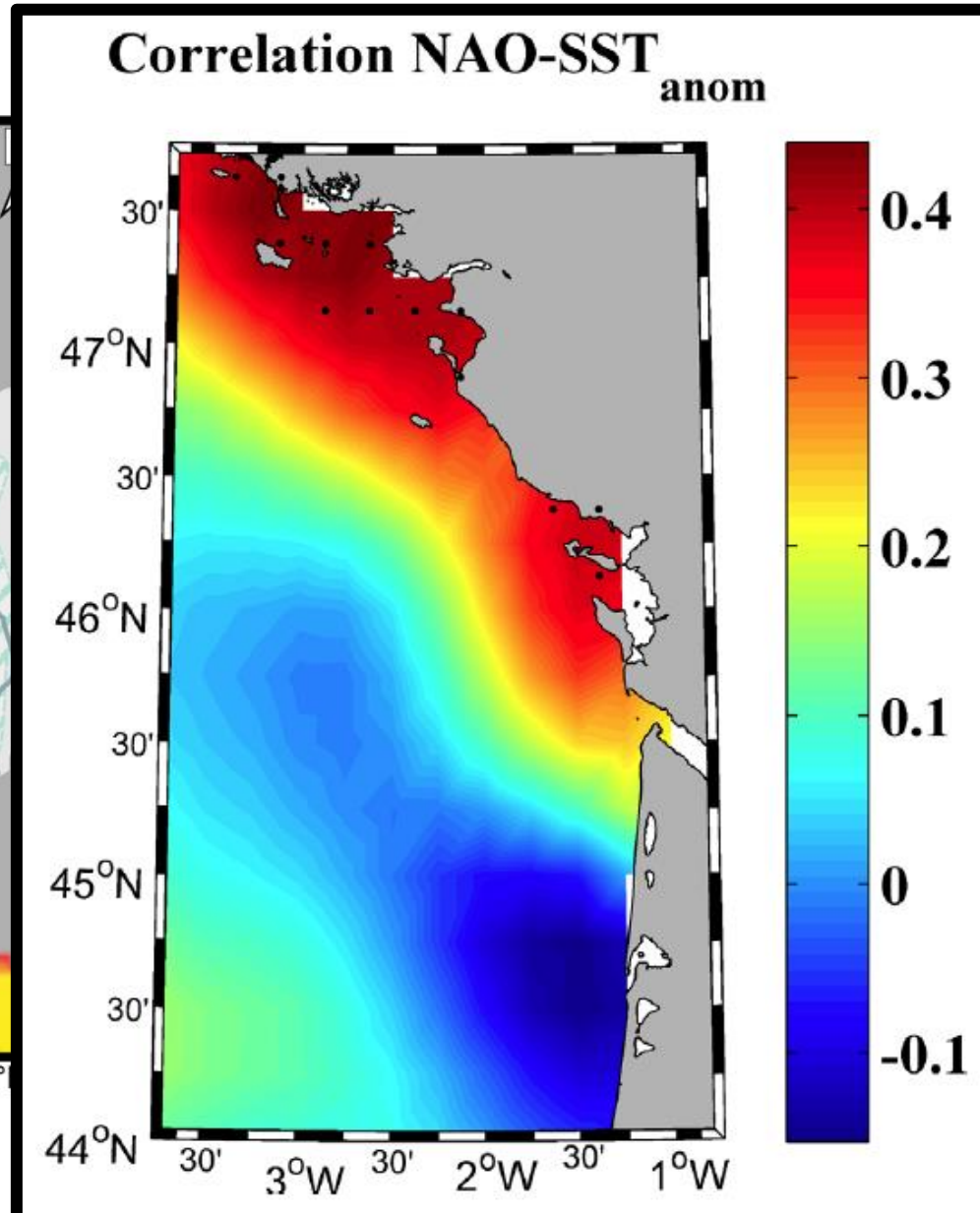



**Fluctuations: 50-70 ans**

## 1. Présentation de la zone d'étude

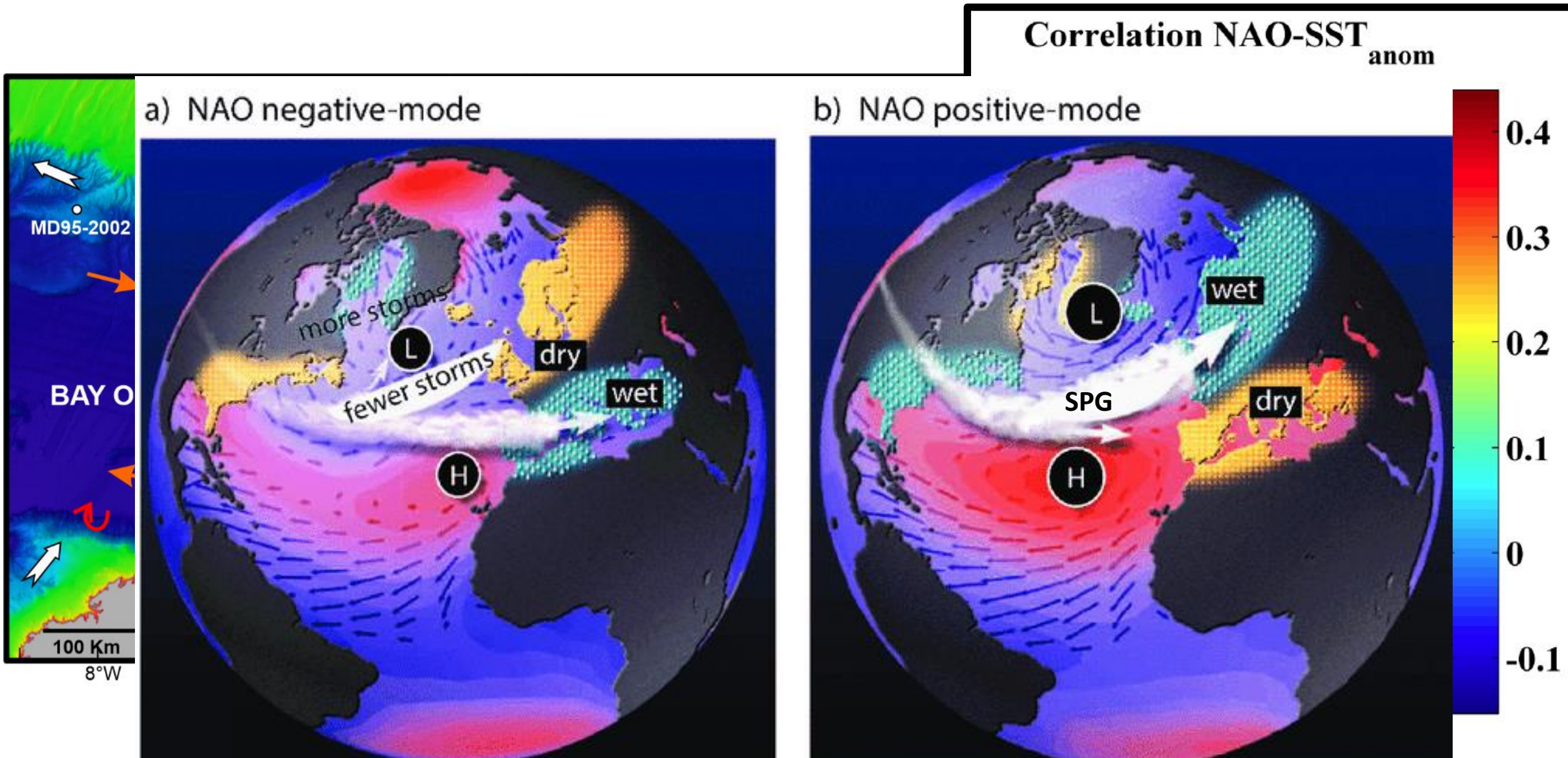


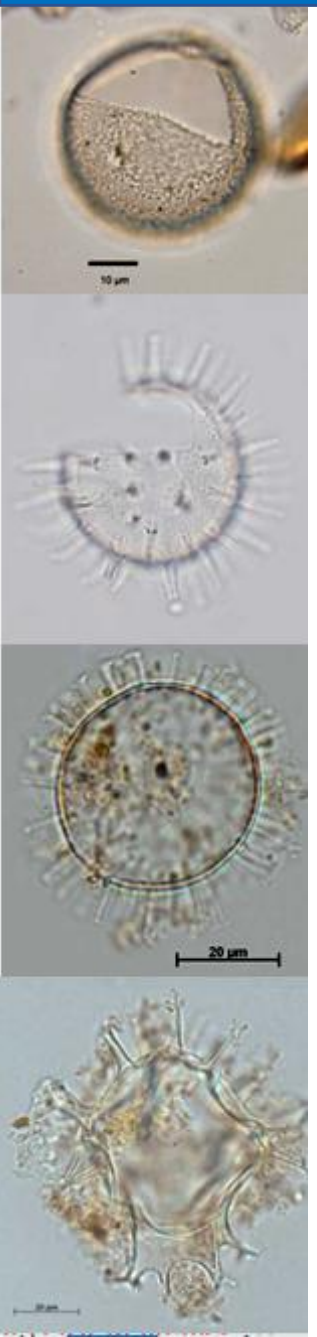

d'après Cassou, 2004



## 1. Présentation de la zone d'étude

d'après Cassou, 2004





## 2. Présentation de l'outil: palynologie marine

**Palynologie marine**

**Dinokystes**

**Pollen et spores**

**Continent**

**Ocean**

**-Hydrologie des eaux de surface**
**-Reconstructions SST, SSS, productivité marine etc…**

**Dynamique de la végétation et d'anthropisation**

**Mer** ⟷ **Terre**

## 3. Les études palynologiques précédentes: Pollen + Dinokystes

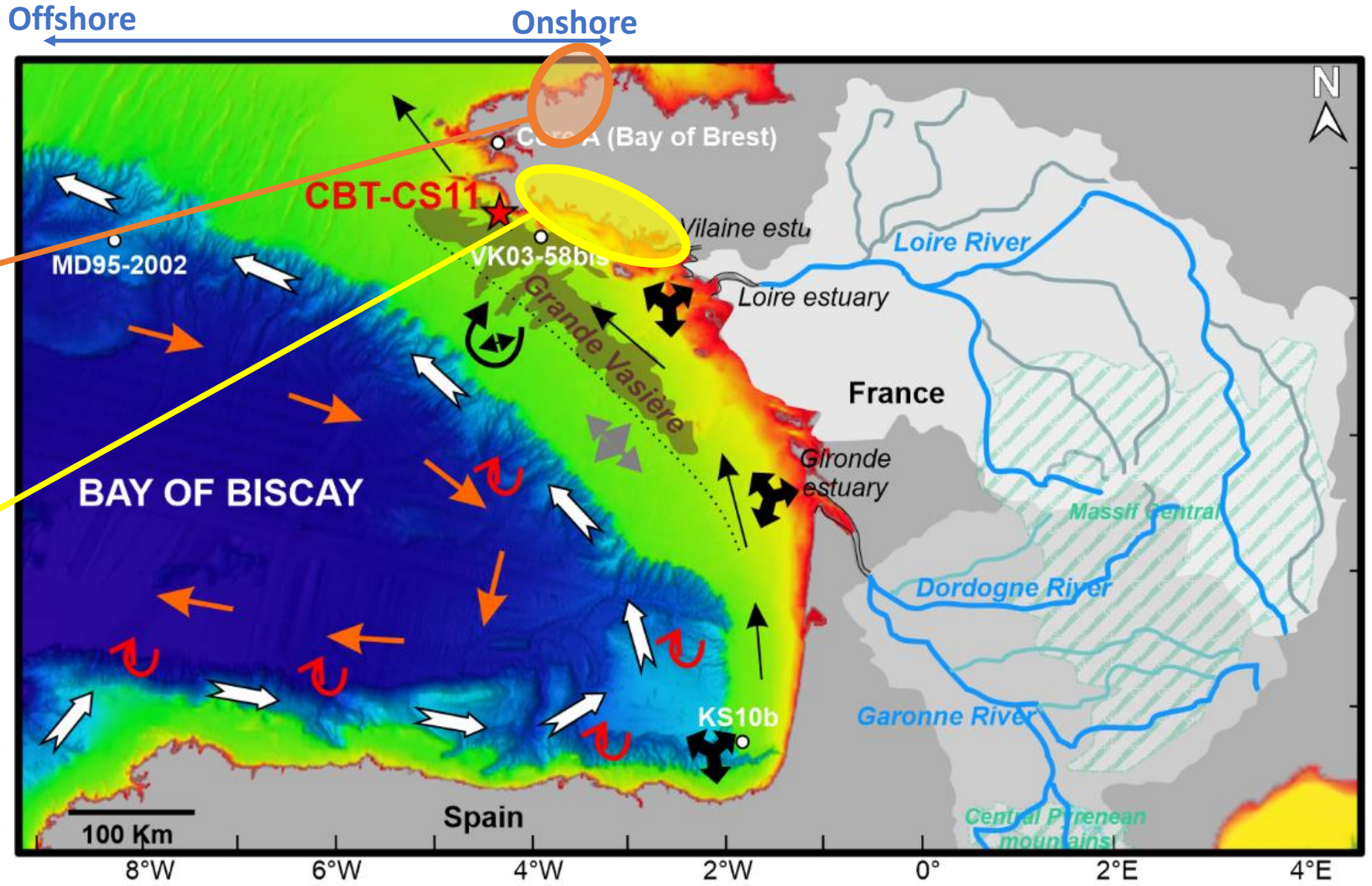
**Tourbes**

**David et al., en cours:**

**Plouescat**

**Fernane et al. 2014 : PorsMilin**

**Fernane et al. 2015 : Guidel**



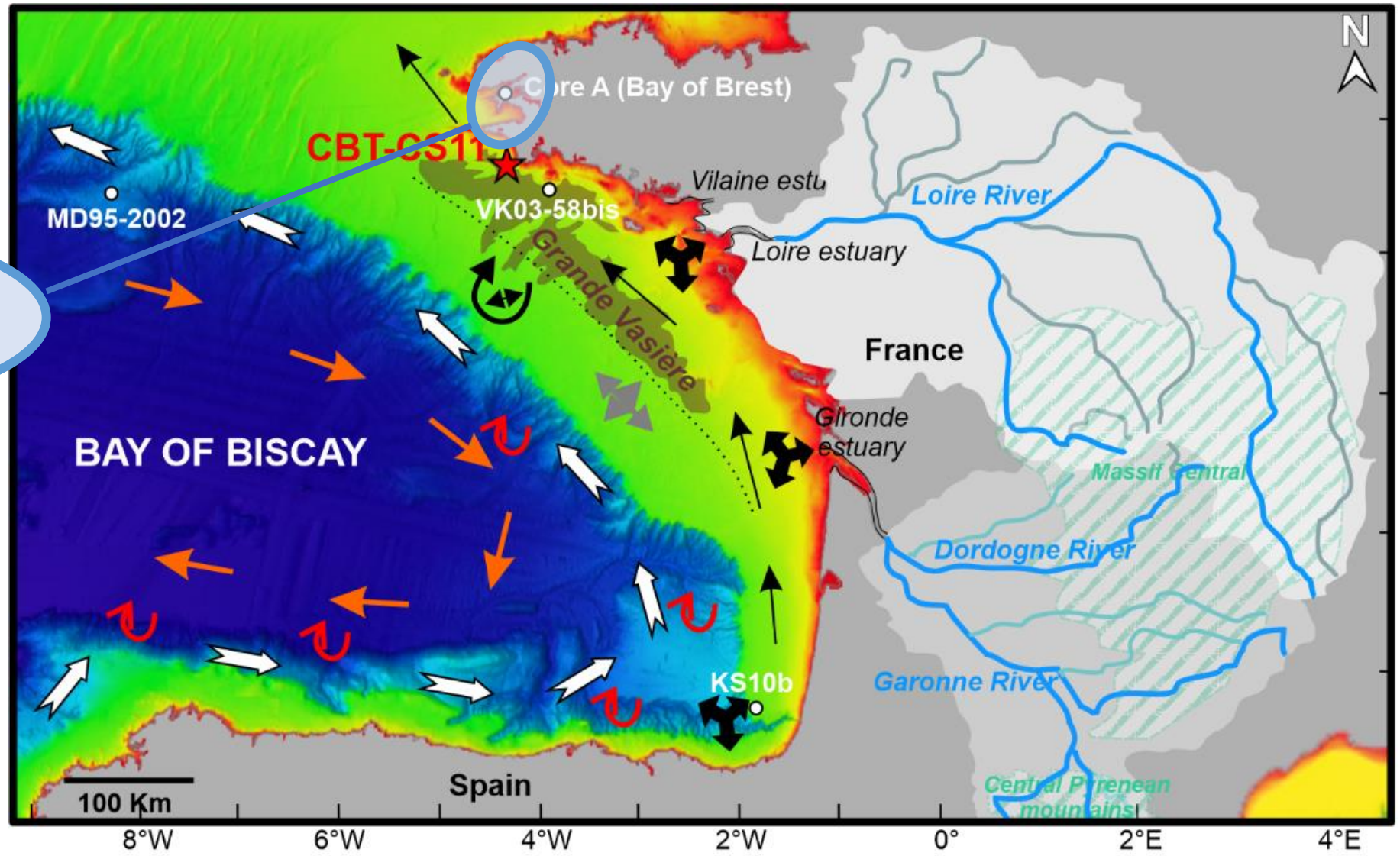
## 3. Les études palynologiques précédentes: Pollen + Dinokystes

**Estuaire**

Offshore ⟷ Onshore

**Lambert et al., 2019, 2020:**

**Rade de Brest**



## 3. Les études palynologiques précédentes: Pollen + Dinokystes

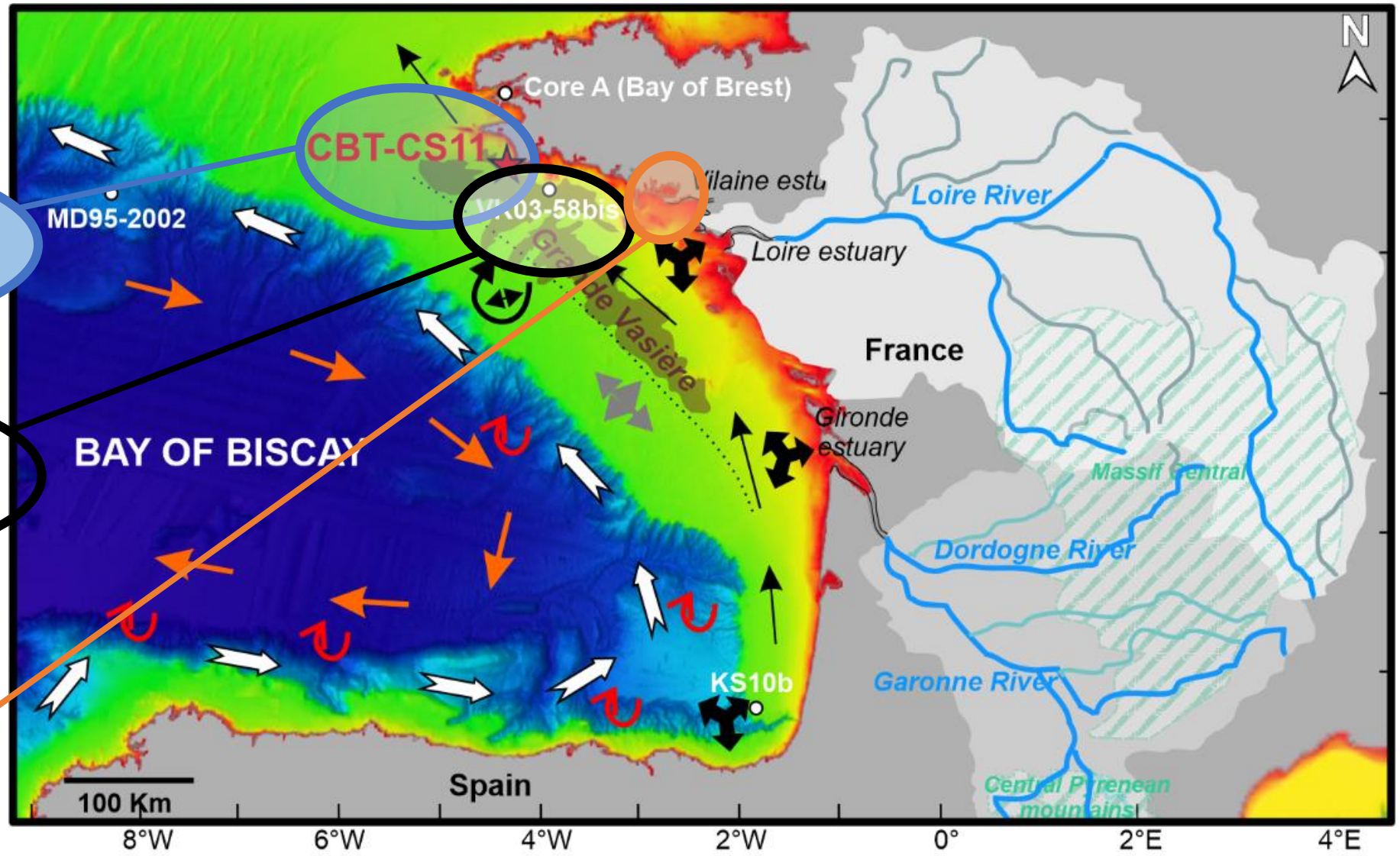
**Plateau continental**

Offshore ⟷ Onshore

**Penaud et al., 2020:**
Nord Grande vasière

**Naughton et al., 2007**
Nord Grande vasière

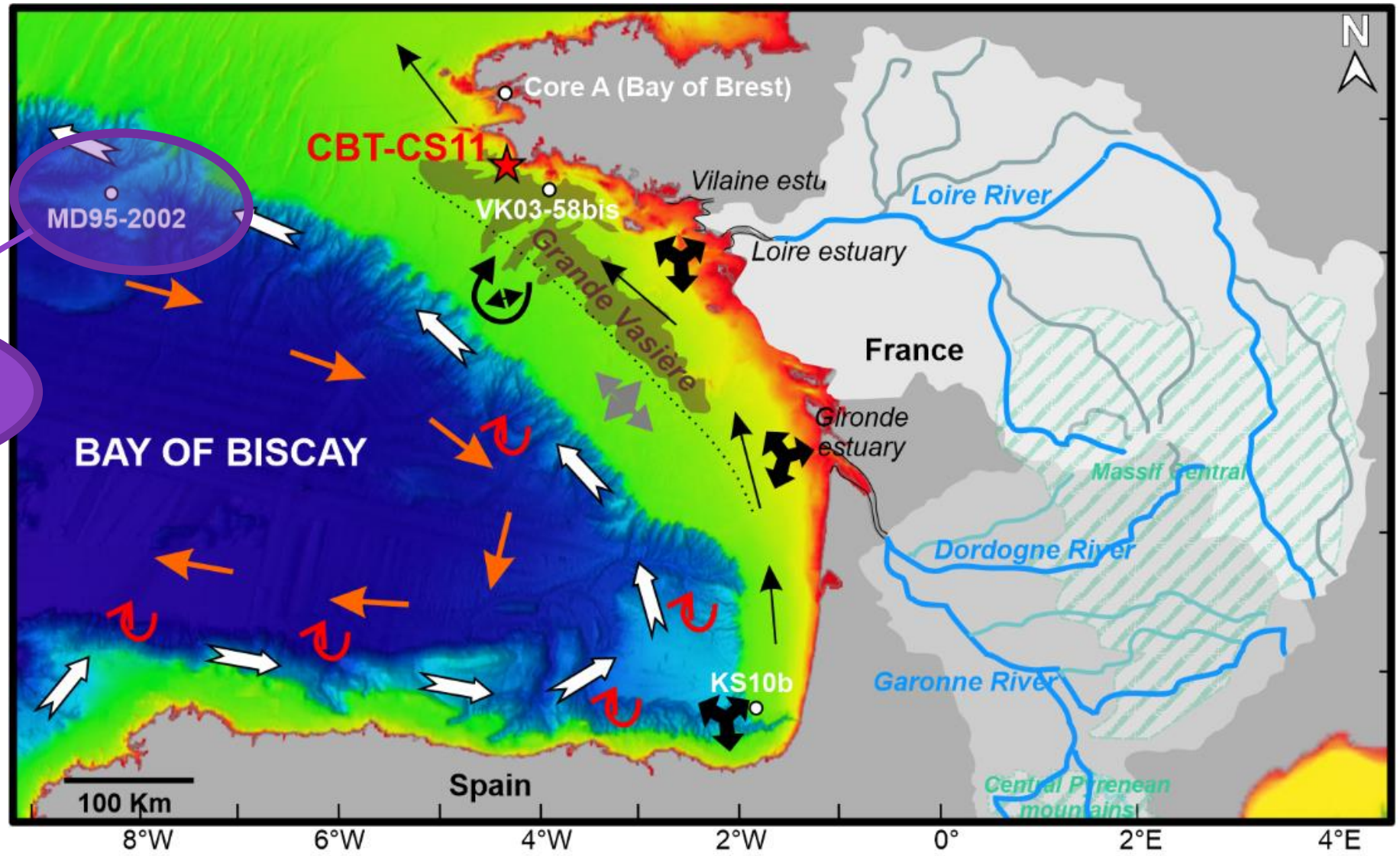
**David et al., en cours:**
Baie de Quiberon



## 3. Les études palynologiques précédentes: Dinokystes

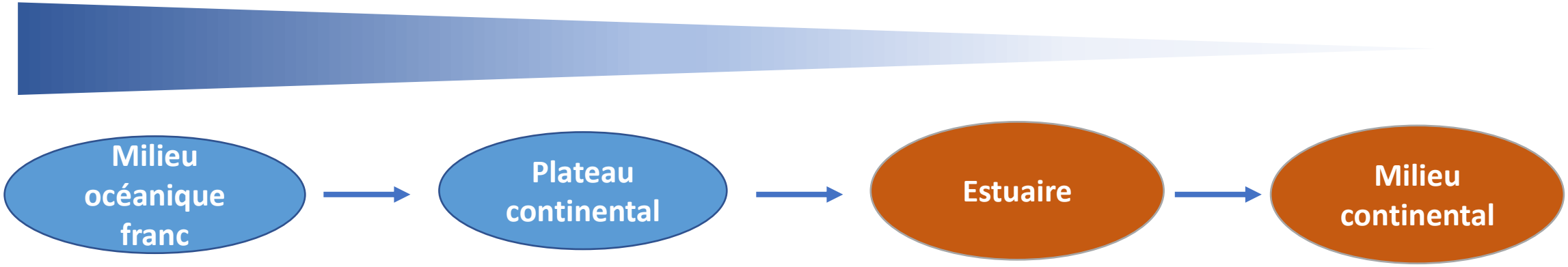
**Milieu océanique**

Offshore ⟷ Onshore




**Zumaque et al., 2017**

Nord Golfe de Gascogne



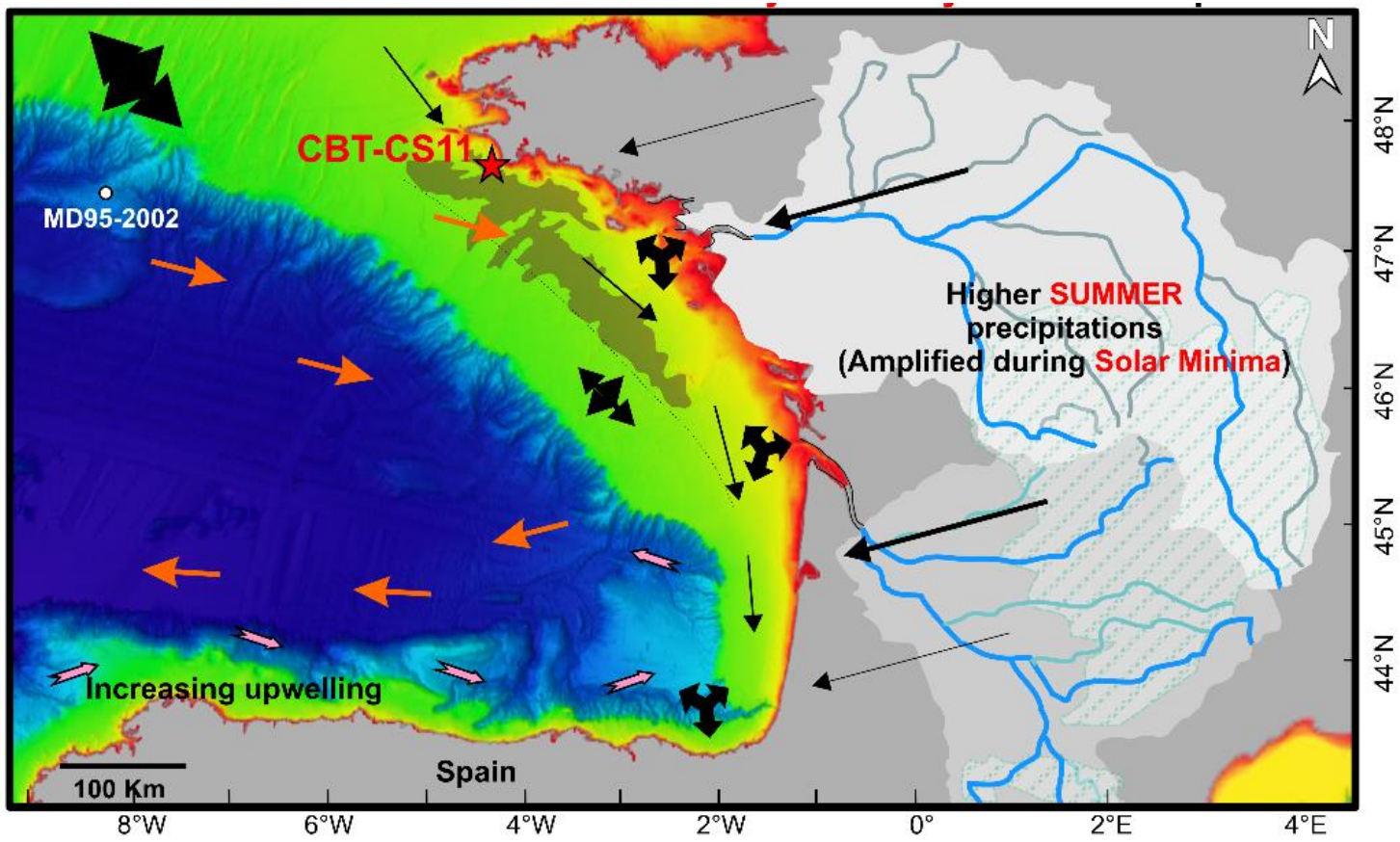

**Dynamique climatique et hydrologique**
+ anthropisation

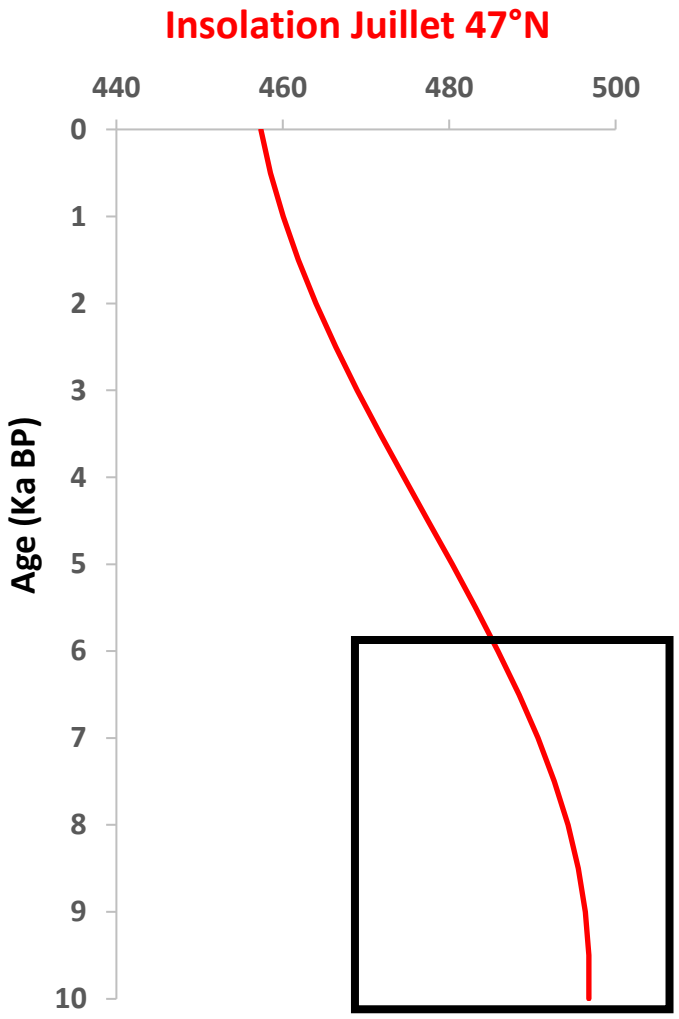
**Dynamique d'anthropisation**
+ climatique

| | | |
|---|---|---|
| + | • **Sédimentation hémipélagique continue** | • **Signature palynologique plus locale**<br>• **Proche des bassins versants étudiés** |
| − | • **Taux de sedimentation plus faibles**<br>• **Signature palynologique macro-régionale** | • **Discontinuités stratigraphiques, hiatus**<br>• **Sedimentation complexe sur le plateau** |

## 4. Changement de l'hydrologie de surface pendant l'Holocène

**Penaud et al., 2020**
**Quaternary Sciences Reviews**



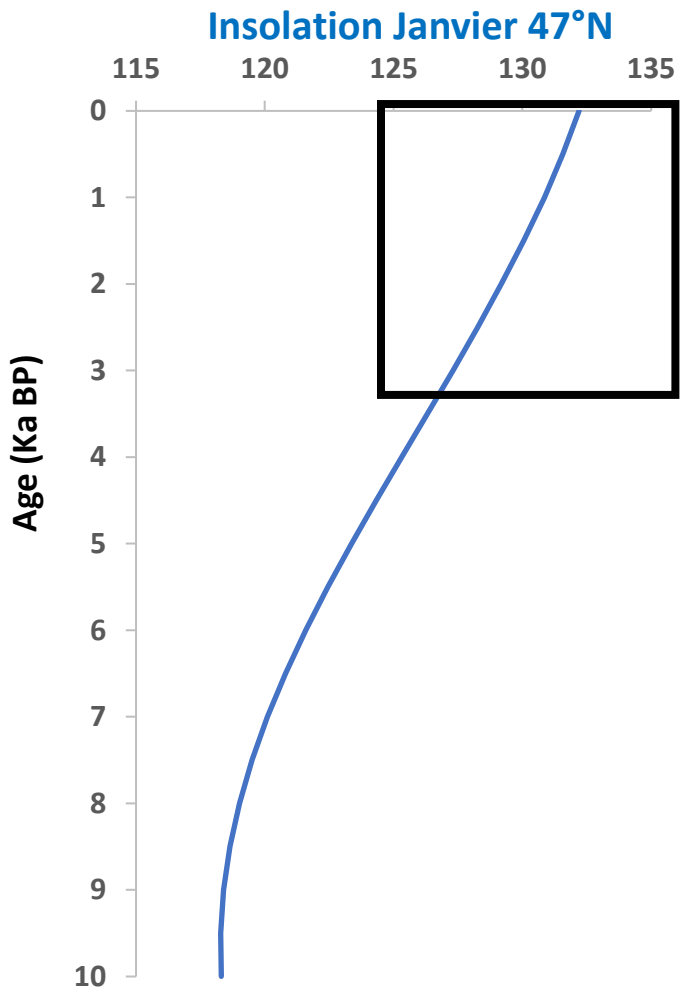




***« Summer mode » : prevalent oceanic influence***

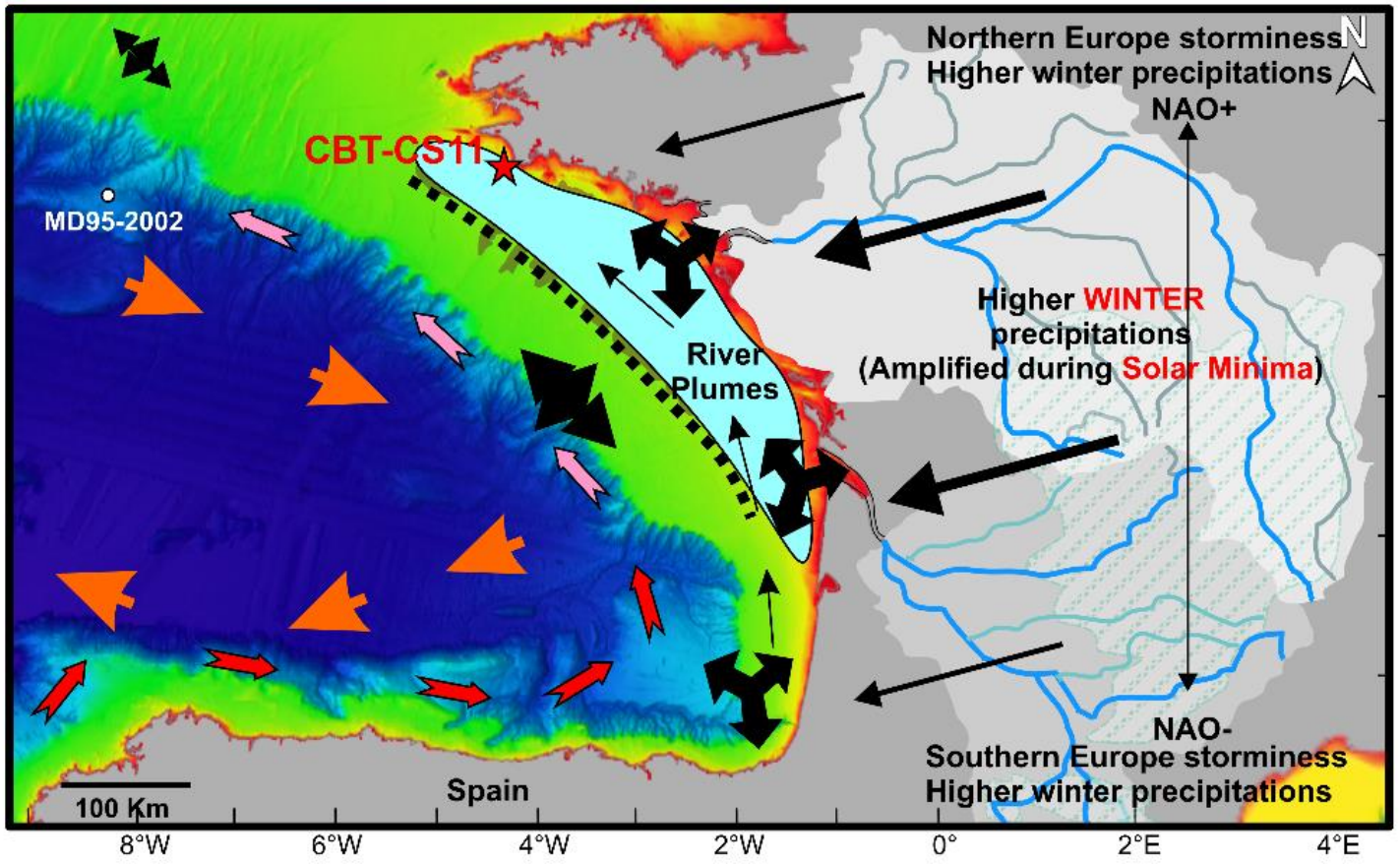
**UNTIL 5.9 ka BP**

## 4. Changement de l'hydrologie de surface pendant l'Holocène

**Penaud et al., 2020**
**Quaternary Sciences Reviews**

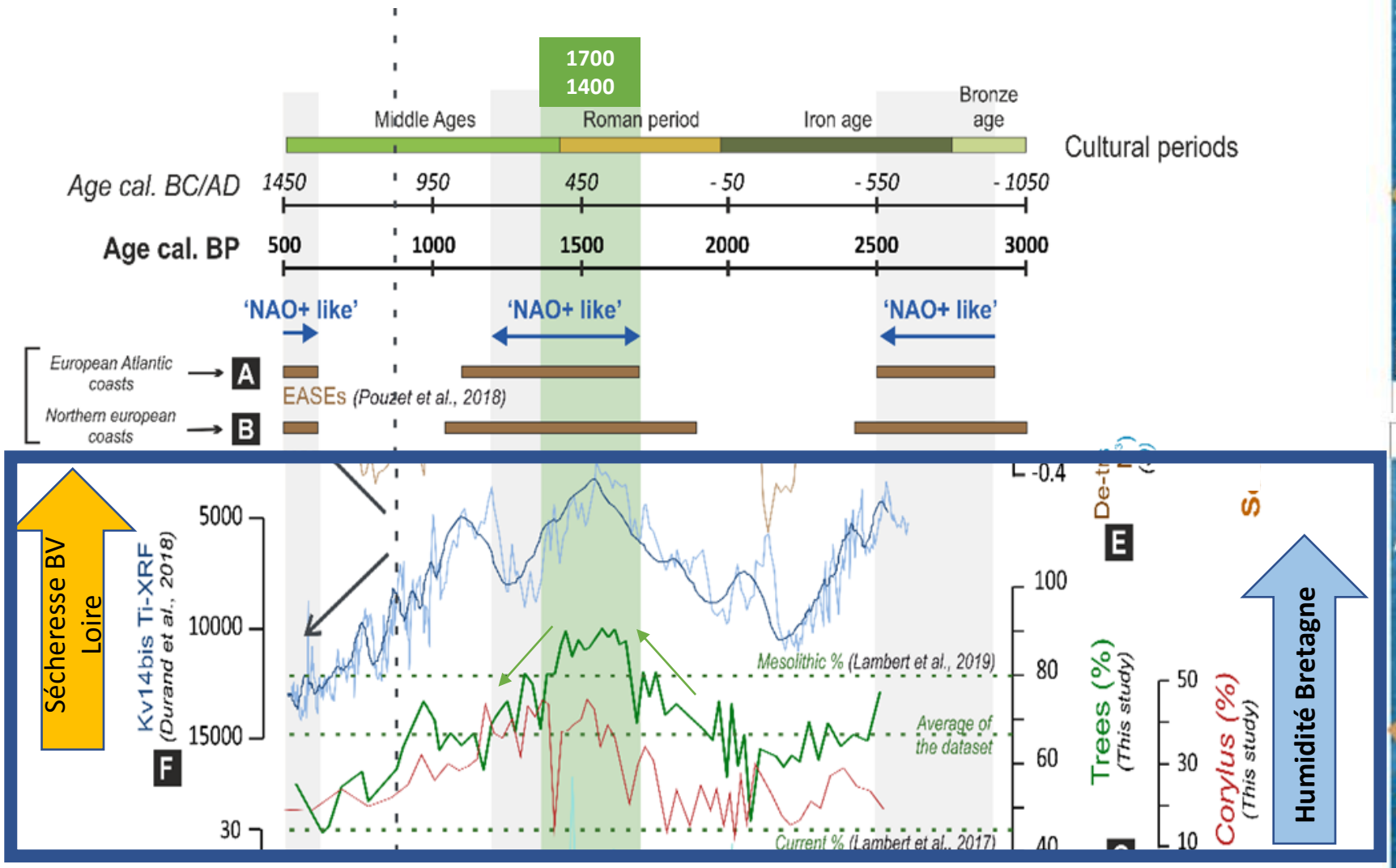


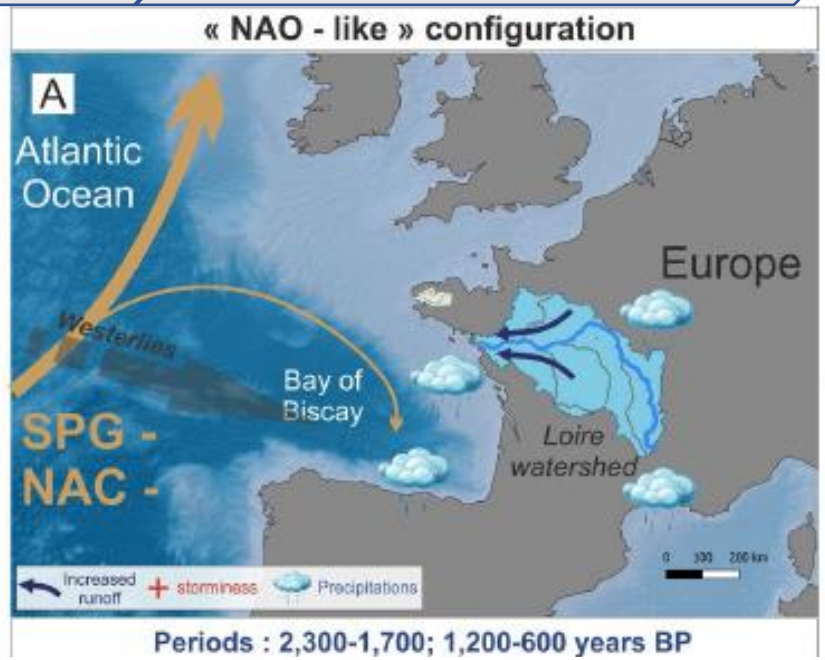

***« Winter mode » : prevalent continental influence***
**FROM 3.3 ka BP**

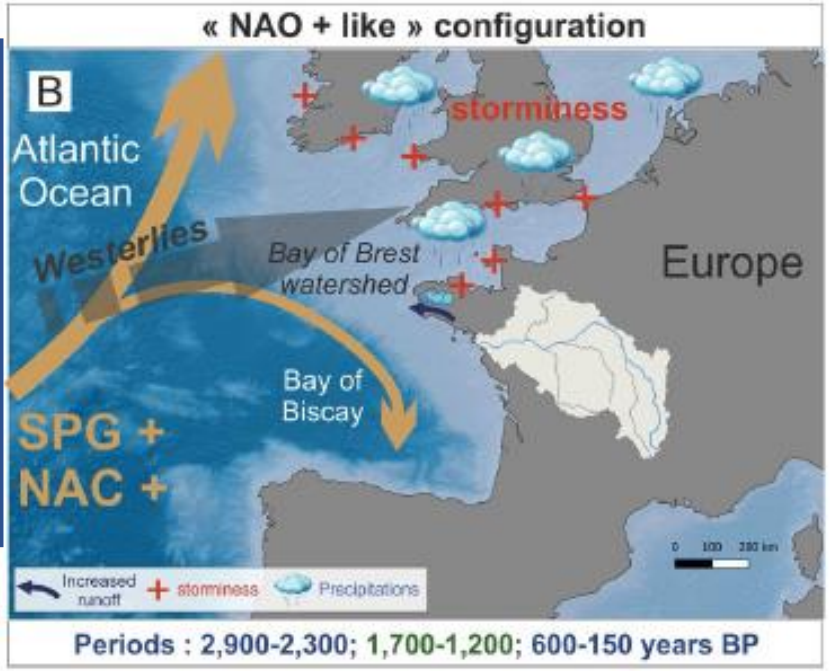



**Equal continental-oceanic influences between 5.9 and 3.3 ka BP : Recent Neolithic to Early Bronze Age**

## 5. Dynamique de la NAO pendant les derniers 2500 ans



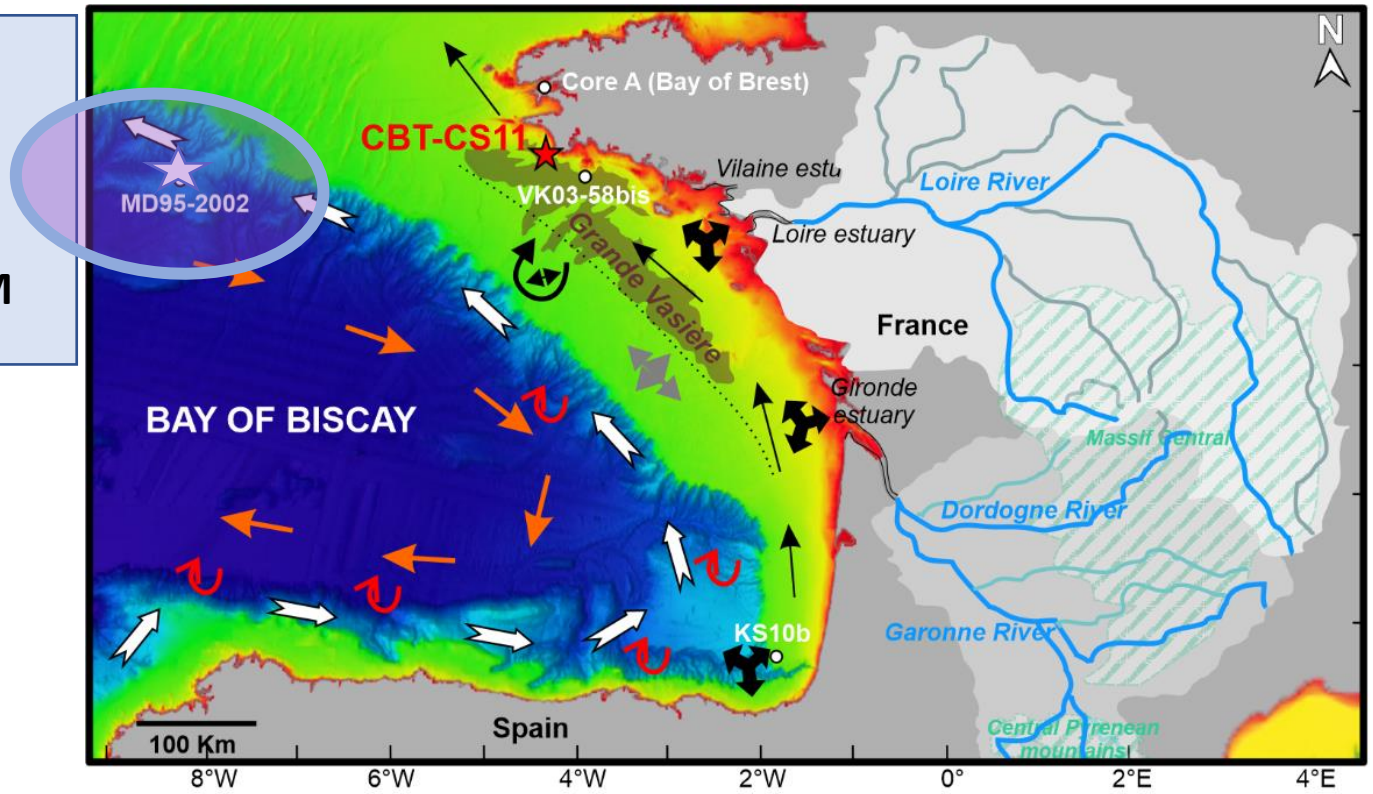




**Lambert et al., 2020: Scientific Reports**

**Partie 1**

1) **"Comprendre à l'échelle régionale le signal climatique holocène au Nord du Golfe de Gacogne"**

**Carotte MD95-2002 : Offshore (Zumaque et al., 2017; Eynaud et al., 2018; collaboration EPOC-UQAM-IfremerGM**

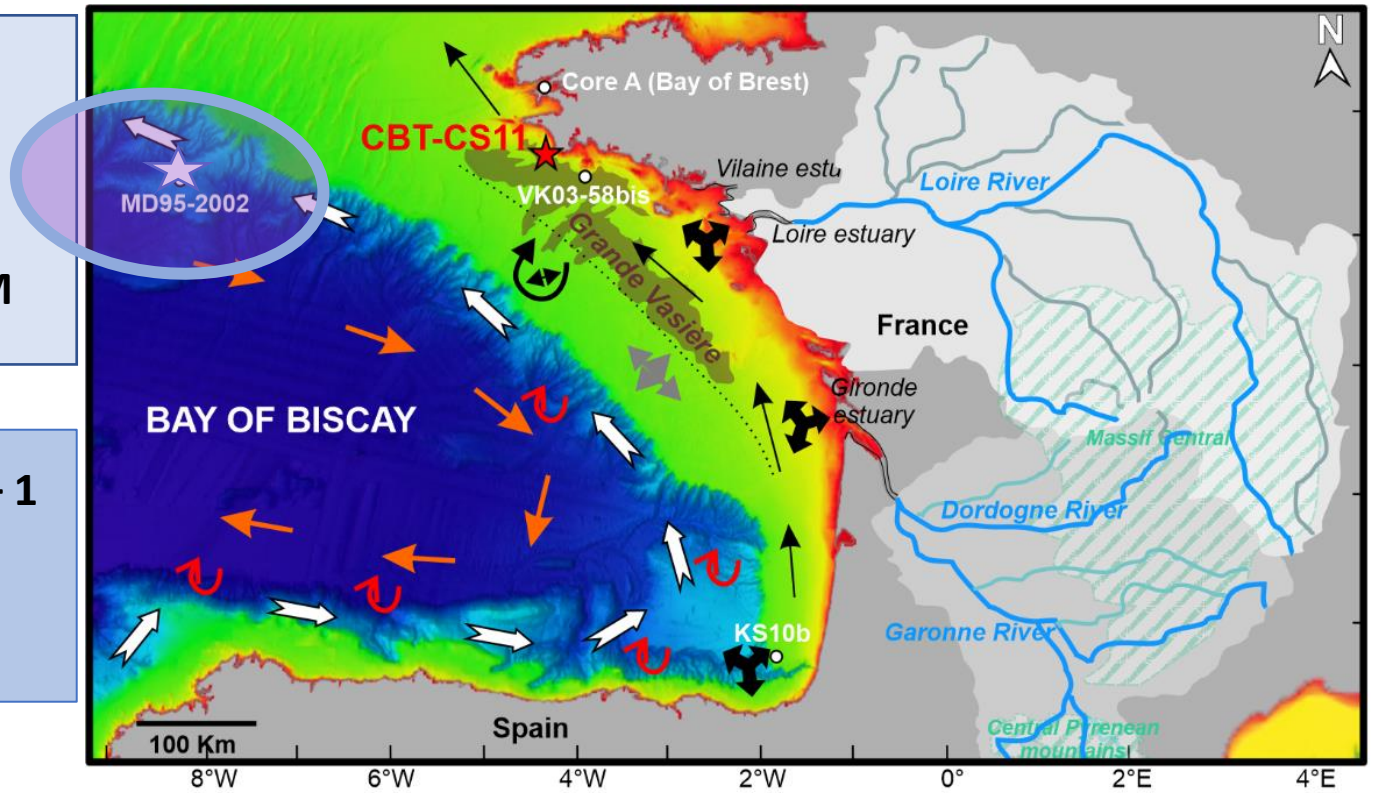


**Partie 1**

1) **"Comprendre à l'échelle régionale le signal climatique holocène au Nord du Golfe de Gacogne"**

**Carotte MD95-2002 : Offshore (Zumaque et al., 2017; Eynaud et al., 2018; collaboration EPOC-UQAM-IfremerGM**

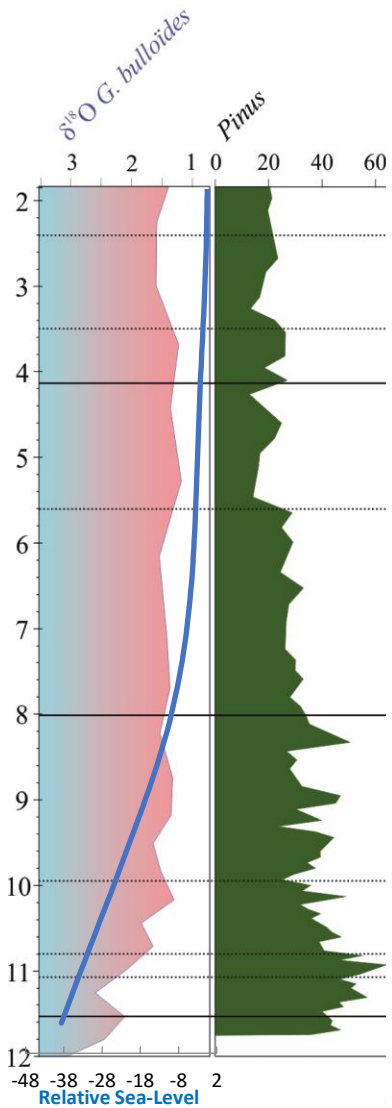
- **Dynamique de vegetation pendant l'Holocène(11 700 – 1 800 ans BP): 50-70 ans de résolution**
- **Approche terre-mer ( SST-SSS)**




**Méthodologie**

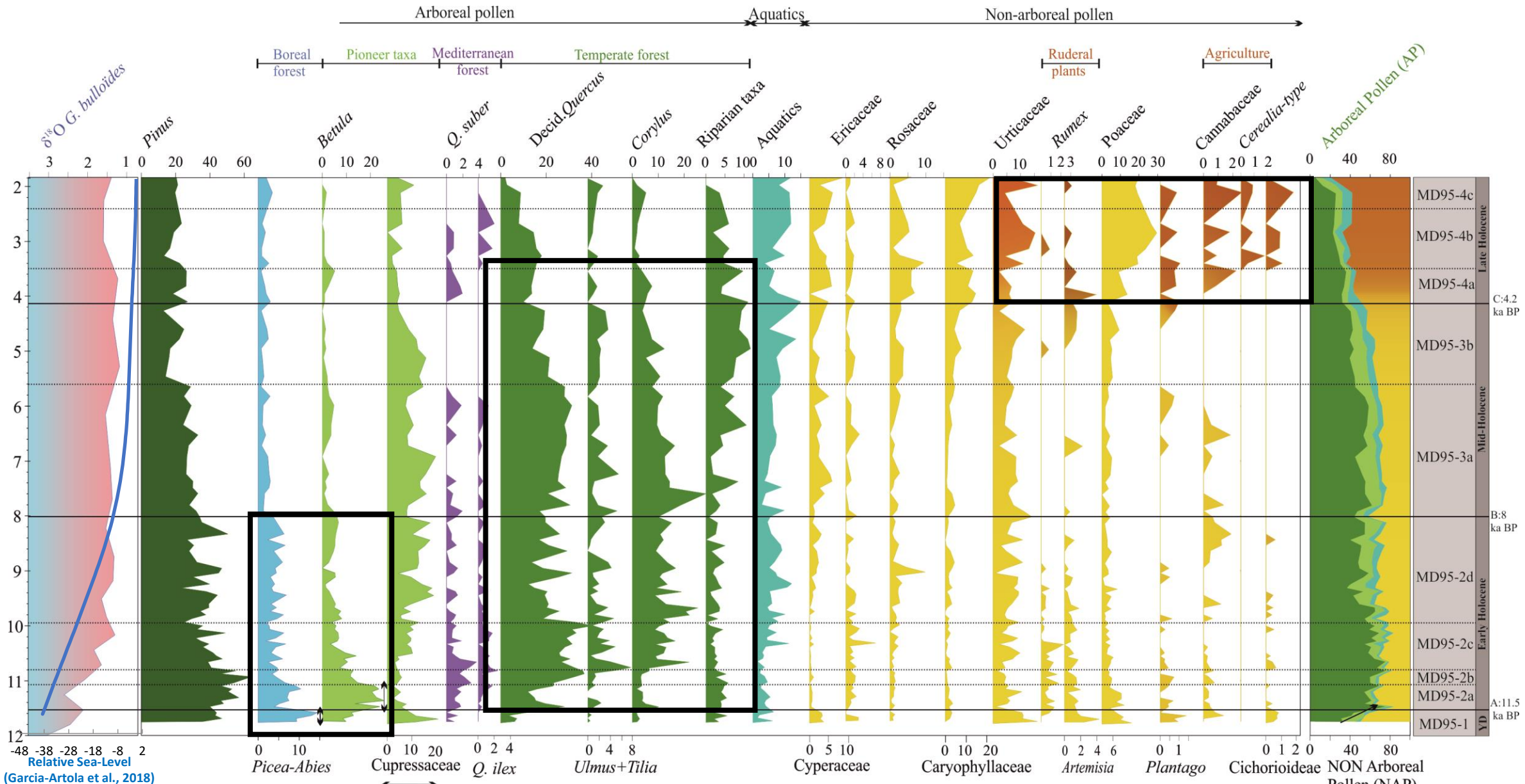
→ **100 niveaux: comptage de bio-indicateurs Terrestres (microscope optique, identification des pollen)**

## 1. Assemblage pollinique

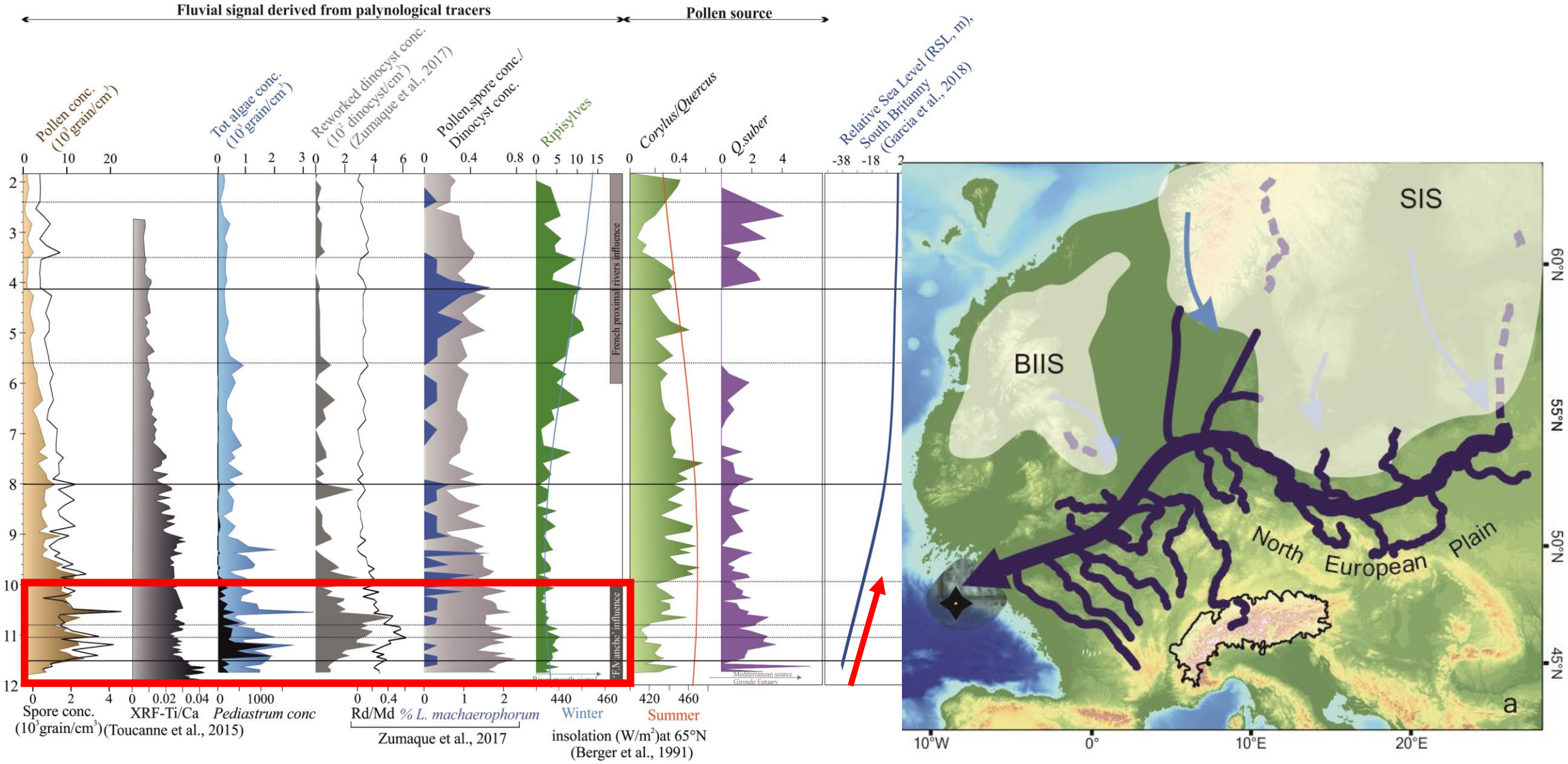



(Garcia-Artola et al., 2018)

## 1. Assemblage pollinique



## 2. Transport fluviatile



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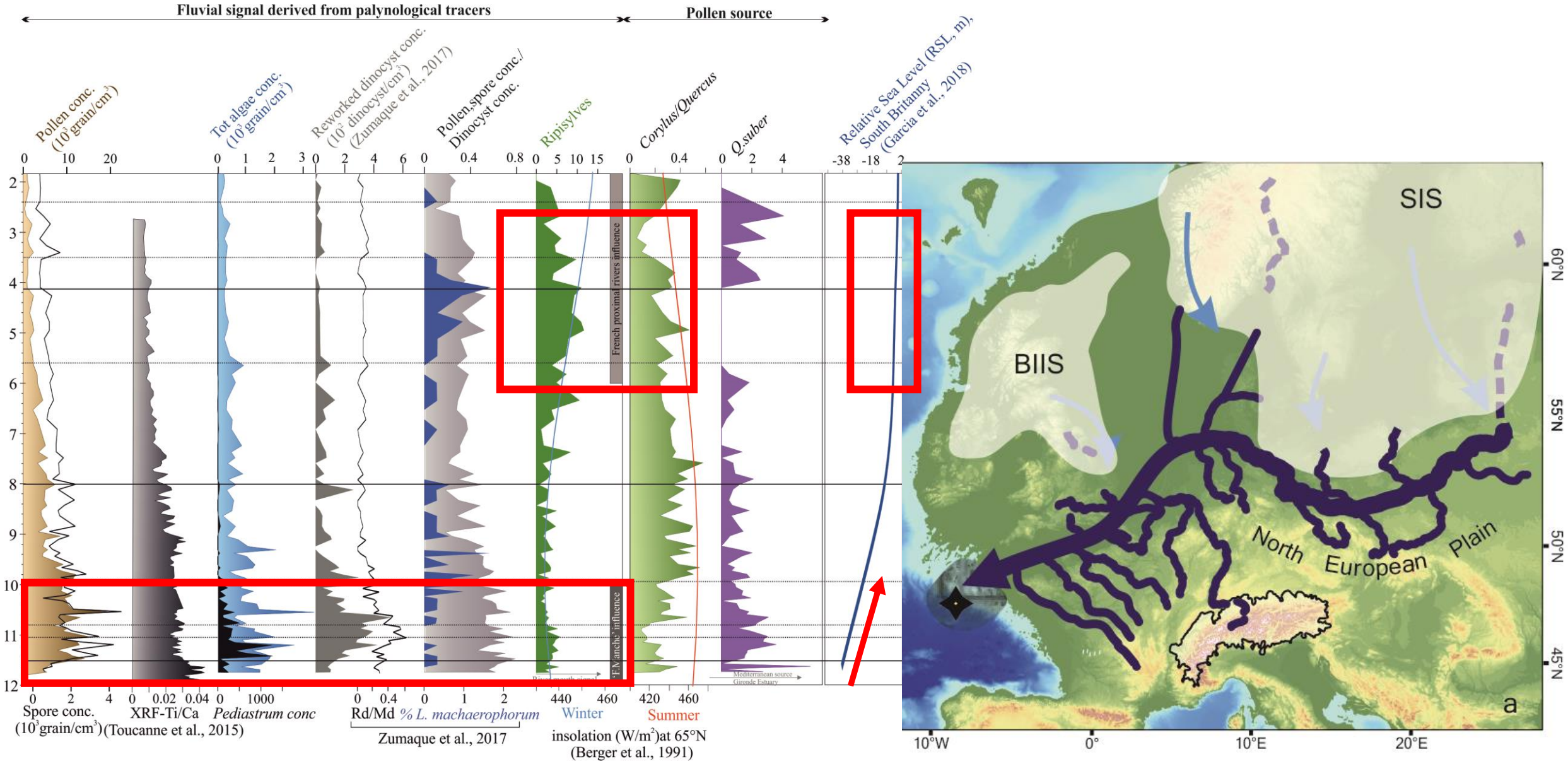

## 3. Comparaison des signaux polliniques: domaine océanique vs plateau continental

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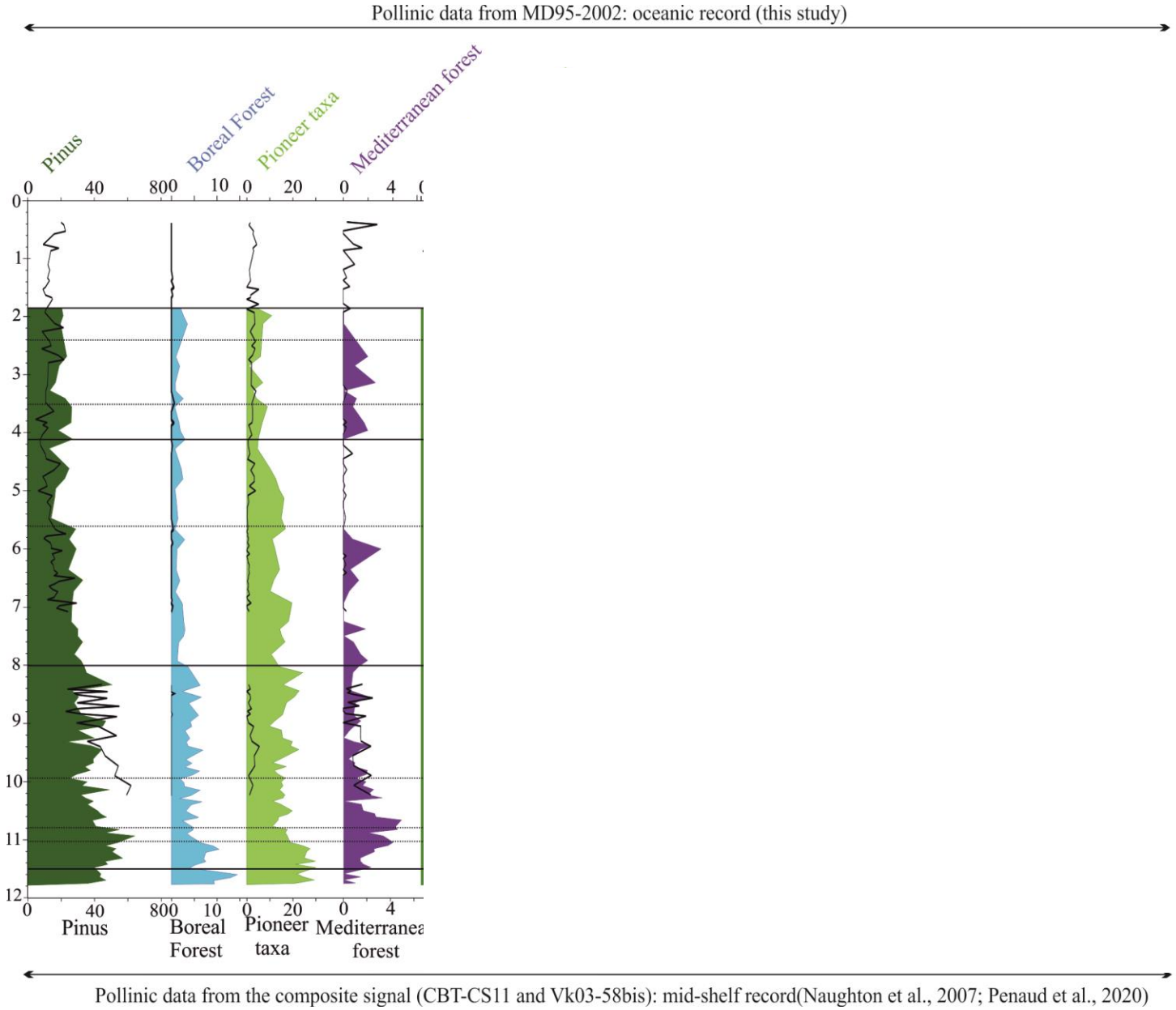
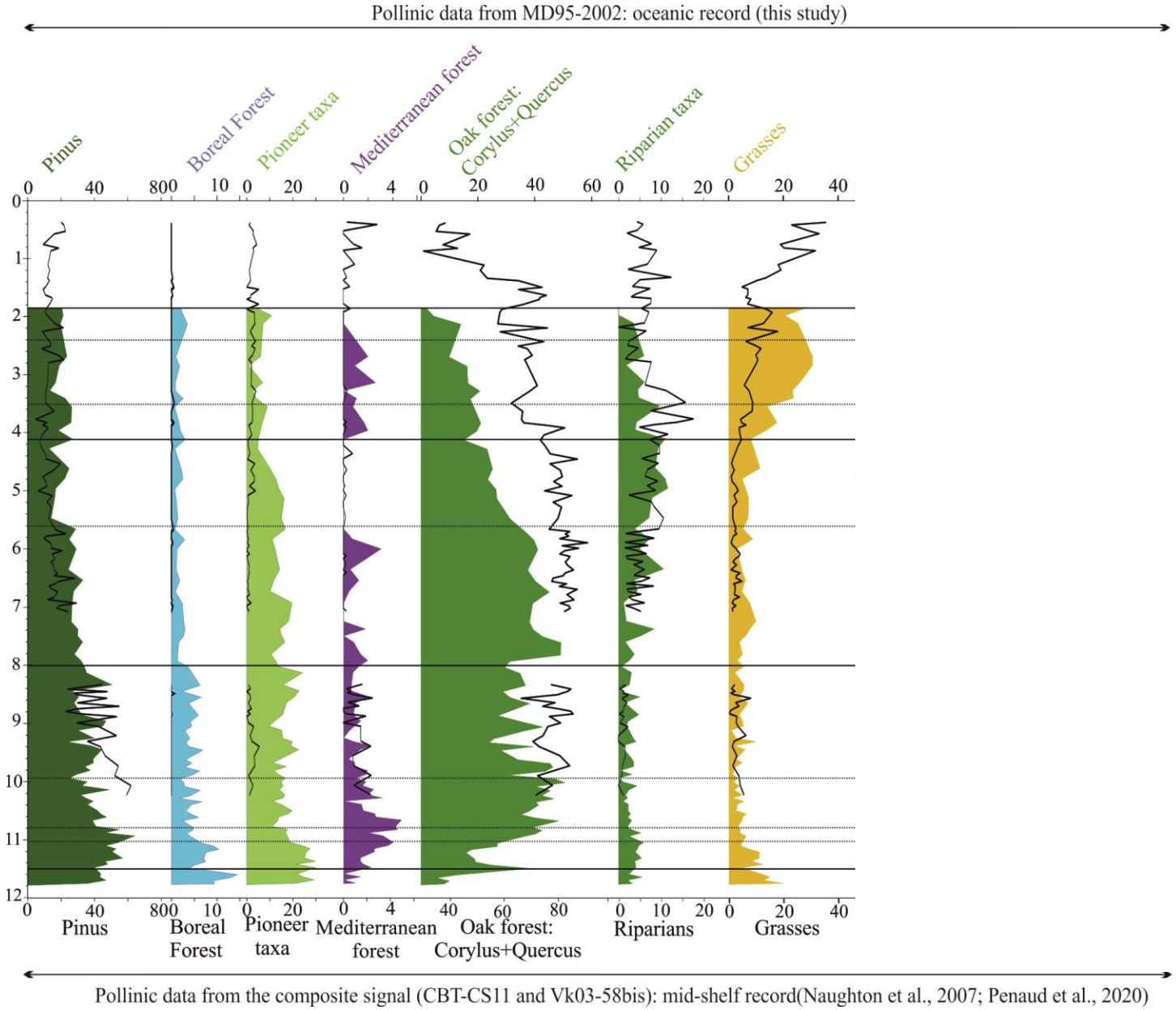


## 3. Comparaison des signaux polliniques: domaine océanique vs plateau continental



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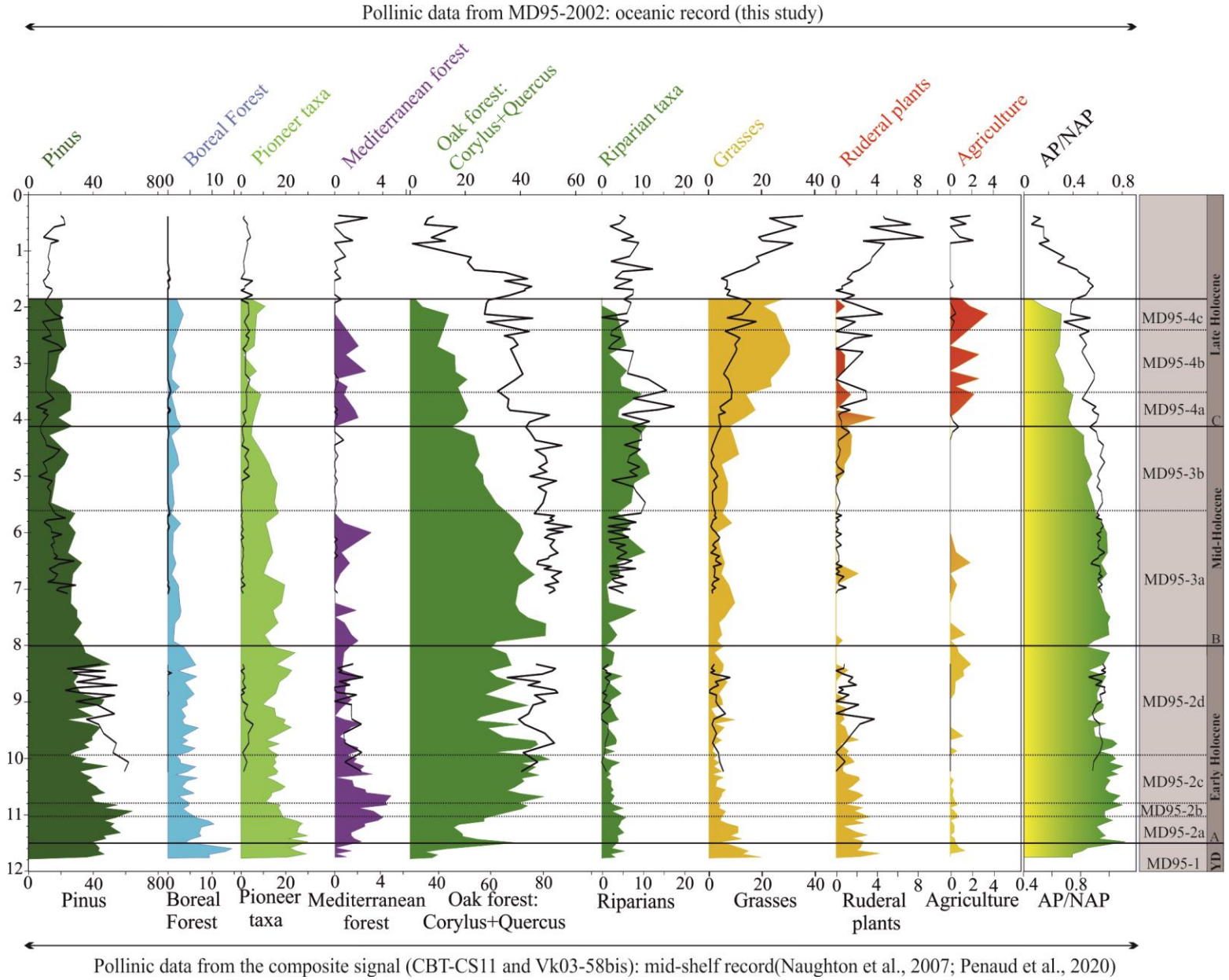
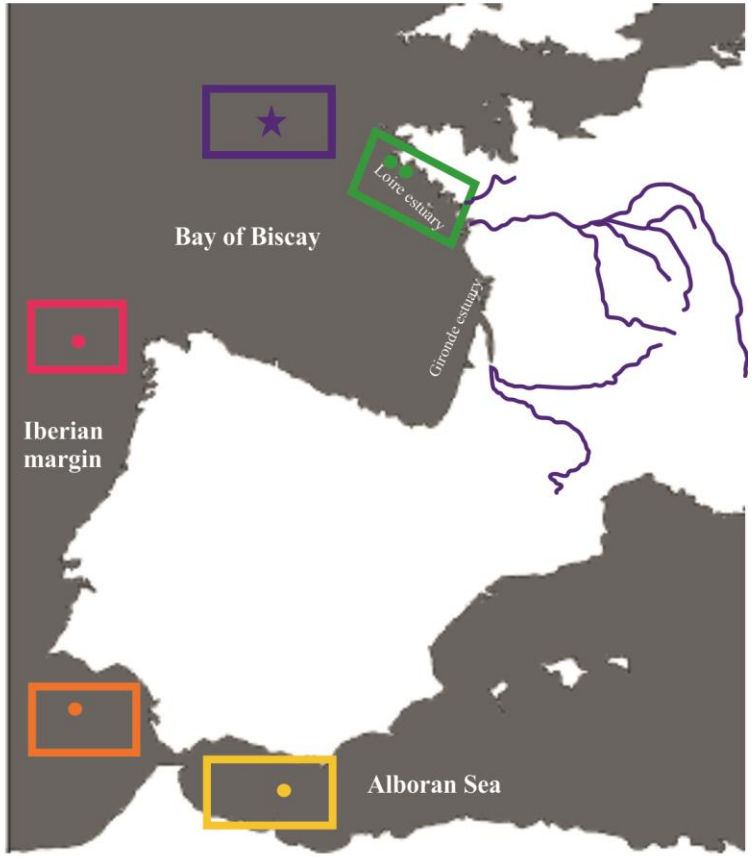
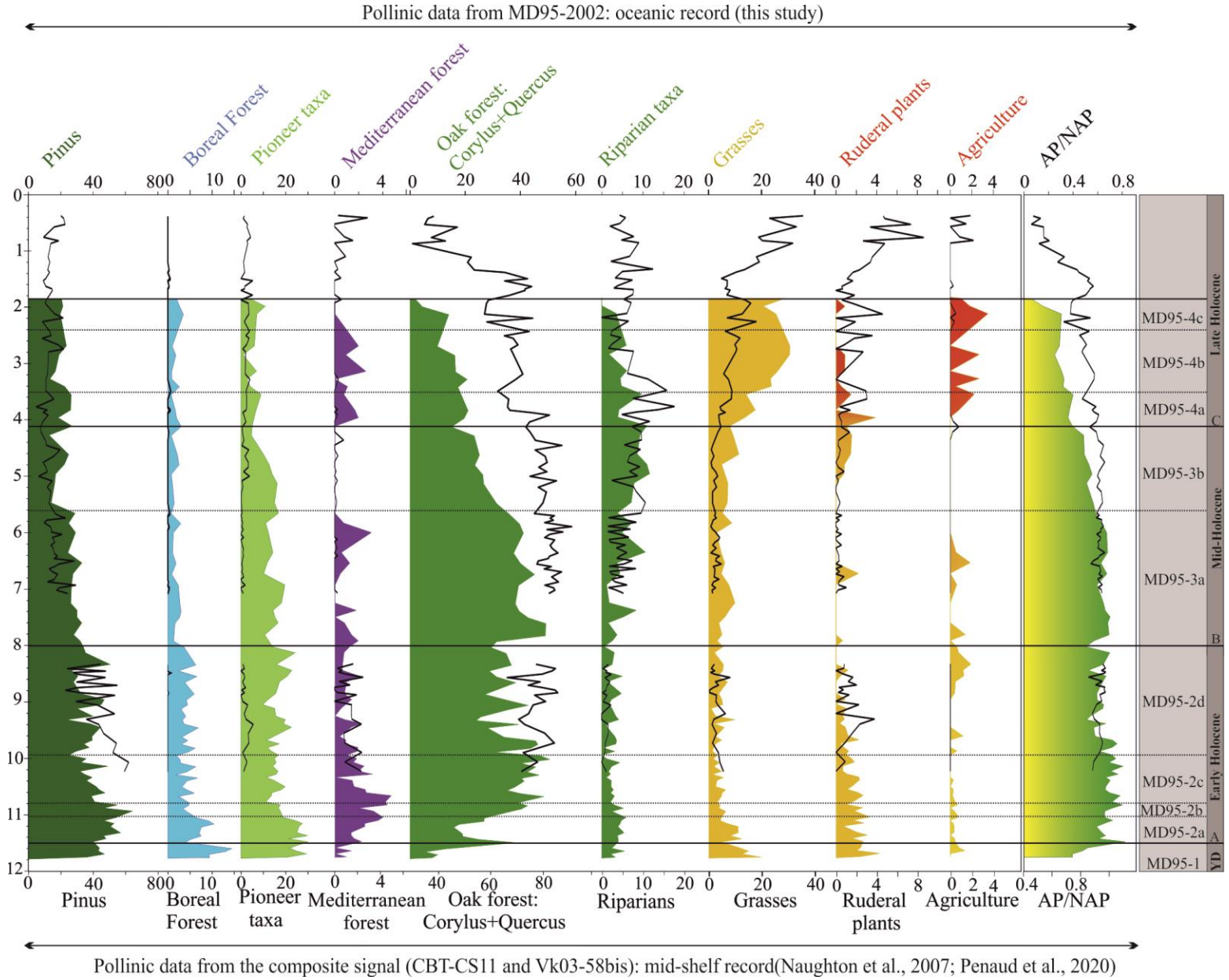


# 1. Carotte MD95-2002: Comparaison des signaux polliniques: offshore vs mid-shelf

a)




| | | |
|---|---|---|
| Bay of Biscay | Offshore | ★ MD95-2002: study core |
| | Mid-shelf | ● Composite CBT-CS11 and VK03-58bis (Naughton et al., 2007; Penaud et al., 2020) |
| Iberian Margin | North | ● MD03-2697 (Naughton et al., 2016) |
| | South | ● MD95-2042 (Chabaud et al., 2014) |
| Alboran Sea | West | ● M95-2043 (Fletscher and Sanchez-Goni, 2008) |

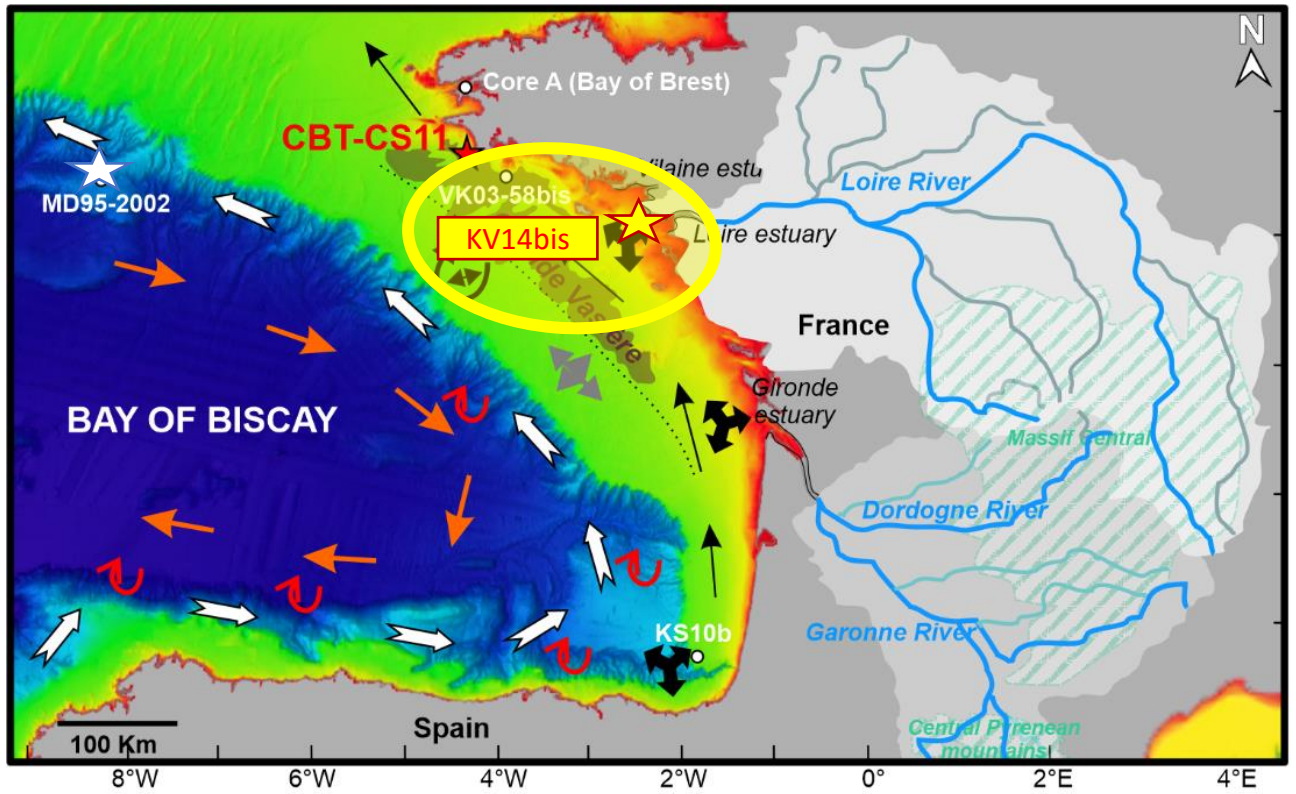


**Partie 2**

**2) " Etudier le signal climatique et anthropique pendant les dernier 2 500 ans "**

**Carotte KV14bis : (embouchure de la Loire, 58m de profondeur, derniers 2 500 ans)**

- **Etudier la signature palynologique à partir des pollen et dinokystes**
- **Continuum terre-mer à l'echelle d'un BV gigantesque : celui de la Loire**
- **Valider, compléter, remettre en cause (?) le modèle de dynamique SPG (Penaud et al., 2020; Lambert et al., 2020)**




**Méthodologie**

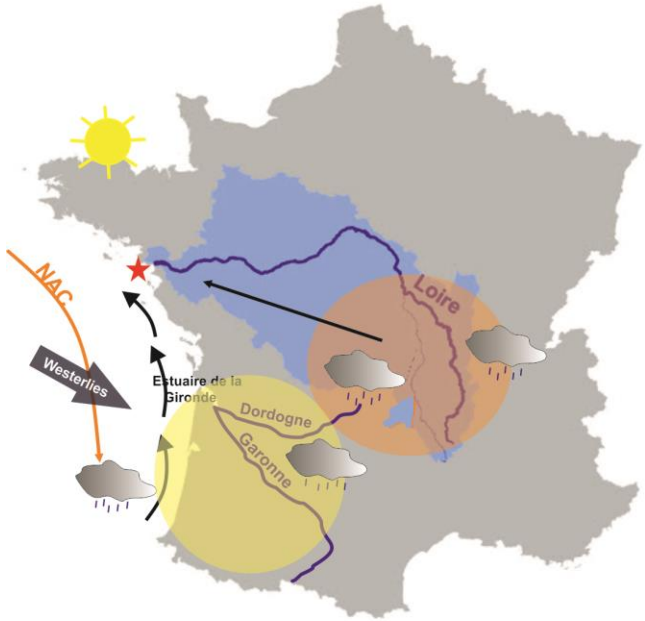
**Comptage des Pollen, Spores et algues d'eau douce : Dynamiques de végétation et fluviatile**

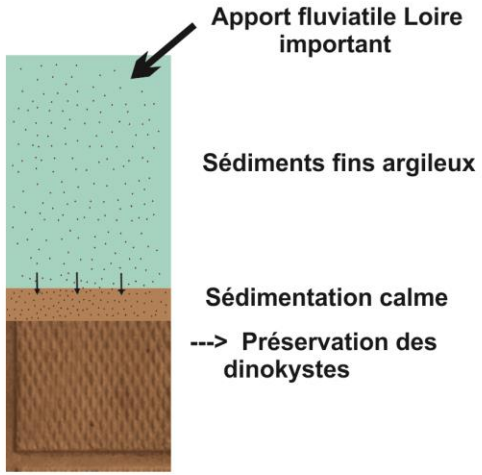
**Comptage des dinokystes: Dynamiques océanique et estuarienne**

**→ 53 niveaux**

## 2500-1700 ans BP

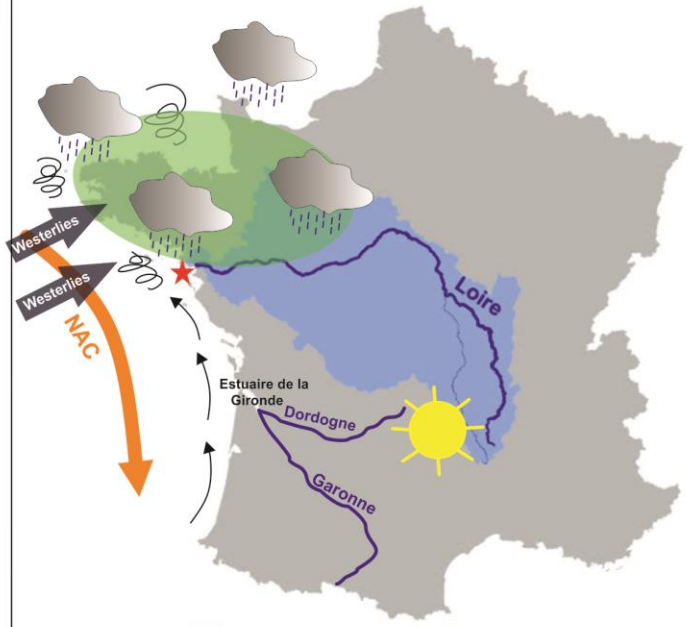
**NAO-**



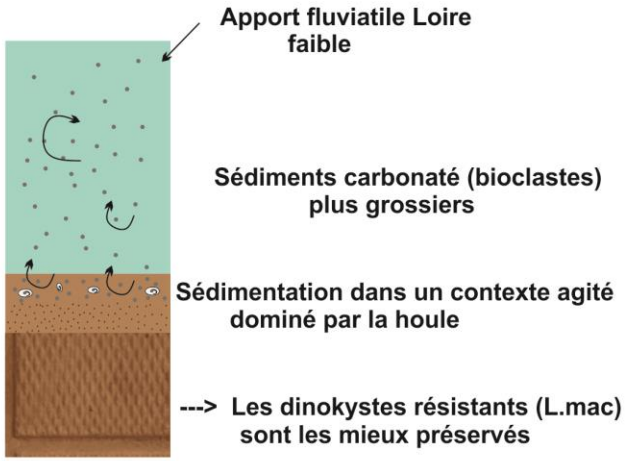




## 1700-1200 ans BP

**NAO+**

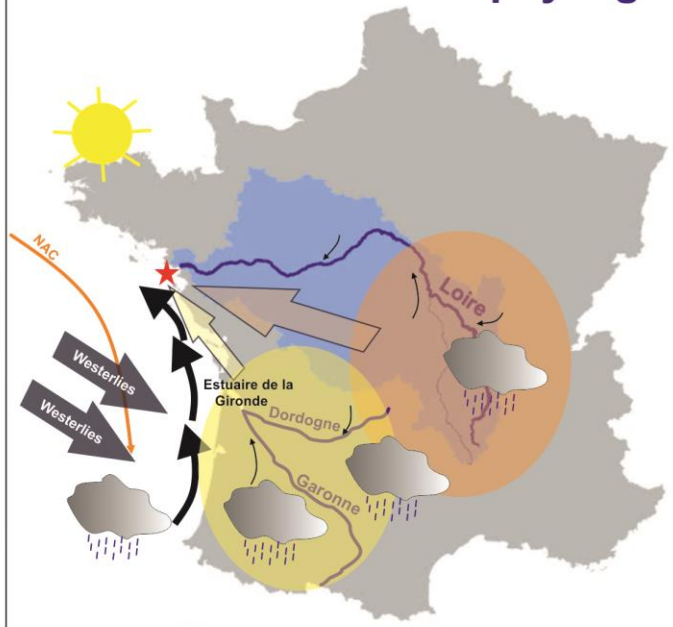


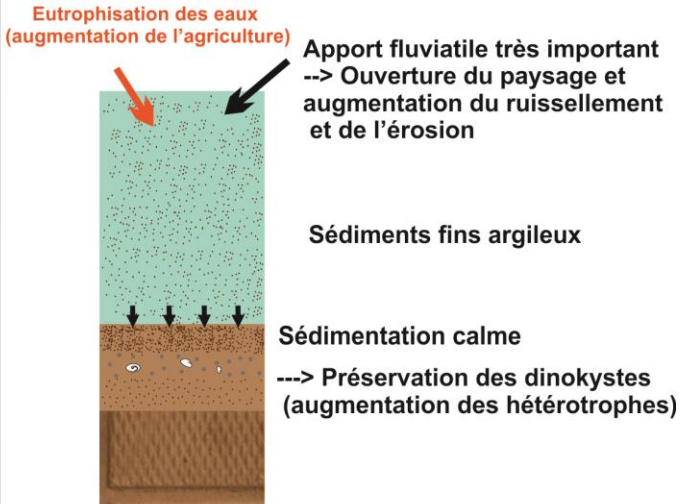

**Fin période Romaine-Début Moyen Age**

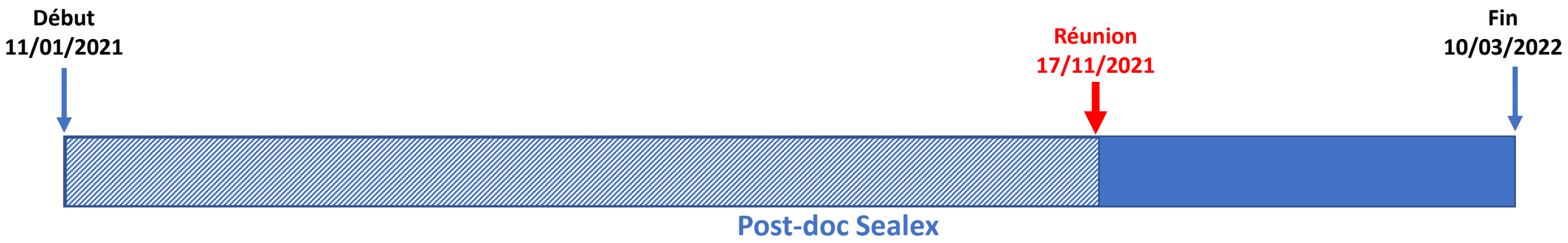


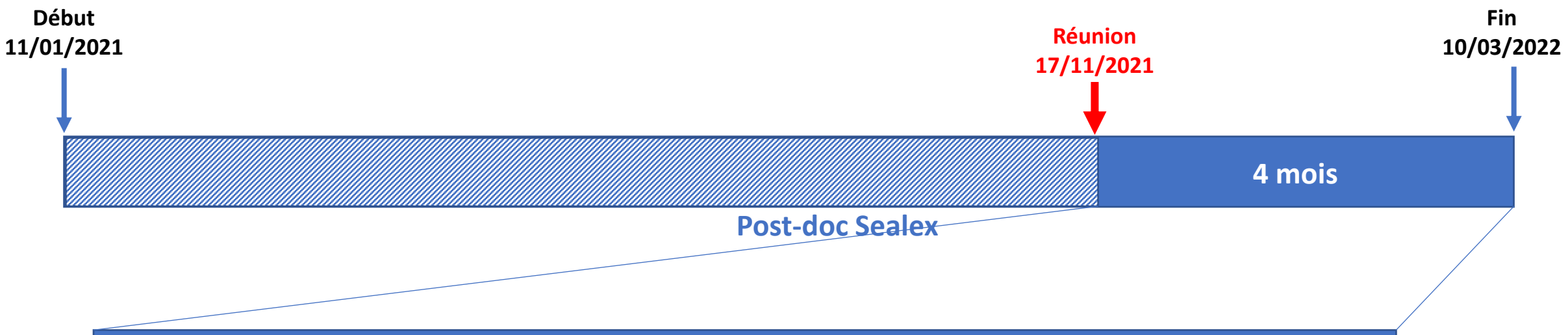

## 1200-300 ans BP

**NAO- et ouverture du paysage**




Début
11/01/2021
Réunion
17/11/2021
Fin
10/03/2022
Post-doc Sealex




→ **Augmenter la résolution de la KV14bis: 35 niveaux restants. Dinokystes et Pollen**

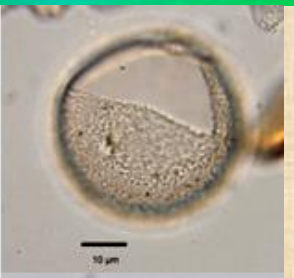
→ **Valorisation des données: 2 papiers**

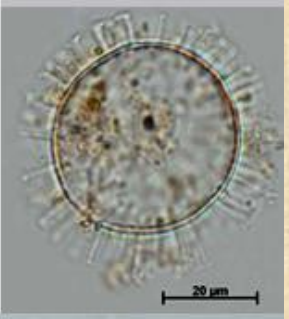
**1) MD95-2002**

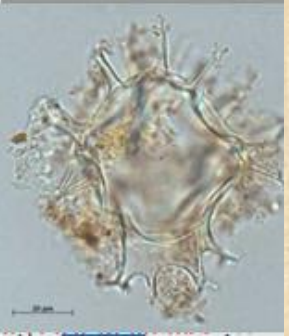
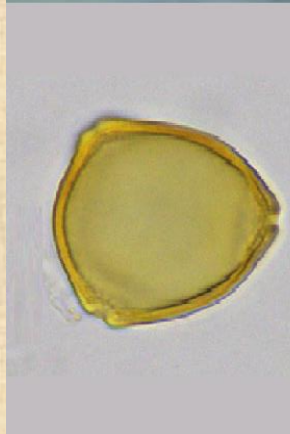
**Fersi, W.**, Penaud, A., et al: Paleoenvironmental signature of Holocene records from the northern margin of the Bay of Biscay.

**2) KV14bis**

**Fersi, W.**, Penaud, A., et al: North Atlantic Oscillation dynamics in western France during the last 2500 years.








# Merci de votre attention