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Supplementary material: The contrasting origins of glauconite in the shallow marine environment highlight this mineral as a marker of paleoenvironmental conditions

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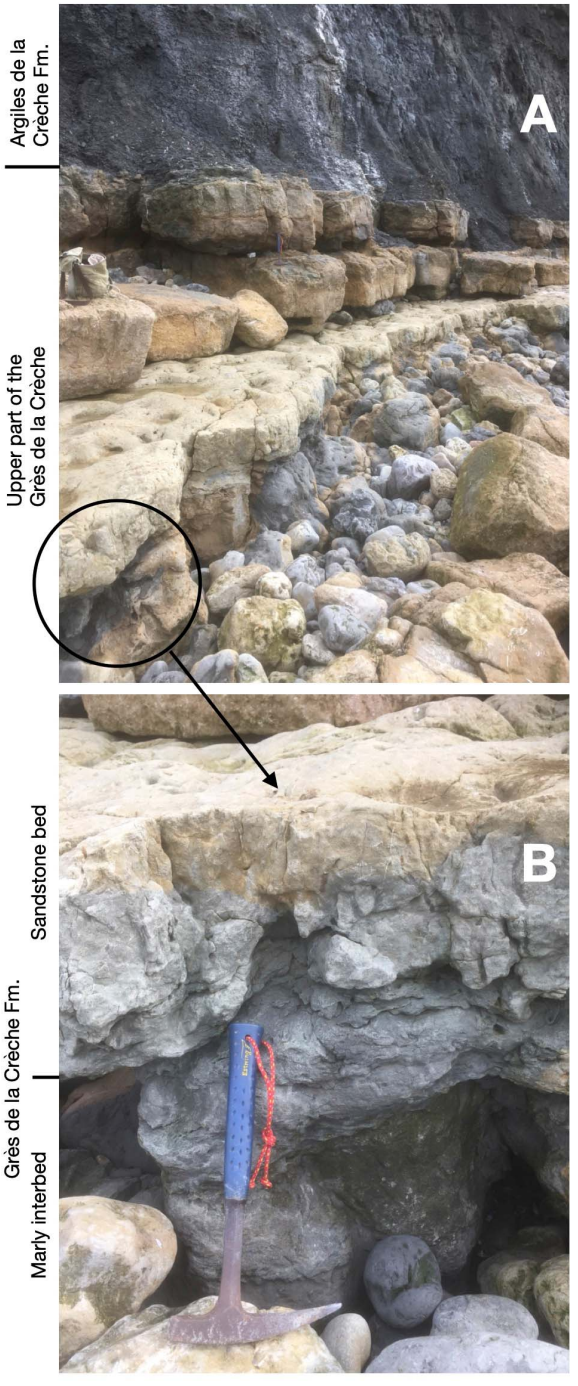
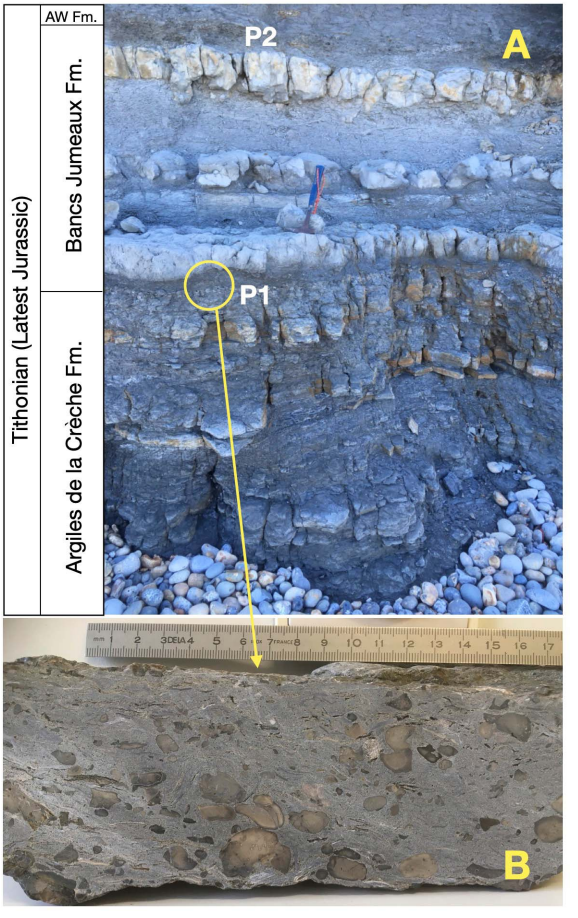
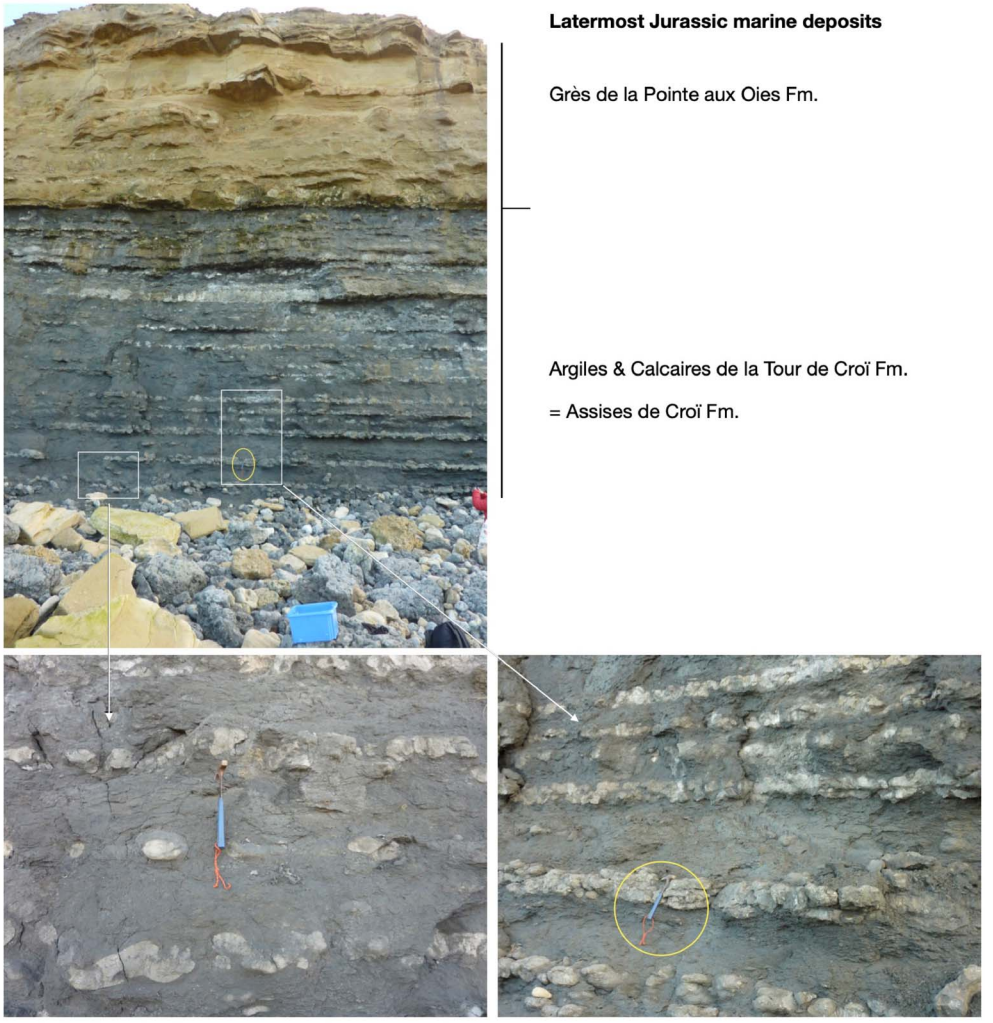


Supplementary Figure S1. (A) Picture of the transition from the underlying Grès de la Crèche Fm. to the overlying Argiles de la Crèche Fm. (B) Close up view of the alternation of sandstone beds and marly interbeds characterizing the upper part of the Grès de la Crèche.



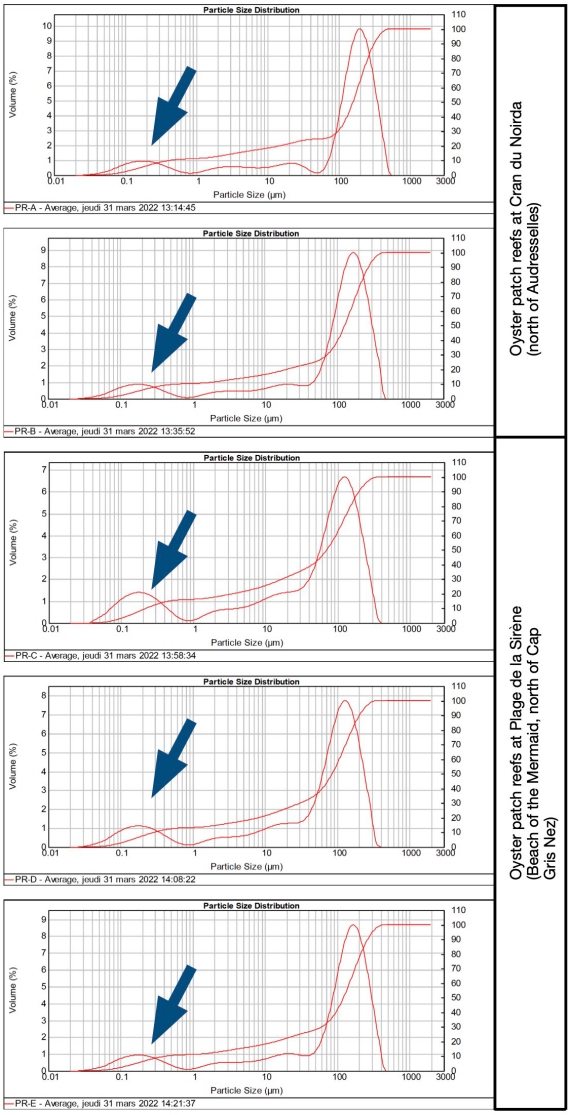
Supplementary Figure S2. (A) The Bancs Jumeaux Fm., being comprised between the P1 and P2 levels, separates the Argiles de la Crèche Fm. (below) from the Argiles de Wimereux Fm. (above). (B) Close up view of the P1 level showing numerous phosphatic pebbles.



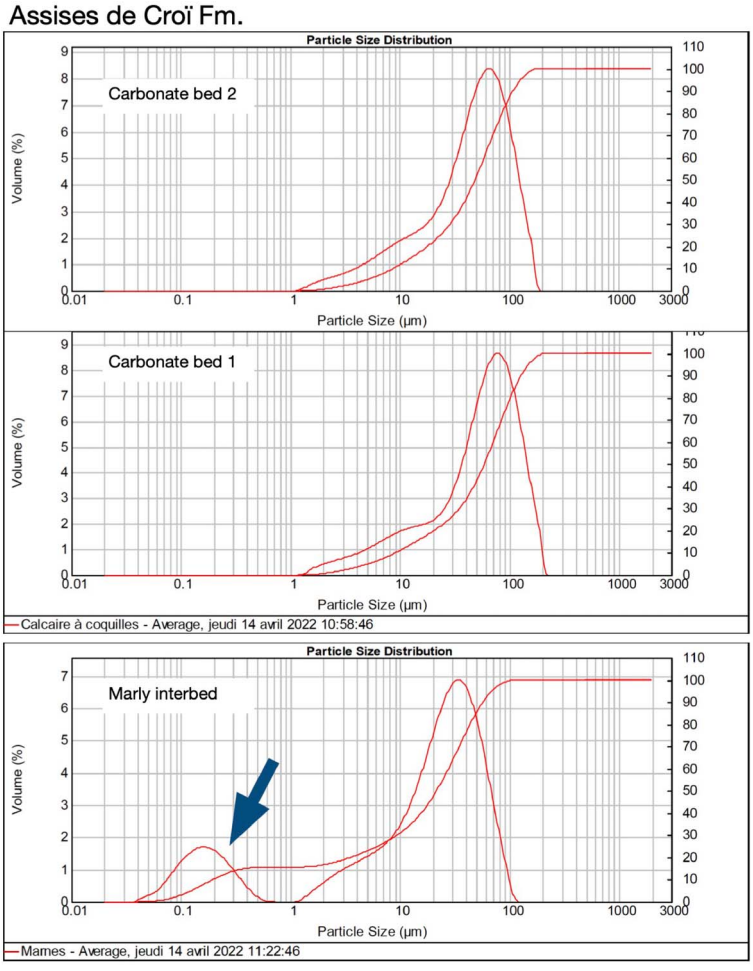
Supplementary Figure S3. The Assise de Croï Fm., pictured immediately south of Wimereux, is topped by the Grès de la Pointe aux Oies Fm.

Supplementary Figure S4. Panorama of the Tithonian geological formations of Boulogne (photograph taken from Cap de la Crèche, between Wimereux and Boulogne-sur-mer).

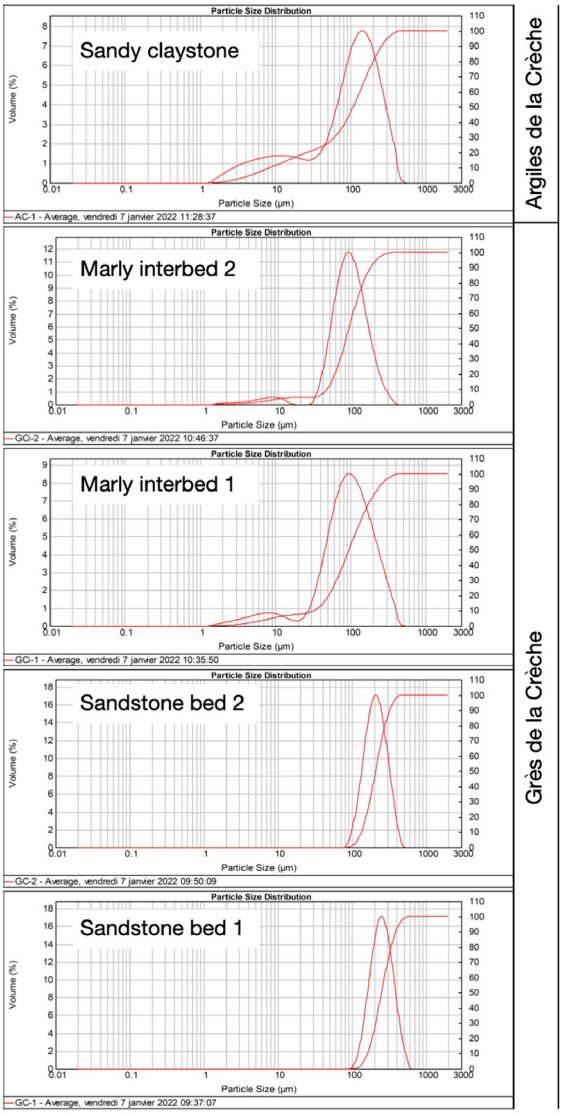
Supplementary Figure S5. The Assise de Croï Fm., pictured north of Wimereux, at the Pointe aux Oies. (A) Bed-interbed alternation. (B) Close up view of the marly interbeds showing numerous oyster shells. (C) Sample of a carbonate bed, extremely rich in glauconite and shells. Note the valves are commonly connected.



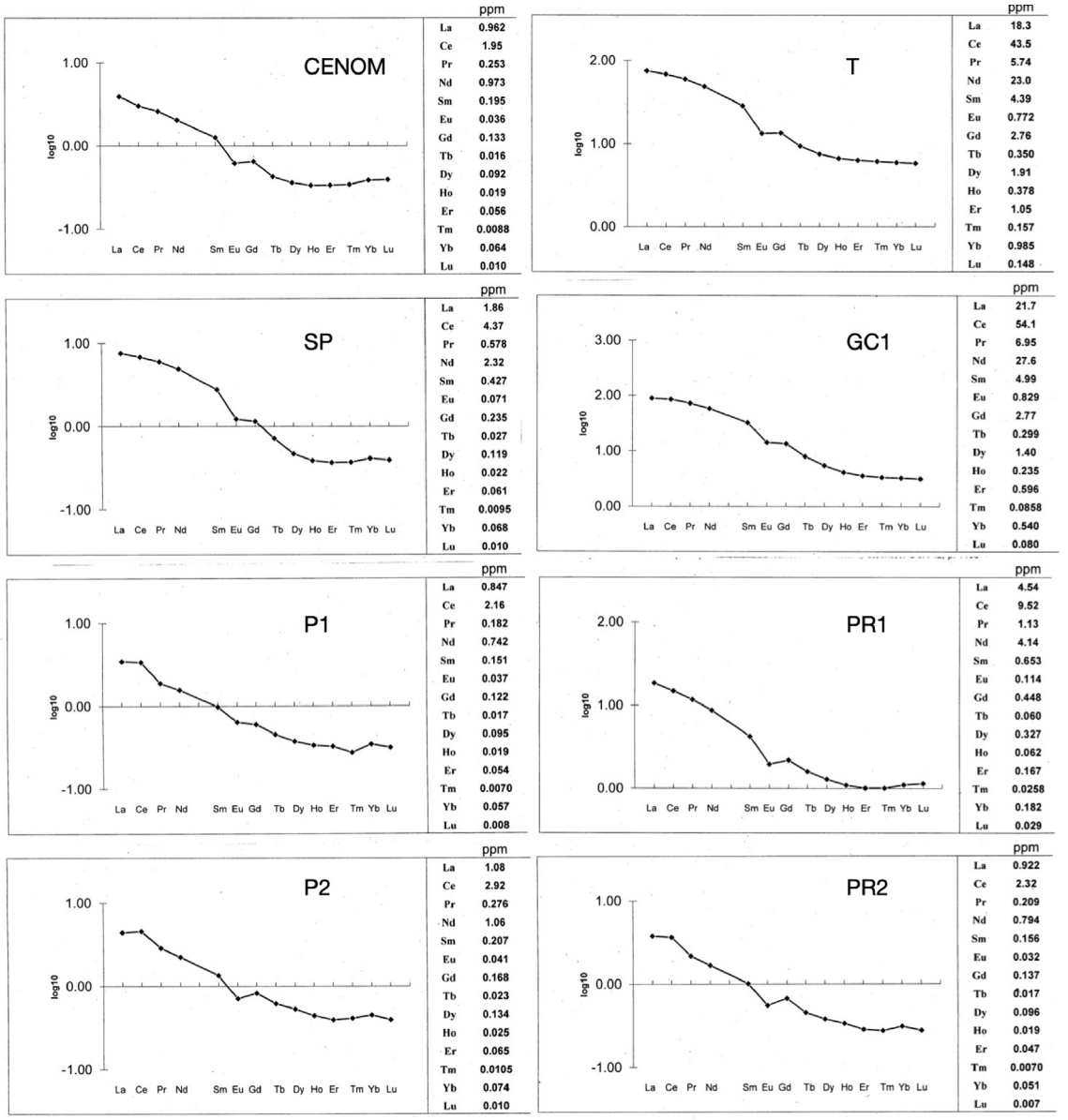
Supplementary Figure S6. Grain size distributions curves of glauconite for samples of patch reefs from the Cran du Noirda (immediately north of Audresselles) and from the Plage de la Sirène (or Mermaid Beach) north of Cap Gris-Nez. The arrows point to a clay-sized fraction of glauconite probably released during grain wear induced by the measuring device.



Supplementary Figure S7. Grain size distributions curves of glauconite for samples of the Assises de Croï (Pointe aux Oies). The arrow points to a clay-sized fraction of glauconite probably released during grain wear induced by the measuring device.



Supplementary Figure S8. Grain size distributions curves of the carbonate-free fraction for samples of the Grès de la Crèche Fm. and the overlying Argiles de la Crèche Fm. See Figure S1. These samples contain no detectable glauconite.



Supplementary Figure S9. Rare Earth Element patterns of glauconite grains from various samples. Cenom, T and SP: Cenomanian chalk, P1 and P2 levels of the Bancs Jumeaux Fm., GC1: Aptian-Albian sandstones, PR1 and PR2: two patch reefs.