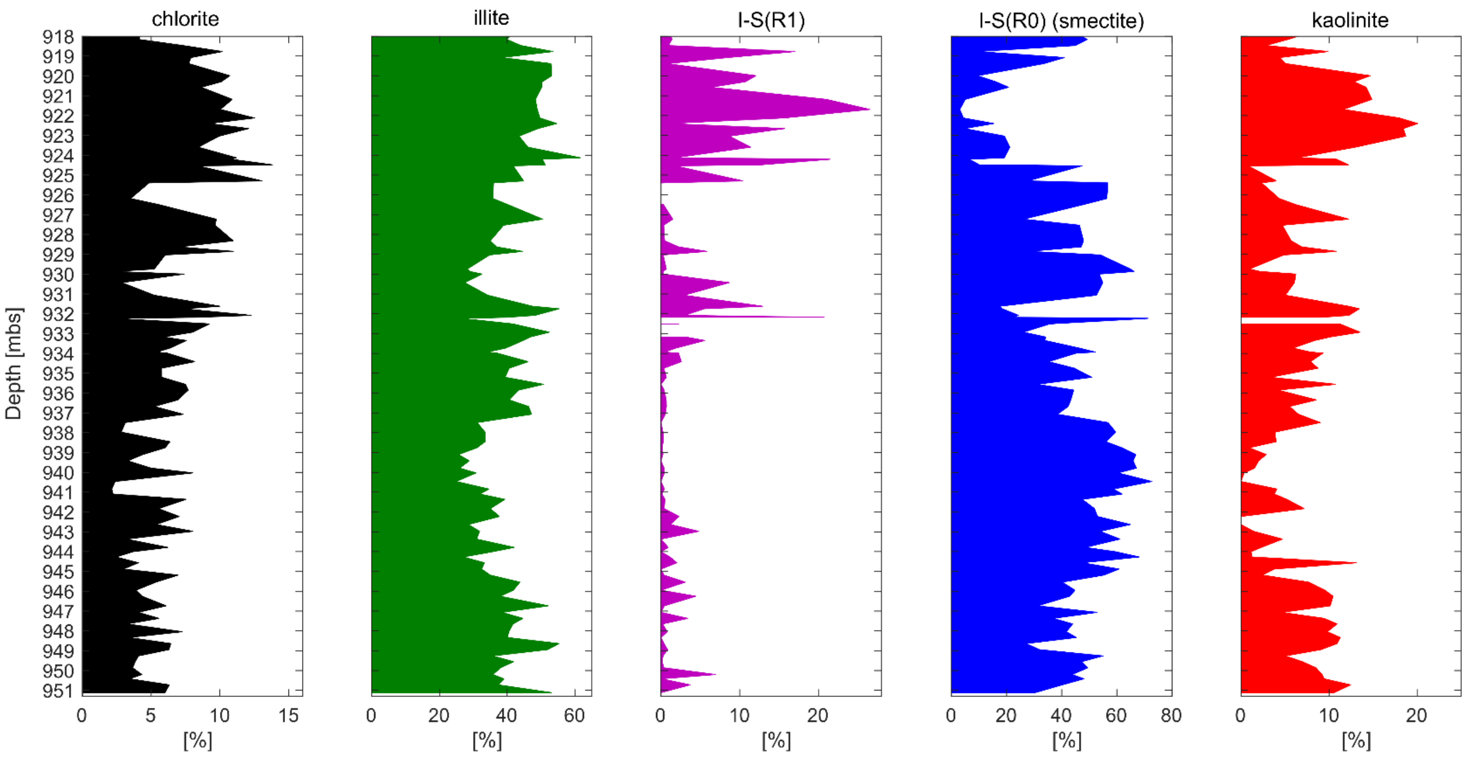
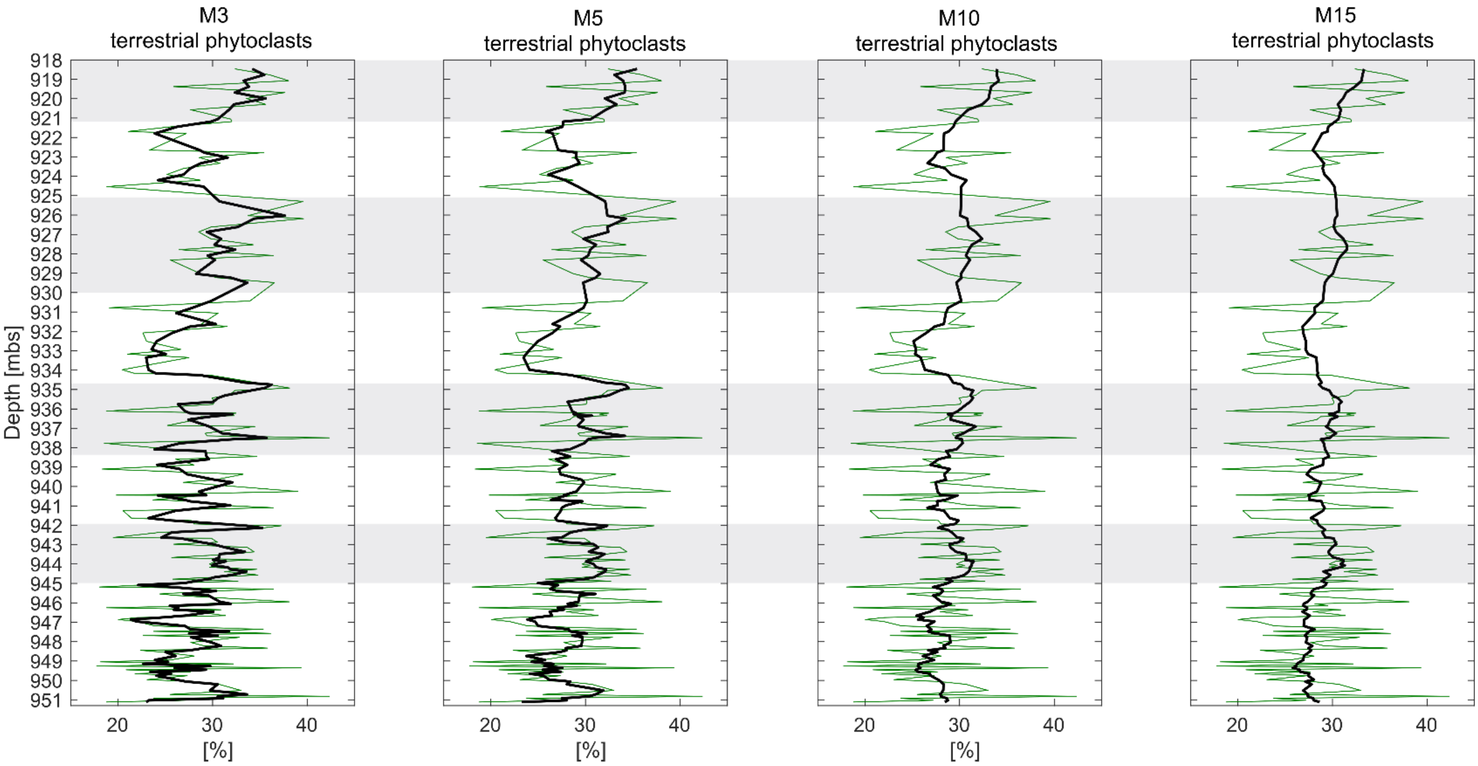
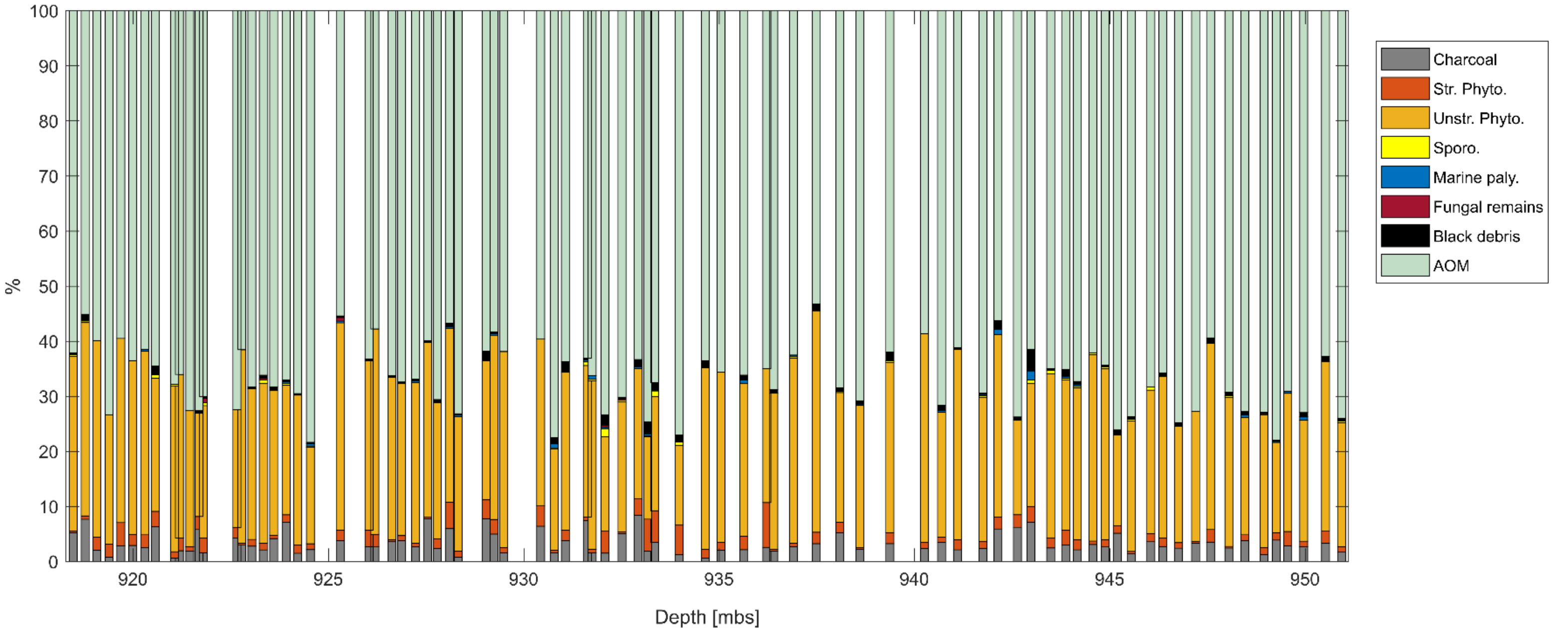
Supplementary Information for 'Environmental changes during the onset of the Late Pliensbachian Event in the Mochras Borehole, Cardigan Bay Basin, NW Wales.'



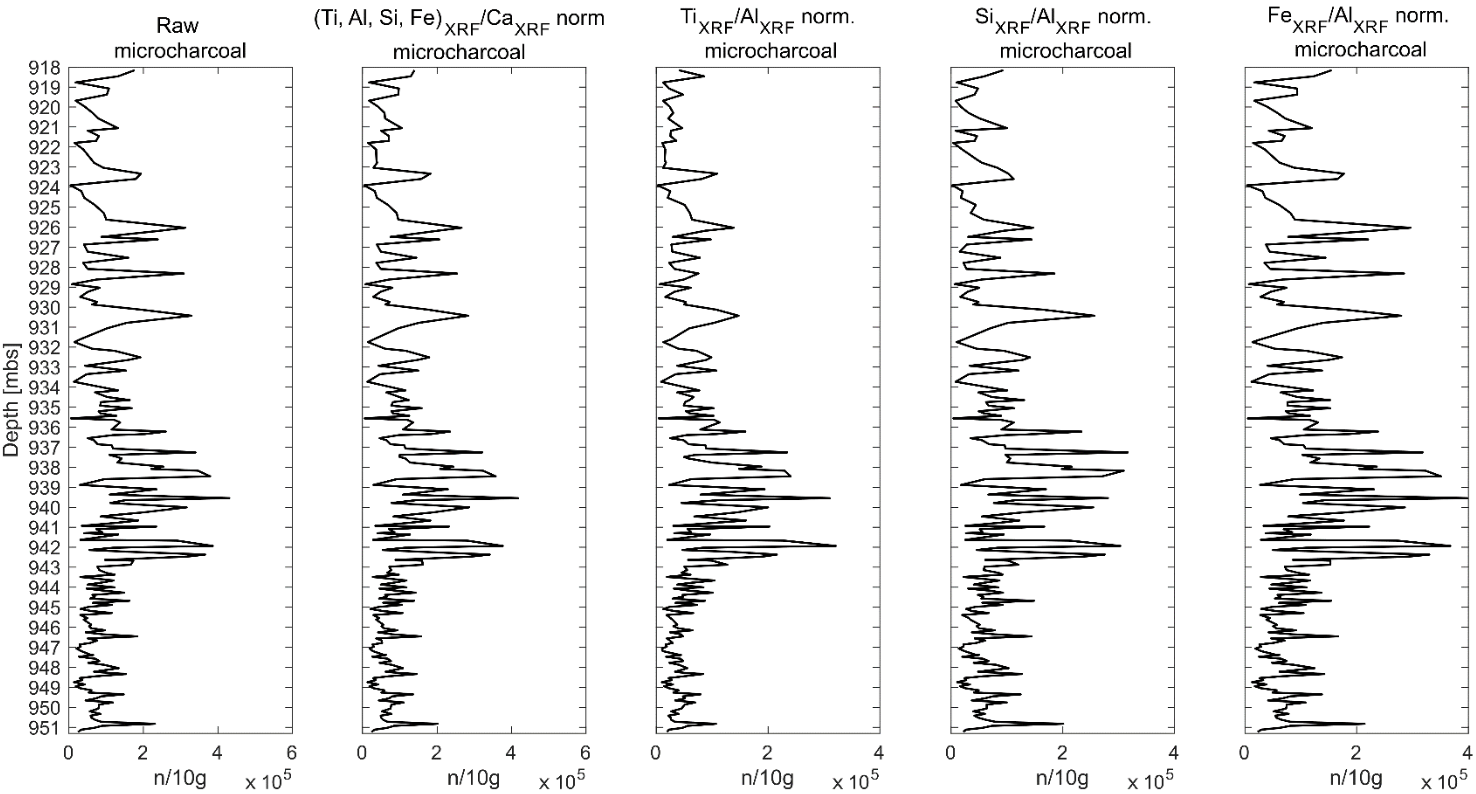
SI Fig. 1: Clay mineral abundance diagram of the studied interval (951 – 918 mbs). Illite and smectite are most abundant, followed by kaolinite. Chlorite and I-S R1 are only abundant in the top part of the here studied record.



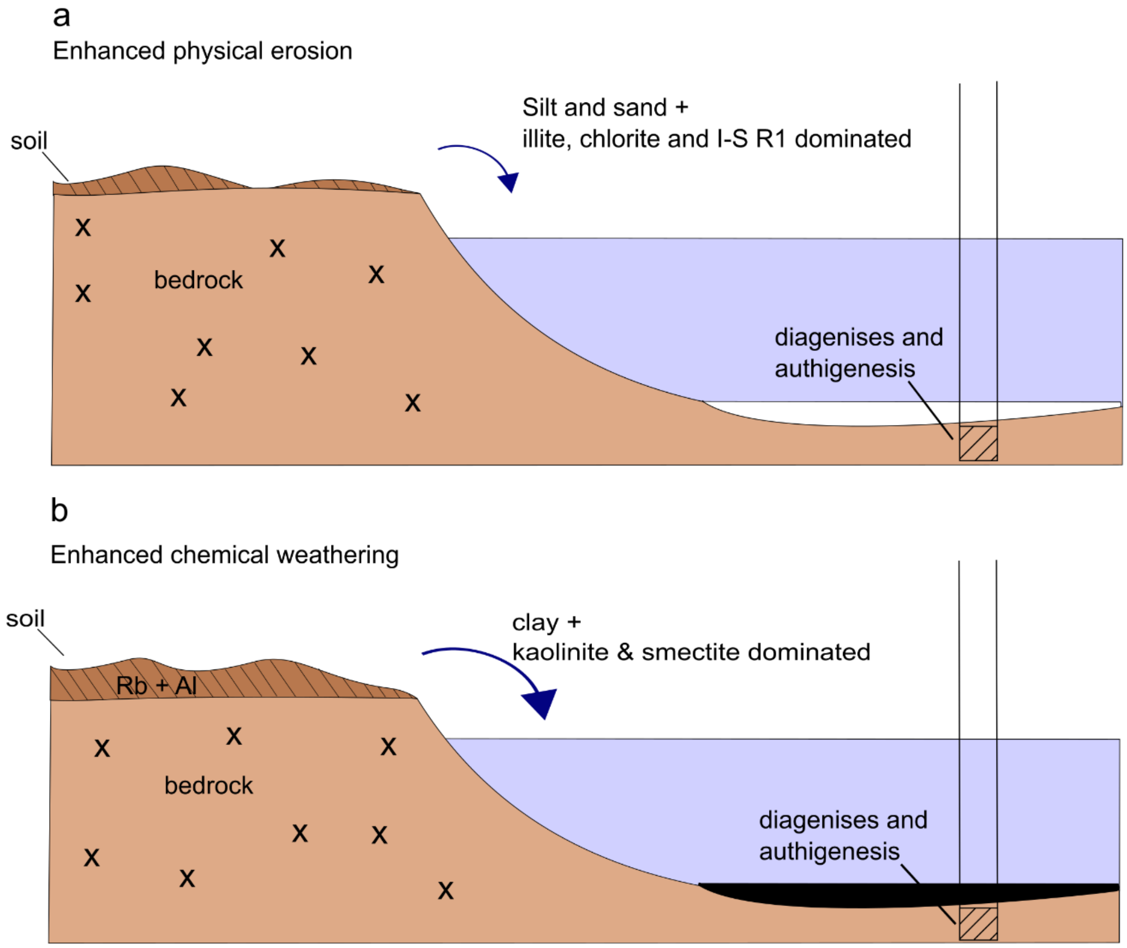
SI Fig. 2: The raw percentage of terrestrial phytoclast compared to the 3, 5, 10 and 15 step moving average. Minor fluctuations of the terrestrial phytoclasts are observed on a metre scale around 30 %, however, the studied interval contains 4 phases of higher proportions of terrestrial phytoclasts (marked in light grey shading). The green graph represents the raw terrestrial phytoclast data and the black lines the 3, 5, 10 and 15 window moving average in this order.



SI Fig. 3: Palynofacies of the study interval 951 – 918 mbs. The particulate organic fraction of the samples studied is dominated by amorphous organic matter (AOM), followed by unstructured phytoclasts. Structured phytoclasts and charcoal particles are relatively common. Palynomorphs, marine and terrestrial, are relatively sparse in all samples.



SI Fig. 4: The overall pattern of the microcharcoal abundance remains the same after correction for detrital influx into the marine realm. Raw microcharcoal abundance (n/10g) compared to microcharcoal abundance corrected for terrestrial influx with the XRF-elemental ratios (following Daniau *et al*., 2013 and Hollaar *et al*., 2021).



SI Fig. 5: Simplified overview of the different terrestrial influx at times of relatively enhanced physical erosion vs chemical weathering in the Cardigan Bay Basin observed over 405 kyr eccentricity cycles. A) shows the scenario of relatively enhanced physical erosion on land, likely this led to a higher relative input of silt to sand sized sediments and clay minerals illite and chlorite, which are indicative of physical erosion in the NW Tethys region in the Early Jurassic (Merriman, 2006; Deconinck *et al.*, 2019). I-S R1 is derived from the chemical weathering of illite (Deconinck *et al.*, 2019). Periods of less fine fraction sedimentations have been linked to periods of lower carbonate dilution and/or enhanced preservation (Deconinck *et al.*, 2019). B) illustrates the scenario of relatively enhanced chemical weathering in the Cardigan Bay Basin. Thicker soil profiles likely developed during this time, from both smectite and kaolinite. Elements associated with clays, such as Rb and Al, were more abundant. Enhanced clay transport to the marine was associated with TOC-rich deposits in the Cardigan Bay region (Deconinck *et al.*, 2019). Limited burial diagenesis occurred in the Mochras core (Deconinck *et al.*, 2019).

References

Daniau, A. L., Sánchez Goñi, M. F., Martinez, P., Urrego, D. H., Bout-Roumazeilles, V., Desprat, S., and Marlon, J. R.: Orbital-scale climate forcing of grassland burning in southern Africa, Proceedings of the National Academy of Sciences, 110(13), 5069-5073, https://doi.org/10.1073/pnas.1214292110, 2013.

Deconinck, J. F., Hesselbo, S. P., and Pellenard, P.: Climatic and sea-level control of Jurassic (Pliensbachian) clay mineral sedimentation in the Cardigan Bay Basin, Llanbedr (Mochras Farm) borehole, Wales, Sedimentology, 66, 2769–2783, https://doi.org/10.1111/sed.12610, 2019.

Hollaar, T. P., Baker, S. J., Hesselbo, S. P., Deconinck, J. F., Mander, L., Ruhl, M., and Belcher, C. M.: Wildfire activity enhanced during phases of maximum orbital eccentricity and precessional forcing in the Early Jurassic, Commun. Earth Environ., 2(1), 1 – 12, https://doi.org/10.1038/s43247-021-00307-3, 2021.

Merriman, R. J.: Clay mineral assemblages in British Lower Palaeozoic mudrocks, Clay Miner., 41, 473–512, https://doi.org/10.1180/0009855064110204, 2006.