

## **Paleozoic vegetation increased fine-sediment in fluvial and tidal channels: evidence from secular changes to mudrock content of ancient point bar deposits**

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### **Supplementary information**

#### **Methodology**

The presented data (Fig. 3, Fig. 4) was quantified from a database of successions proven to contain inclined heterolithic stratification (Table S1). To the extent that could be ascertained by the authors, these successions comprise the complete reported Archean to Carboniferous record of inclined heterolithic stratification of Earth. The compilation was constructed using the internet search engines ISI Web of Science (<https://www.webofscience.com/wos/woscc/basic-search>) and Google Scholar (<https://scholar.google.com>), using the terms “inclined heterolithic stratification”, “lateral accretion”, and “epsilon cross-stratification” in conjunction with both extant and outdated, global and regional stratigraphic terms in both American and British English (e.g., “Paleoproterozoic”, “Palaeoproterozoic”, “Carboniferous”, “Pennsylvanian”). The dataset continually expanded utilizing references cited within these results, and PhD and Masters theses where these could be identified.

For comparability, the ages of the compiled successions were translated onto the GTS2012 geological timescale (Gradstein et al., 2012). If a succession containing inclined heterolithic stratification crossed a period boundary the instance was included in each but with half the weighting (e.g., 47; Bakken Formation; Late Devonian to Early Carboniferous; 0.5 instances of class 1 tidally influenced IHS in both Late Devonian and Early Carboniferous). If a succession contains multiple classes of inclined heterolithic stratification they were each weighted equally (e.g., 57; Shalwy Formation; Viséan; 1 instance of class 1 tidally influenced IHS, 1 instance of class 2 tidally influenced IHS, 1 instance of class 3 tidally influenced IHS). If a succession contains both fluvial and tidally influenced IHS they were each weighted equally (e.g., 35; Battery Point Formation; Emsian to Eifelian; 1 instance of class 3 fluvial IHS, 1 instance of class 3 tidally influenced IHS). If uncertainty existed as whether an instance of IHS was fluvial or had tidal influence it was included in each but with half the weighting (e.g., 24;

Moor Cliffs Formation; 0.5 instances of class 4 fluvial IHS, 0.5 instances of class 4 tidally influenced IHS).

The defined IHS classes build on those given by Thomas (1987): Class 1, dominantly homogenous, usually sand-grade or coarser material; Class 2, sand-grade or coarser IHS set, with each set capped with a discontinuous fine-grained component; Class 3, IHS with a continuous fine-grained component, either covering the entire sigmoidal surface or occurring within repeated coarse-to-fine grained couplets; and Class 4, IHS composed of >50% mudrock. For the 44 original field investigations included in the study, mudrock occurrence was recorded from direct measurement in the field. IHS sets recorded by other researchers were assigned a class based on the criteria above, either following the exact wording given by the original researchers, or utilizing annotated, high-resolution figures detailing the IHS sets. In the rare instances where IHS were recorded but not described in any detail, or the detail given was insufficient to assign a class, the occurrences were included in Table S1 but not assigned a class or included in the analysis of temporal IHS trends (Figure 3–4).

**Table S1.** Previous and original reports of inclined heterolithic stratification (IHS). IHS occurrences were grouped into the classes of Thomas (1987) based on either first-hand observations, descriptions from the original authors or by assessments of previously figured examples.

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