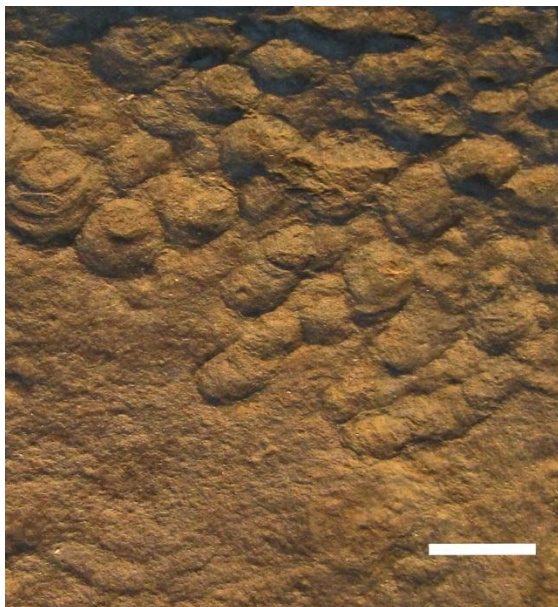**Supplementary Information – Menon *et al.,* Evidence for Cnidaria-like Behaviour in ~560 Ma *Aspidella***
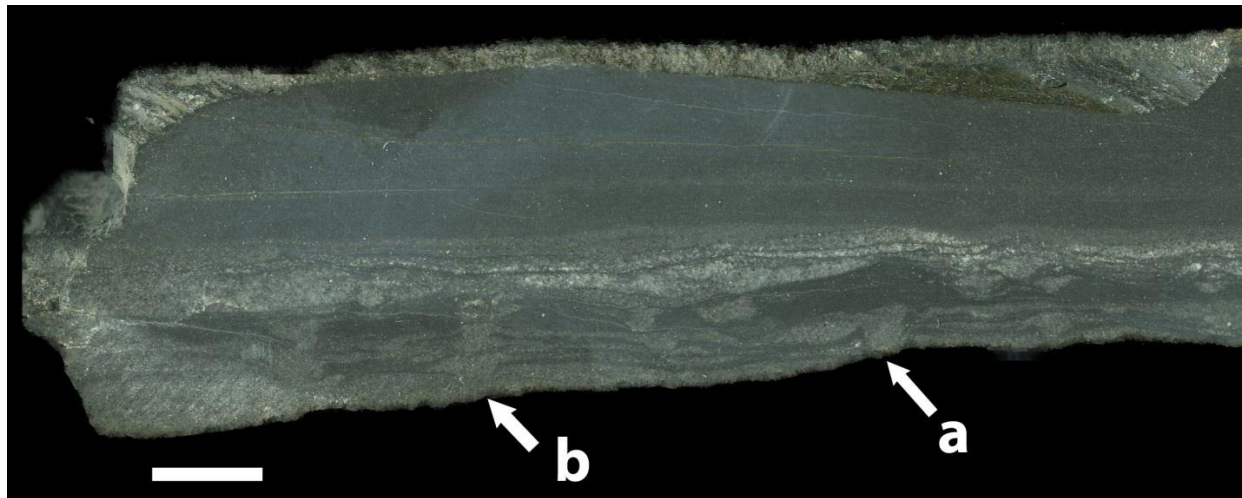

Supplementary Figure DR1. Oblique view of horizontal trail in Fig. 2B, showing characteristic *Aspidella* ornamentation in crescentic trail (arrow), and the horizontal movement of one organism among static neighbours. Scale bar: 3 mm.
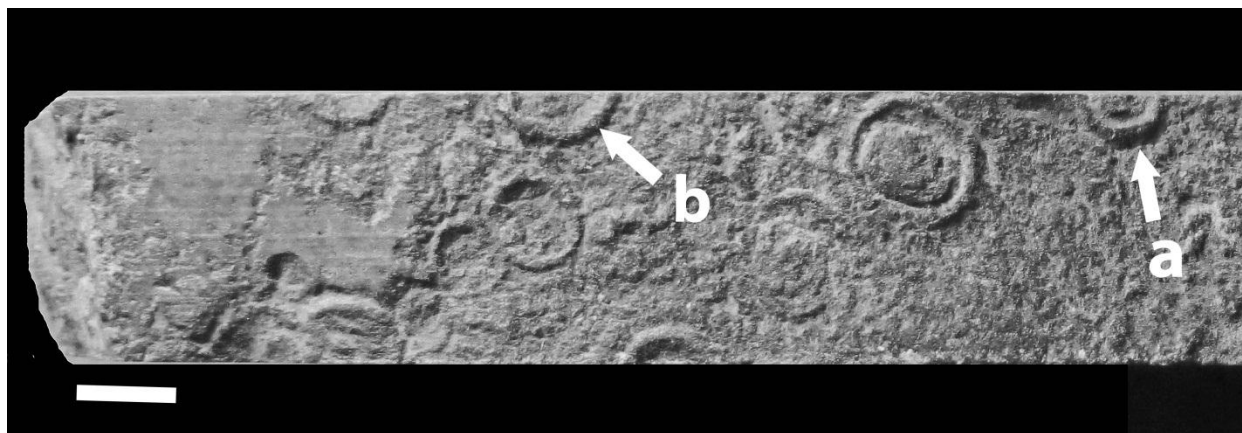

Supplementary Figure DR2. Long trails, top of bed heavily populated by *Aspidella*. Ferryland locality. Scale bar: 1 cm.

A

B

**Supplementary Figure DR3.** Corresponding sole surface expression of two traces beginning at base of cut block. (A) Two vertical traces, marked 'a' and 'b' arising from the base of the block are indicated; others are also visible. (B) Sole surface of block, showing the cut external expressions in the form of simple rimmed discs associated with the two labelled traces in (a). Scale bars: 1 cm.
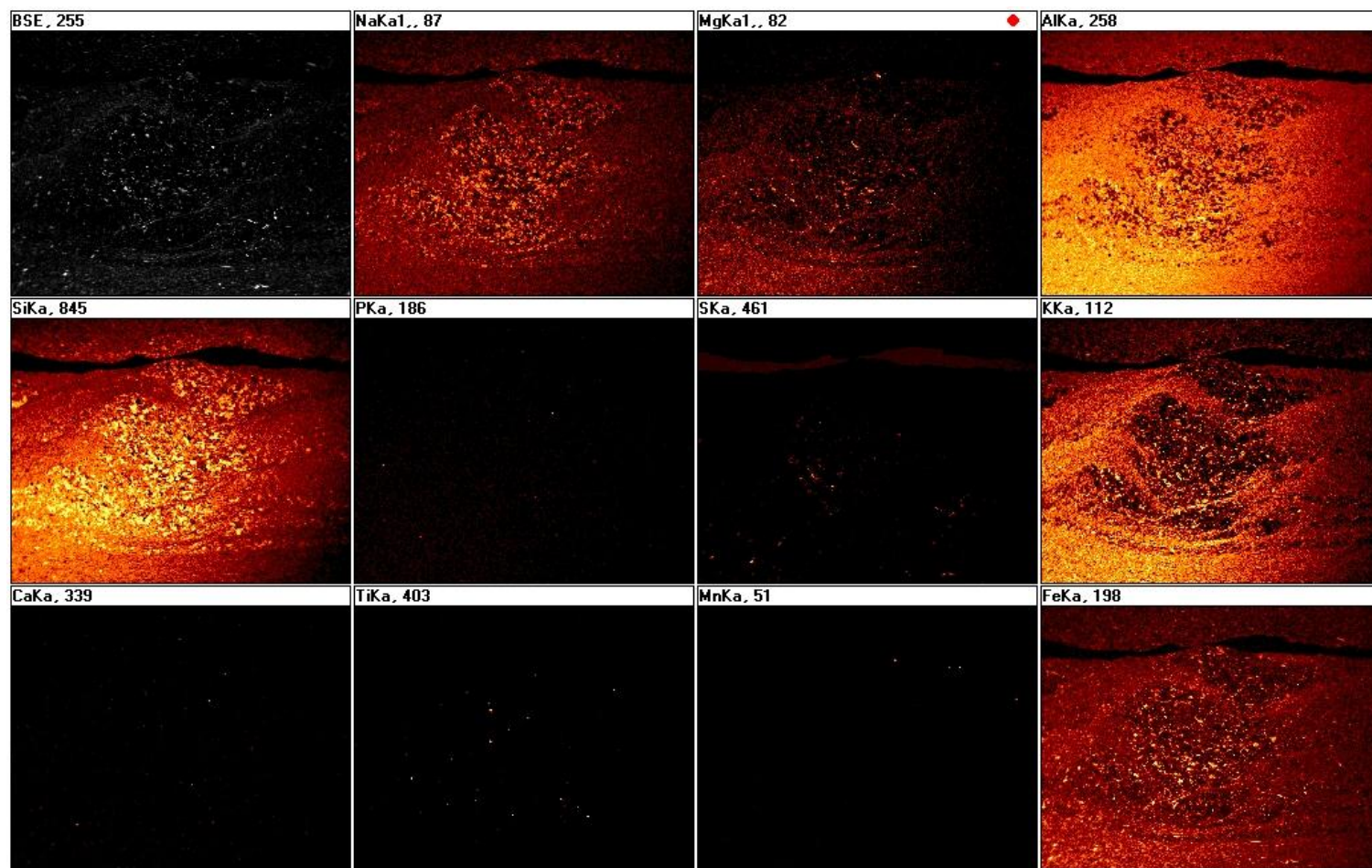
Supplementary Figure DR4. SEM-EDS element mappings of right-hand trace shown in Fig. 3E. Mappings illustrate quartz and some feldspar concentrated in trace (Si, Na maps), and spilling out to sides, with clay minerals (picked up in Al, K maps) dominating surrounding matrix and forming fine, fragmented mud

drapes between menisci of equilibrium trace. Instrumentation and running details: JEOL JSM-840A SEM with Oxford Instruments Isis 300 EDX system. Acceleration voltage: 20 kV; probe current 6 nA; magnification x20.
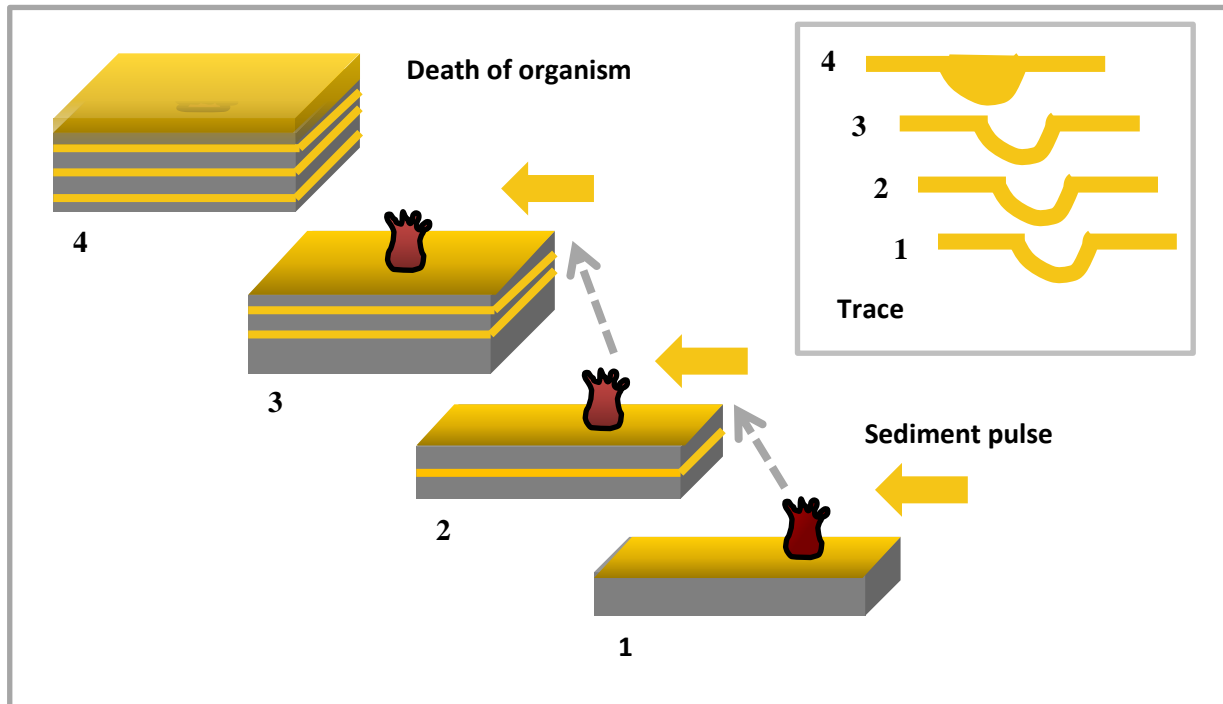
Supplementary Figure DR5. Schematic diagram showing interpretation of traces. In response to each pulse of sediment from the right, the organism adjusts its position vertically to maintain itself at the sediment-water interface, producing an equilibrium trace. The organism is eventually smothered by a substantive pulse, and sand fills from above as it decays. The organism is represented here as a simple polyp, distinct from the holdfast of an Ediacaran frond, but the possibility of an attached frond which was not preserved cannot at present be ruled out.