

Deep-sea turbidite systems:

Trace fossils and Ichnofacies

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Deep-sea turbidite systems form through sediment gravity flows and display complex sedimentary architectures. A key distinction exists between fine-grained and coarse-grained turbidite systems, with fine-grained systems typically accumulating silt- and clay-rich sediments under stable, low-energy conditions that favor abundant, diverse trace fossil assemblages. In contrast, coarse-grained turbidite systems are sandier and more erosive, with rapid sedimentation that limits preservation of traces.

Turbidite depositional systems display a rich diversity of trace fossils both pre- and post-deposition, mainly consisting of ethological types such as: *Pascichnia*, *Fodinichnia*, *Agrichnia*, *Chemichnia*, *Domichnia* and *Repichnia*. Deep-sea turbidite systems contain trace fossils that belong to the *Nereites* ichnofacies (Knaust, D. & Bromley, R.G. 2012). The *Nereites* ichnofacies is subdivided into three subichnofacies:

- *Ophiomorpha rudis* subichnofacies for thick-bedded sandstones in channels and proximal lobes in turbidite successions;
- the *Paleodictyon* subichnofacies for more sandy, medium-to-thin bedded „normal“ flysch;
- the *Nereites* subichnofacies for mud-rich distal flysch;

These trace fossil assemblages provide valuable insights into paleoenvironmental factors like oxygen levels and sediment dynamics, enhancing our understanding of benthic activity and depositional processes in deep-marine turbidite environments.