



## **Fossils as environmental indicators**

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The abiotic environment influences organisms as individuals and as communities. While alive, organisms can react to such influences and, over evolutionary time-scales, adapt themselves to a particular set of environmental conditions and their small-scale fluctuations. After death, the influence of environmental parameters continues by acting on hard- and soft parts and finally determines their preservation potential and preservation quality. As a result, fossils usually carry a signature of their habitat and of the post-mortem processes that affected them. Deciphering the morphological and physiological adaptations of fossil organisms and their taphonomic signatures as well as studying the composition and structure of ancient community relicts provides an excellent tool for reconstructing environmental parameters in the geological record. Fields of palaeontology that provide tools for such reconstructions are palaeoecology (both aut- and synecology), ichnology, and taphonomy. Additional information may be obtained by analysis of geochemical signals encased in skeletal elements. An integrated approach combining several of these tools usually yields highly reliable results. The potential and pitfalls of these tools are illustrated by case histories of Mesozoic marine benthic macrofaunas.