



GR focus

A tale of three taphonomic modes: The Ediacaran fossil *Flabellophyton* preserved in limestone, black shale, and sandstone



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ABSTRACT

Ediacaran macrofossils are typically preserved in three taphonomic modes: casts/molds in siliciclastic rocks, casts/molds in carbonate rocks, and carbonaceous compressions in black shales. Only a few taxa are known to be preserved in more than one of these taphonomic modes. *Flabellophyton* is a genus that has been previously reported from lower Ediacaran black shale of the Lantian Formation (635–551 Ma) in South China and upper Ediacaran sandstone of the Ediacara Member (560–550 Ma) in South Australia. Here we report *Flabellophyton* from upper Ediacaran limestone of the Shibantan Member of the Dengying Formation (551–539 Ma) in South China, making *Flabellophyton* the only genus that occurs in all three taphonomic modes. We also provide a systematic description of *Flabellophyton* based on material from the Lantian and Dengying formations in South China, recognizing three morphospecies—*F. lantianense*, *F. typicum* sp. nov., and *F. obesum* sp. nov. *Flabellophyton* is reconstructed as an erect epibenthic marine organism attached to sandy, carbonate, and muddy substrates. Its phylogenetic affinity remains ambiguous though it was historically interpreted as an algal fossil. The wide environmental and stratigraphic distribution of *Flabellophyton* allow comparative taphonomic and paleoecological analysis. Taphonomic analysis of *Flabellophyton* indicates that multiple taphonomic pathways can facilitate the preservation of Ediacaran macrofossils. As a window into Ediacaran paleoecology, *Flabellophyton* and other Ediacaran fossils played a crucial role in the construction of epibenthic communities in Ediacaran oceans, and helps to understand the ecological migration and evolutionary expansion from deeper to shallower oceans during the Ediacaran Period.

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