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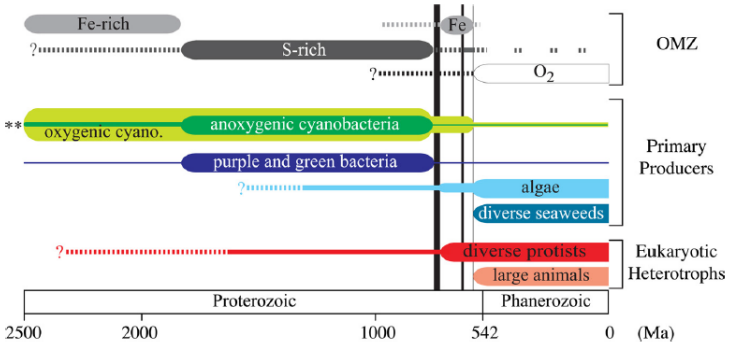

Fig. 3. A timeline showing OMZ chemistry (1–4, 7–10, 13, 14, 17), the relative contributions from different primary producers (17, 55, 69), and the evolution of eukaryotic heterotrophs (55–59, 70, 71). Band thicknesses approximate the importance of each feature through time. Dashed lines represent postulated or uncertain histories. The specific evolutionary sequence of oxygenic and anoxygenic photoautotrophs (including both cyanobacteria and purple/green S bacteria), marked here by **, rests in the Archean rock record (>2,500 Ma). As both processes had evolved by 1,800 Ma (23) (when our story begins), we make, nor require, any distinct sequence. The two thicker vertical lines represent the major Neoproterozoic glaciations (72), and the thinner line to the right marks the Ediacaran Gaskiers glaciation. The precise timing of Neoproterozoic climatic and biogeochemical events is the subject of ongoing research. We highlight the mixed contributions to primary productivity through the Proterozoic, a transition in OMZ chemistry at 800–700 Ma, and the coincident change in cyanobacteria, algal, protist, and animal abundances, based on body and molecular fossils.