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Preservation of life across ocean anoxic events

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Oceanic anoxic events (OAEs) are sediments that contain high amounts of organic matter that were deposited under oxygen-depleted conditions and form an excellent archive for the reconstruction of ancient environments. Often OAEs coincide with mass extinction events, although many localised OAEs do not reflect global phenomena. Concretions are often preserved in sediments and can contain encapsulated fossil remains (e.g., bones, soft tissue). Concretions formed under highly reduced conditions allow for exceptional preservation of soft tissue and biomolecules (e.g., cholesterol [1,2]). Concretions were formed over long geological time spans, but have never been studied in sufficient detail by organic–inorganic approaches that we have applied here [3]. With access to concretions from several worldwide *Lagerstätte* locations (e.g., Lower Jurassic Posidonia Shale, NW Germany; The Devonian Gogo Formation, Western Australia) and the surrounding sedimentary shales- organic (biomarkers, biomolecules and stable isotopes, inorganic geochemistry and morphology by imaging) reveal the extent of preservation of cholesterol and the entire diagenetic continuum [2] as-well as exceptionally well preserved cells (unpublished) from sediments deposited under photic zone euxinic (PZE) conditions [1] providing insights into the development and evolution of life (including highly important cellular remains).

References:

[1] Melendez I et al. (2013) *Geology* 41 (2): 123-126

[2] Melendez I et al. 2013 *Scientific Reports* 3

[3] Plet C et al. (2016) *Chemical Geology* in press.

