The role of restricted basins in global biogeochemical cycles

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Some things I would have discussed/thought about in my presentation – for discussion in the chat
The traditional view of global biogeochemical cycles are of the oceans – a box – with various sources and sinks to the ocean. These sources and sinks have various rates and concentrations of elements, producing different fluxes to the oceans.
What happens when you have restricted basins (where salt giants form)? What if much of your ocean covers continental landmass in epicontinental seas?

How does this influence Global Biogeochemical Cycles?
Traditionally it was thought that the primary influence was that the deposition of large salt deposits and then their subsequent chemical erosion would change the chemistry of the ocean. The restricted basin would hold excess ions for release on tectonic exposure (e.g. Wortmann et al., Science 2013)
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For example, Higgins and Schrag (2006) suggest that these environments bury much organic carbon which could be rapidly oxidized on exposure and drive perturbations in the carbon cycle.
Small changes in sea level can cause a restricted basin or epicontinental sea to become quickly (geologically speaking) isolated from the global ocean.
Two more recent papers suggest that the loss of restricted basins resulted in fundamental changes to the sulfur and nitrogen biogeochemical cycles in the Cenozoic.
Pyrite (FeS$_2$) buried in shallow environments like restricted basins has a higher overall sulfur isotopic composition than pyrite buried in deeper environments (Fike et al., 2015). Sealevel drop closing off restricted basins and forcing pyrite burial into deeper environments may have driven the increase in the sulfur isotope composition of the ocean in the early Cenozoic.

Rennie et al., Nature Geoscience, 2018
Nitrogen isotopes in foram-bound organic matter are high when there is water column denitrification and low when there is sediment denitrification. Conditions in restricted basins may have favored anoxic/suboxic water columns and enhanced water column denitrification.

*Kast et al., Science 2019*
We are currently working on models and acquiring more data and better age models to understand how these various processes might be linked and to explore how there may be coupled changes to biogeochemical cycles associated with the opening and closing of restricted basins.

Open questions: What are the fundamental chemical differences in restricted basins that link global tectonic cycles to changes in seawater chemistry?