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Reply on AC3

Thomas Blattmann

Author comment on "Ideas and perspectives: Emerging contours of a dynamic exogenous kerogen cycle" by Thomas M. Blattmann, Biogeosciences Discuss.,
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As the full revised manuscript cannot be uploaded at this stage in the review process, I have included the first paragraph of the revised section 3 as referred to in the author response below:

Chemical weathering of silicates and carbonates as well as the burial and oxidation of organic matter exert fundamental control over atmospheric chemistry on Earth over geologic timescales (Berner et al., 1983; Berner, 1990; Hilton and West, 2020; Petsch, 2014). On modern-day Earth, carbon release and sinks from mineral-based weathering (i.e., silicates and carbonates via carbonic and sulfuric acids) and biogeochemical fluxes (i.e., organic matter burial and kerogen oxidation) stand in fine balance to one another with contrasting concoctions of these under different tectonosedimentary settings (e.g., Bufe et al., 2021; Hilton and West, 2020; Blattmann et al., 2019a; Horan et al., 2019). Deglaciation likely modulated silicate and carbonate weathering resulting in enhanced (temporary) drawdown of atmospheric CO₂ (e.g., Tranter, 1996; Gibbs and Kump, 1996; Munhoven and François 1996; c.f., Schachtman et al., 2019). Glaciers have been invoked as agents for accelerating chemical weathering of carbonate and silicate minerals by increasing sediment yield and creating reactive substrate with high surface area (Torres et al., 2017; Vance et al., 2009; Yu et al., 2021), with carbonate weathering constituting a source of CO₂ to the atmosphere when sulfuric acid, stemming from oxidized sulfide minerals, is involved (c.f., Torres et al., 2014; Kölling et al., 2019). In the following, the idea of glaciers producing reactive substrate susceptible to chemical weathering is reviewed and explored for kerogen.