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Organic, inorganic or both? Comparing the magnitude of the weathering and organic carbon long-term carbon sinks using riverine data

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Over geological time-scales, atmospheric carbon dioxide levels and hence the global climate, are influenced by the intensity of chemical weathering reactions of silicate rocks and by the mobilization of organic carbon from terrestrial landscapes followed by its burial on adjacent continental margins. These processes are carbon sinks that balance the continuous input of mantellic CO_2 and hence stabilize the Earth's climate [1]. Understanding the processes that control the magnitude of both organic and inorganic carbon sinks has received significant attention so far and a number of studies point towards the importance of tectonics and climate [e.g. 2,3,4,5]. However, most of these studies have considered the organic and inorganic forcing of the carbon cycle separately and there currently is no consensus on the relative importance of each pathway and controls thereon. For this contribution, we compiled riverine chemical weathering and organic carbon export data from the literature and investigate what factors control the relative importance of both carbon sub-cycles. Preliminary analysis of the data shows that the ratio of silicate weathering over biospheric organic carbon yields decreases with erosion rates, suggesting that the organic pathways becomes more important with increasing erosion. Further analysis should provide a better insight into the controls on the balance between inorganic and organic carbon draw-down.

[1] Berner R.A., 1999 – GSAT 11, vol. 9.
[2] Gaillardet J., et al., 1999 - Chemical Geology 159, 3–30.
[3] Maher, K. & Chamberlain, C.P., 2014 - Science 343, 1502–1504.
[4] Galy V., 2015 - Nature 521, 204–207.
[5] Hilton, R.G., 2017 - Geomorphology 277, 118–132.