Environmental controls of global river DSi export: A new modelling approach

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Concentrations of dissolved silicon (DSi) in the ocean have the potential to impact atmospheric CO_2 drawdown because diatoms, which account for 43% of marine primary productivity [1], have an absolute requirement for marine DSi. Rivers are the main source of Si to the oceans [1], and despite the importance of rivers to the marine Si budget and CO_2 drawdown, the controls of river DSi flux are not fully resolved. Previous work modelling watershed DSi export has found that environmental conditions such as precipitation, lithology, slope, and soil characteristics significantly influence DSi export [2], although a number of other studies have found land cover to be a dominant control of DSi export [3]. Thus, a changing global climate is expected to alter river DSi export through shifts in watershed environmental conditions, with consequences for the global carbon cycle. We use a global river chemistry database (GLORICH) [4] to create a statistical model that predicts DSi yield based on environmental conditions in the watershed and evaluate land cover as a predictor of DSi yield on a global scale.

[1] Tréguer, Nelson, Van Bennekom, DeMaster, Leynaert & Quéguiner (1995), *Science* 268, 375-379. [2] Beusen, Bouwman, Dürr, Dekkers & Hartmann (2009), *Global Biogeochemical Cycles* 23, 1-13. [3] Carey & Fulweiler (2013), *Biogeochemistry* 113, 525-544. [4] Hartmann, Lauerwald & Moosdorf (2014), *Procedia Earth and Planetary Science* 10, 23-27.