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Weathering rates, natural organic matter and global climate change: Are they related?

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Some things concerning the title of this presentation are certain. Global warming is happening (Hinzman 2005). As polar ice cover recedes, senescent organic matter will be exposed and partially degraded. Primary productivity in polar regions will increase, producing increased loads of detrital organic matter (Striegl et al. 2005, 2007). Natural organic matter (NOM) and concomitant small chain organic acids will be produced in increasing quantities (Michaelson et al. 1998, Benner et al. 2004, Kawahigashi et al. 2004, Frey, Smith 2005). However whether or not this will have dramatic effect on mineral weathering rates is far from certain (Antweiler, Drever 1983, Ranville, Macalady 1997, Rauland-Rasmussen et al. 1998, Anderson, Drever 2000). Higher temperatures may have an effect (Veibel 1983)? Increased levels of carbon dioxide and, probably, lower freshwater pH values, will almost certainly increase weathering rates (Raymond, Cole 2003). Will NOM exacerbate or mollify such weathering rate increases? Will effects be different depending on soil cover and soil type (Jardine et al. 1989a, b, 1990, McCarthy et al. 1993, 1996). This presentation will provide data, both new and from the published literature, to support arguments on both sides of the issue.

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