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Development of a chemical weathering model toward quantification of global weathering rate in the past

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Global climate is thought to have been maintained by the long-term balance of CO₂ due to continental silicate weathering and volcanic degassing. The rate of chemical weathering of silicate minerals depends on lithology, temperature, runoff, plant evolution, soil microbial activity, and so on. Although the relationship among the controlling factors of the chemical weathering rate is still an open question, many studies have mentioned the importance of the rate of physical weathering, or erosion, on the chemical weathering rate. Efforts to quantify the chemical weathering rate using numerical models have also been made, but the number of publications in which such kind of process-based models were applied to paleo-environmental study is limited. We try to develop a process-based weathering model which can be applied for investigating roles of chemical weathering in paleo-environmental change through biogeochemical cycle quantitatively on the basis of governing physical, chemical, and biological processes.

Keywords: chemical weathering, process-based modeling