

***Interactive comment on “Rolling stones; fast weathering of olivine in shallow seas for cost-effective CO<sub>2</sub> capture and mitigation of global warming and ocean acidification” by R. D. Schuiling and P. L. de Boer***

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Anonymous referee #2 passes over our demonstration that the rate of olivine weathering is not hampered by reaction-inhibiting silica at the surface of olivine grains when these are kept in motion in agitated aqueous environments. There, continuous mutual impacts remove such reaction-inhibiting surface layers. These impacts also produce tiny  $\mu\text{m}$ -size slivers that react fast. Anonymous referee #2 deems it necessary to carry out 1) a comprehensive study of laboratory experiments, 2) a comprehensive field study, and 3) a comprehensive carbon cycle modelling study. Our experiment shows,

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based on first principles, that contrary to theoretical and static laboratory models, the reaction rate is much enhanced when olivine grains are kept in motion. Remarks on dissolution rates in mol/area/time or similar units, the ionic composition of the water, supersaturation in a closed system, as well as recommendations made by this referee are irrelevant to our statement that the use of high-energy shallow marine environments as a giant marine ball mill, free of charge, can be used at great advantage to attack the climate change and ocean acidity problem.

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Interactive comment on Earth Syst. Dynam. Discuss., 2, 551, 2011.

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