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1 Evidence for reduced biogenic silica dissolution rates in diatom aggregates

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At the end of a bloom, diatoms often settle as large aggregates. With a higher sedimentation rate than freely suspended cells, diatom aggregates directly influence the silica cycle of the upper ocean and the sedimentation and preservation of biogenic silica (BSi) at the seafloor. Here, data from laboratory studies is shown, investigating the influence of aggregation on BSi dissolution rates. Monospecific aggregates were formed for three different species of diatoms, *Chaetoceros decipiens, Skeletonema costatum, and Thalassiosira weissflogii.* The biogenic silica (BSi) dissolution rates were measured from aggregates and compared to the dissolution rates of freely suspended diatoms. Parameters known for their influence on dissolution were measured in parallel: dissolved silica (DSi) concentration within aggregates, viability (ratio of living cells to dead cells), the amount of transparent exopolymer particles (TEP) and bacterial concentration. For the first time, unambiguous evidence is shown, that initial dissolution rates of diatom frustules are lower for aggregated diatoms than for freely suspended diatoms. Lower dissolution rates in aggregates were attributed to a lower number of bacteria per diatom, to elevated DSi concentrations inside aggregates and to a higher viability of cells within aggregates.