Supplements

Ocean alkalinity enhancement approaches and the predictability of runaway precipitation processes

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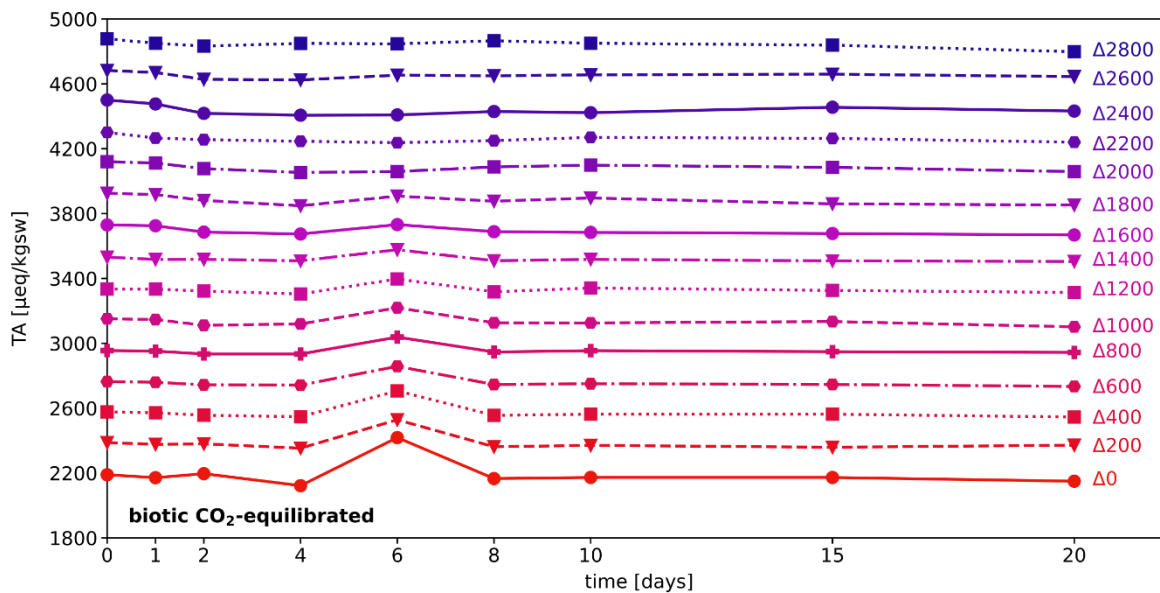
Figure S1: experimental setup, flow-through incubation boxes, Espeland Marine Biological Station (Bergen, Norway), background Raunefjord

15   Figure S2: Temporal development of TA in biotic CO₂-equilibrated treatments

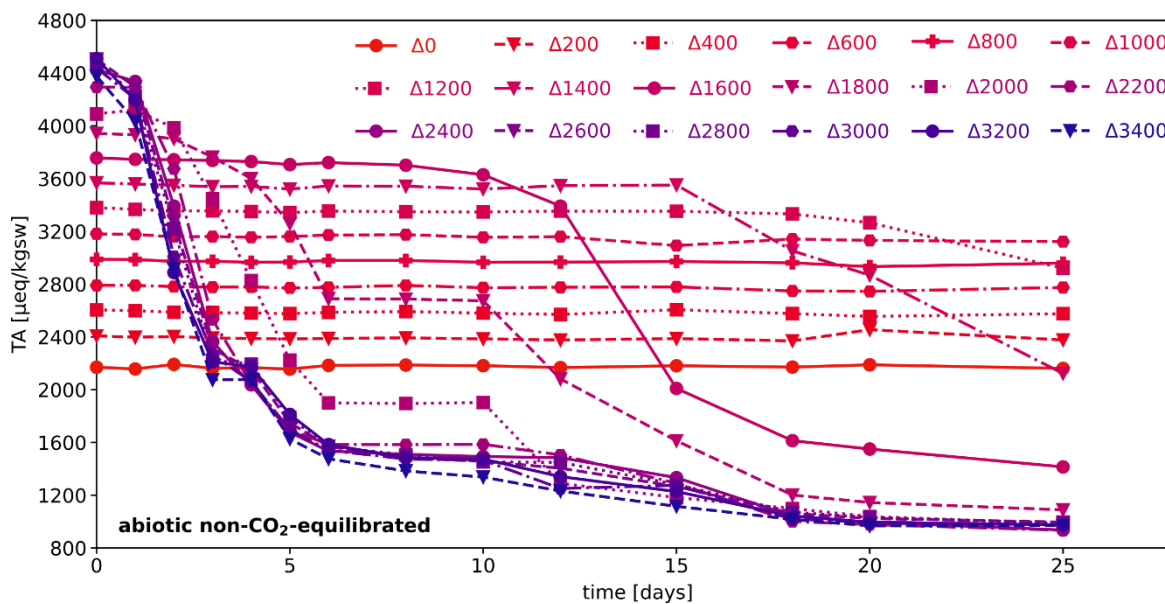



Figure S3: Temporal development of TA in abiotic non-CO₂-equilibrated treatments

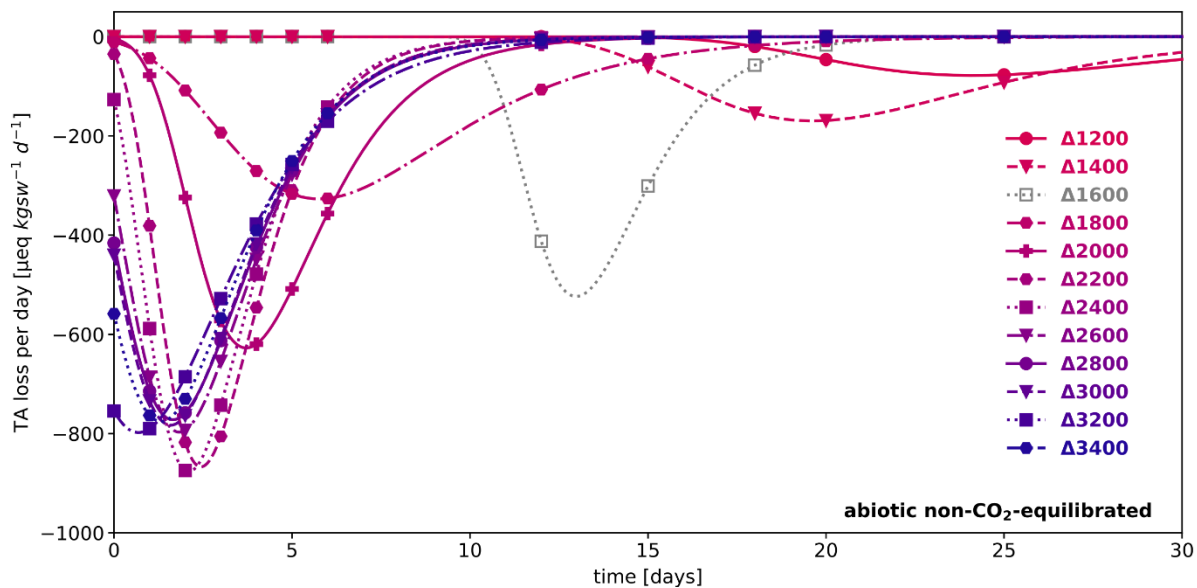



Figure S4: TA loss rates per day in the abiotic non-CO_2-equilibrated experiment, showing precipitation processes; rates were calculated based on differentiating functions determined by a sigmoidal curve fit model of the temporal development of TA; due to missing data points, rates for treatment level Δ1600 could not be determined properly, also see description of outliers below

Outliers

As described in the Methods section, each TA treatment was divided into three individual bottles. These bottles were sampled at defined time intervals. For the CO_2-equilibrated abiotic experiment a complete set of bottles (sampling days 4, 6 and 8), exhibited stable parameters at the same level throughout the experiment (see Fig. 2d, 4b, and 6a). In contrast, the set with the related sampling days 10, 15, and 20, continued the process of runaway precipitation uniformly. A similar phenomenon was observed in the abiotic non-CO_2-equilibrated experiment. Again, bottles sampled on days 6, 8, and 10 exhibited no significant changes, while bottles sampled on days 15, 20, and 25 showed continued precipitation. Despite thorough examination and multiple repetitive measurements on-site, no explanation for this behavior could be determined. The temporal alignment of both incidents (occurring between June 24th and June 28th, 2022) suggests that an environmental factor, such as water temperature, sunlight intensity, or a specific aspect of the sampling procedure might have affected related bottles. Errors during the measurements were excluded by numerous iterations with check standards. Furthermore, the simultaneous impact on pH and TA indicates that the measured values were accurate.