Interactive comment on “Ocean acidification mediates photosynthetic response to UV radiation and temperature increase in the diatom *Phaeodactylum tricornutum*” by Y. Li et al.

D. Campbell (Referee)
dcampbell@mta.ca

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The authors analyzed the interactive effects of increasing pCO2, temperature and irradiance (P, UVA, UVB) on photoinactivation and repair in the cosmopolitan diatom *Phaeodactylum*.

They find that warm temperatures and high pCO2 confer increased capacity to repair the damage caused by UVB.

Abstract: "The ratio of repair to UV-induced damage showed inverse relationship with increased NPQ, showing higher values under the ocean acidification condition against UV-B, reflecting that the increased pCO2 and lowered pH counteracted UV-B induced..."
harm."

This sentence is confusing and from the abstract, I am not sure the meaning.

General query: Phaeodactylum has multiple cell morphologies. Did the authors track the morphological state of the cultures they studied? +/- frustules?

Abstract: "The ratio of repair to UV-induced damage showed inverse relationship with increased NPQ, showing higher values under the ocean acidification condition against UV-B, reflecting that the increased pCO2 and lowered pH counteracted UV-B induced harm."

I found this sentence confusing, and I did not understand it in the abstract alone. Perhaps: "The ratio of repair to UV-induced damage decreased as the induction of NPQ increased, so the cells induced NPQ as repair fell behind damage. The ratio of repair to UV-induced damage was higher under the ocean acidification condition in cells exposed to UV-B, showing that the increased pCO2 and lowered pH counteracted UV-B induced harm."

Intro - fine. Materials & Methods: Growth light of 70 umol photons m-2 s-1; was this measured with a 4pi integrating sphere sensor or a flat sensor?

PAR:UVA:UVB ratio: How was this chosen? Is it based upon values from a particular location?

Results: "In order to determine the potential “protecting” role of excess energy dissipation via non-photochemical quenching (NPQ), the variations of the ratio of repair (r) to damage (k)−r/k−,"

I think better to write: "In order to determine the potential “protecting” role of excess energy dissipation via non-photochemical quenching (NPQ), the variations of the ratio of repair (r) to damage (k), (r/k),

P. 7206 & 7207; Very similar equations are used to describe loss of photochemistry un-
der excess irradiance and recovery after the stress, but in one case the equation a, b, c are described as 'adjustment parameters' and in the second case they are described as rate constants. In the second case, I do not think that a, b, c are all rate constants; I think c is a rate constant, a is an intercept and b is scaling factor? Also, I think the authors should spell out how a, b, c relate to r & k, which are the rate constants from the underlying model. I think that during the recovery period, 'k' falls to near zero?

P.7211 'stimulative' effects of UVA, not 'simulative' (typo)

Figure 1: How many times were the treatments replicated? Also, on my screen there is a problem with the triangle symbols - the bottom of the triangle is a white stripe.

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