

Do the effects of a 0.2 or 0.3 pH unit decline depend on the baseline or starting point?

We thank the reviewer for raising this issue.

The pH is defined as the negative logarithm of the hydrogen ion concentration ($[H^+]$). From the basic properties of logarithms it follows that the difference in pH equals the logarithm of the ratio of hydrogen ion concentrations. For a given pH change, the change in $[H^+]$, $\Delta[H^+]$ is a linear function of the initial hydrogen ion concentration ($[H^+]_i$) as $\Delta[H^+] = [H^+]_i(10^{-\Delta pH} - 1)$. Hence, the larger the initial $[H^+]$, the larger the perturbation. We illustrate this point with an additional supplementary figure representing on panel (a) the observed pH at depth and on panel (b) the change in $[H^+]$ corresponding to a pH reduction by 0.2 units.

The dependence of the absolute change in $[H^+]$ on the starting point cautions against a simplistic analysis of pH changes, be it in numerical or laboratory experiments. Contrasting shallow and deep environments highlight that absolute changes in $[H^+]$ are amplified at depth, that is for environments of low natural variability.

In addition to adding a new figure to the supplements, we inserted the following text on p8615, line 6: "The pH is defined as the negative logarithm of the hydrogen ion concentration ($[H^+]$). From the basic properties of logarithms it follows that the difference in pH equals the logarithm of the ratio of hydrogen ion concentrations. For a given pH change, the change in $[H^+]$, $\Delta[H^+]$, is a linear function of the initial hydrogen ion concentration ($[H^+]_i$) as $\Delta[H^+] = [H^+]_i(10^{-\Delta pH} - 1)$. Hence, the larger the initial $[H^+]$, the larger the perturbation (Fig. S1). Contrasting shallow and deep environments highlights that absolute changes in $[H^+]$ are amplified at depth for any threshold, that is for environments of low natural variability."