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## Ocean acidification may be increasing the intensity of lightning over the oceans

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The anthropogenic increase in atmospheric CO<sub>2</sub> is not only considered to drive global warming, but also ocean acidification. Previous studies have shown that acidification will affect many aspects of carbon uptake and release in the surface water of the ocean through increased primary productivity and decreased biogenic calcification and CaCO<sub>3</sub> dissolution. In this report we present a potential novel impact of acidification on the flash intensity of lightning discharged into the oceans. Our experimental results show that a decrease in ocean pH corresponding to the predicted increase in atmospheric CO<sub>2</sub> according to the IPCC RCP 8.5 worst case emission scenario will increase the Lightning Flash Intensity (LFI) by ca. 30% by the end of the 21<sup>st</sup> century relative to 2000. This increase in LFI may have broader implications for the atmospheric NO<sub>x</sub> production and precipitation as well as the atmospheric ozone budget (O<sub>3</sub> and N<sub>2</sub>O production). In turn, these feedback processes may impact both marine and terrestrial biological uptake of carbon that should be considered in global carbon and climate models.