Sensitivity of marine primary productivity to changes in soluble iron deposition within the Anthropocene.

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Iron can be a growth‐limiting nutrient for phytoplankton, modifying rates of net primary production, nitrogen fixation, and carbon export to ocean depths. Desert dust, pollution, and wildfires carry iron particles within their plumes to every corner of the globe, providing an essential new source of this micronutrient for primary production in remote marine ecosystems. Due to the large spatiotemporal variability in aerosols from a multitude of sources, combined with knowledge that different biota can utilise iron differently, it is crucial to be specific about how much iron enters which marine ecosystems at which times. Here we show recent modelling results of changes in primary production owing to changes in soluble iron deposition from human activity and climate change over the Anthropocene. Results suggest that Northern Hemisphere soluble iron deposition has likely been enhanced between 2% and 68% over the Industrial Era. While, if policy and climate follow the intermediate Representative Concentration Pathway 4.5 trajectory then Southern Ocean (>30°S) soluble iron deposition would be enhanced between 63% and 95% by 2100. We find that carbon export is most sensitive to changes in soluble iron within the Southern Ocean, and from a fire source rather than a dust source. This suggests that the role of fires in modulating biogeochemical cycles needs to be further explored.