Electronic Supplementary Information ESI-A to

Reduced greenhouse gas emissions from particulate organic matter degradation in iron-enriched sediments

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This file contains ten ESI-A Figures A–J.
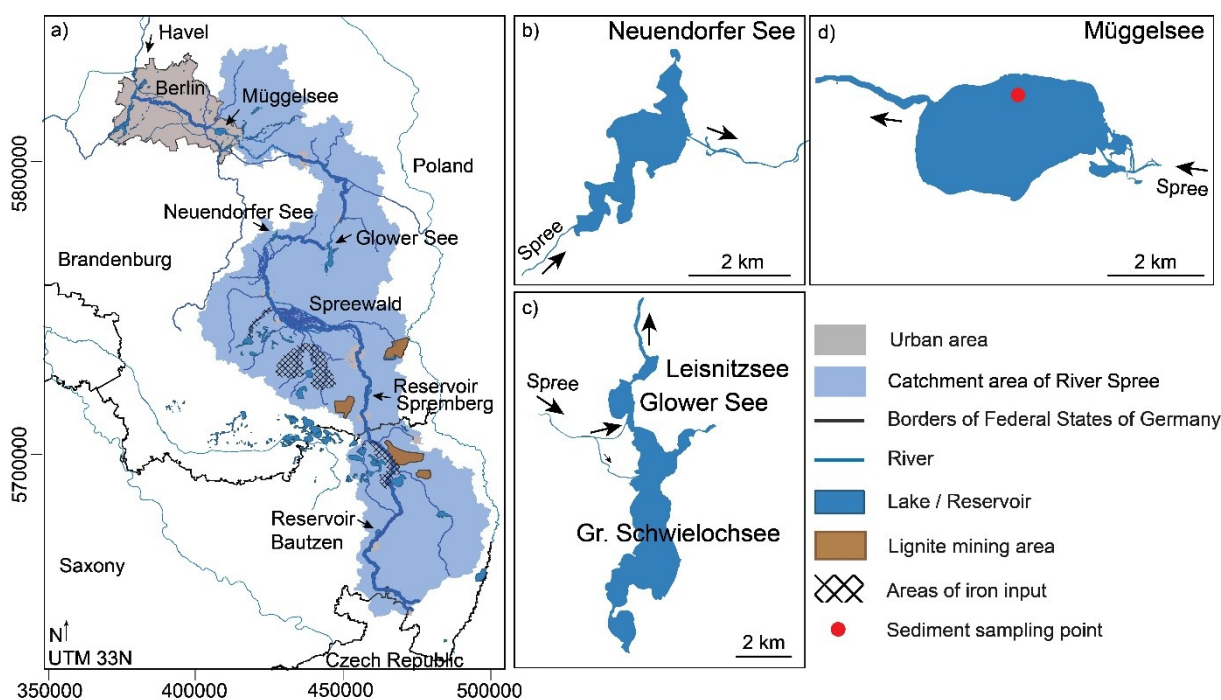
ESI-A Figure A. Panel (a) Map illustrating the fluvial-lacustrine system of River Spree including the location of Lake Müggelsee, Lake Neuendorfer See and Lake Glower See. Panel (b) Lake Neuendorfer See. Panel (c) Lake Glower See. Panel (d) Lake Müggelsee with sediment sampling site.
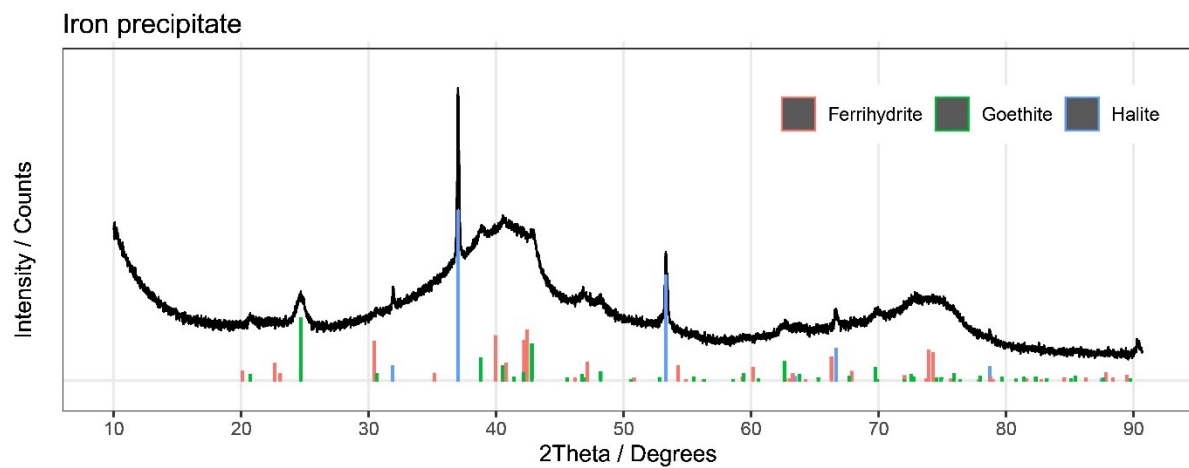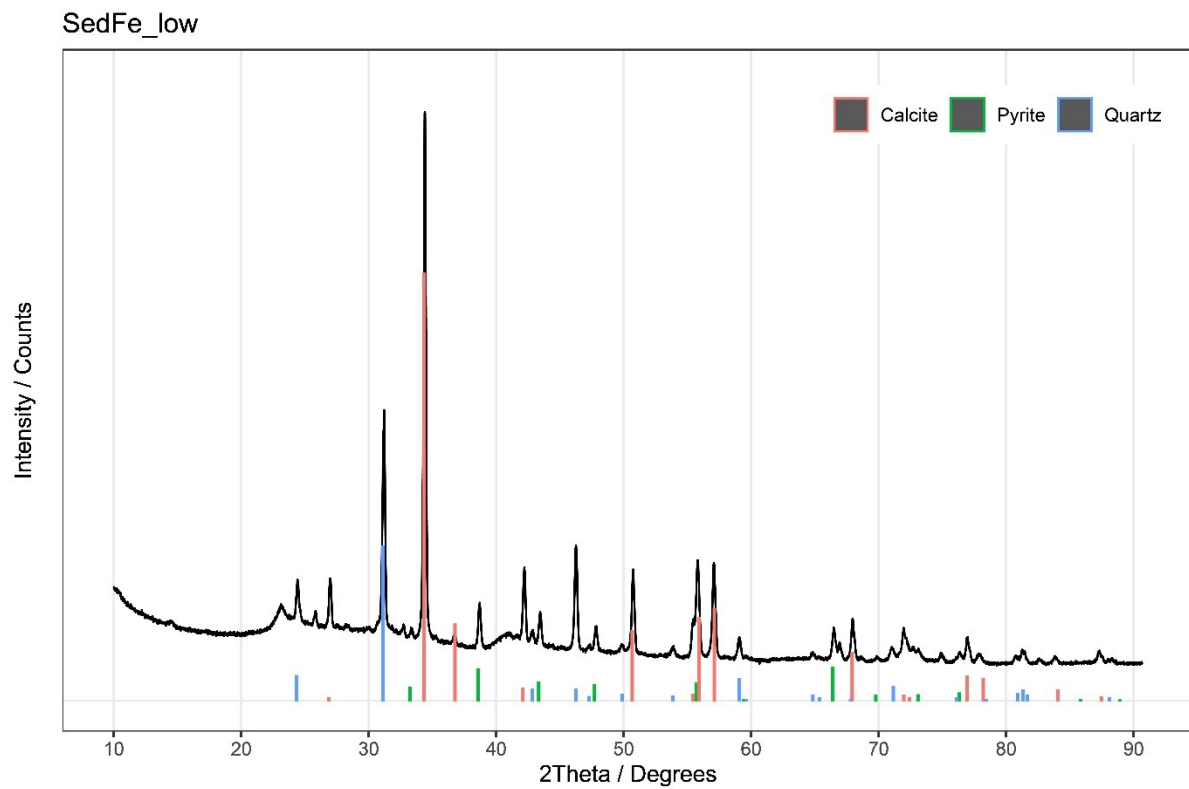
ESI-A Figure B: XRD patterns of original Lake Müggelsee Sediment (SedFe_low; upper figure) and iron precipitate (lower figure). Major reflections of dominant crystalline minerals are marked in red, green, and blue.
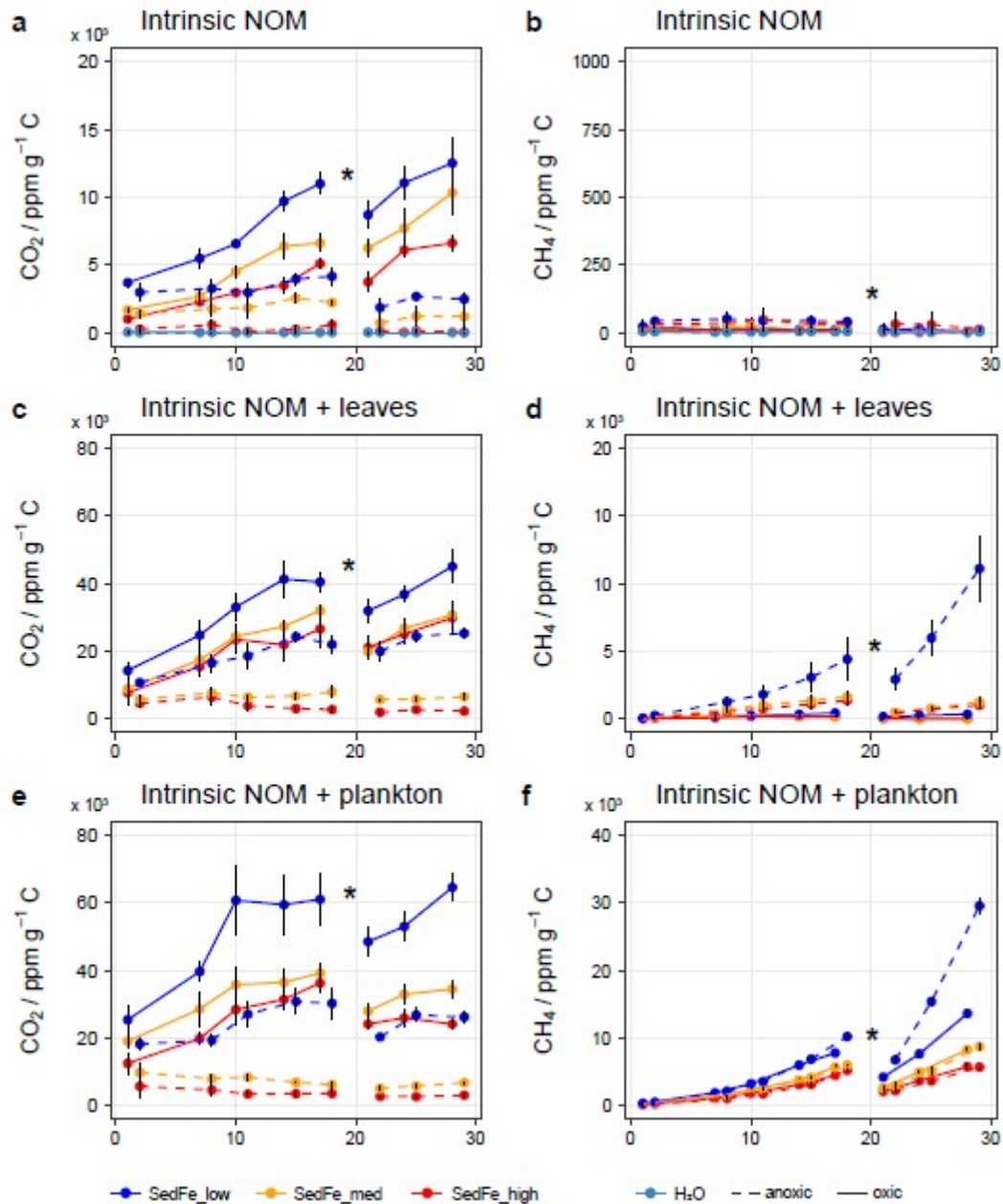
ESI-A Figure C: Equilibrium headspace concentrations of CO_2 (left column, panels a, c, e) and CH_4 production (right column, panels b, d, f). (*) After day 18 resp. day 19 the gaseous headspace was flushed and restored to atmospheric pressure by adding nitrogen (see Methods in main text). Note the different axis ranges.
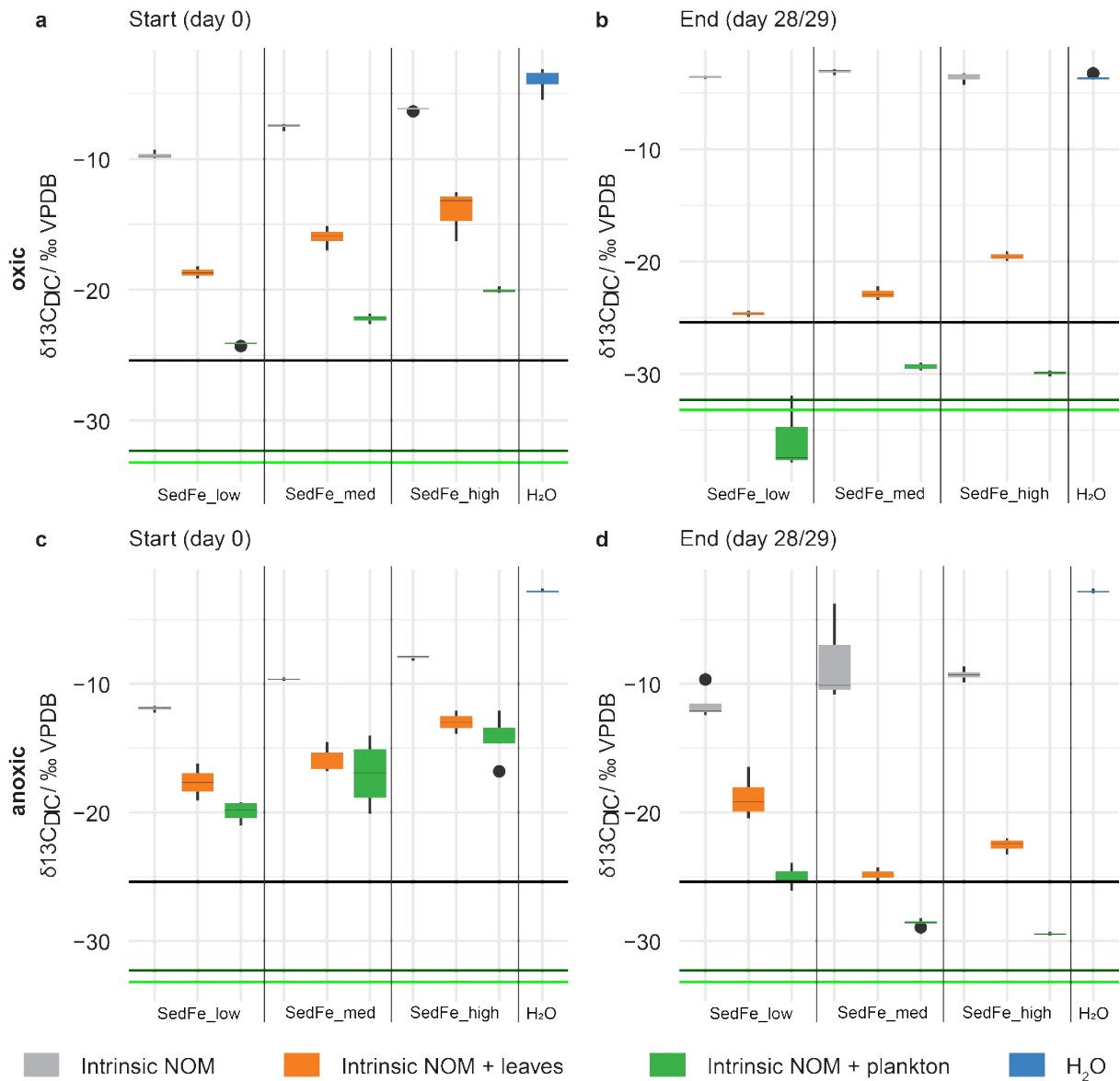
ESI-A Figure D: Stable carbon isotope signatures of DIC ($\delta^{13}C_{DIC}$) at the start of the experiment (panel a, oxic incubation; panel b, anoxic incubation) and the end of the experiment (panel b, oxic incubation; panel d, anoxic incubation). Black line, bulk $\delta^{13}C$ of sediment, dark green line, $\delta^{13}C$ of leaf POM, light green line, $\delta^{13}C$ of plankton POM. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers.
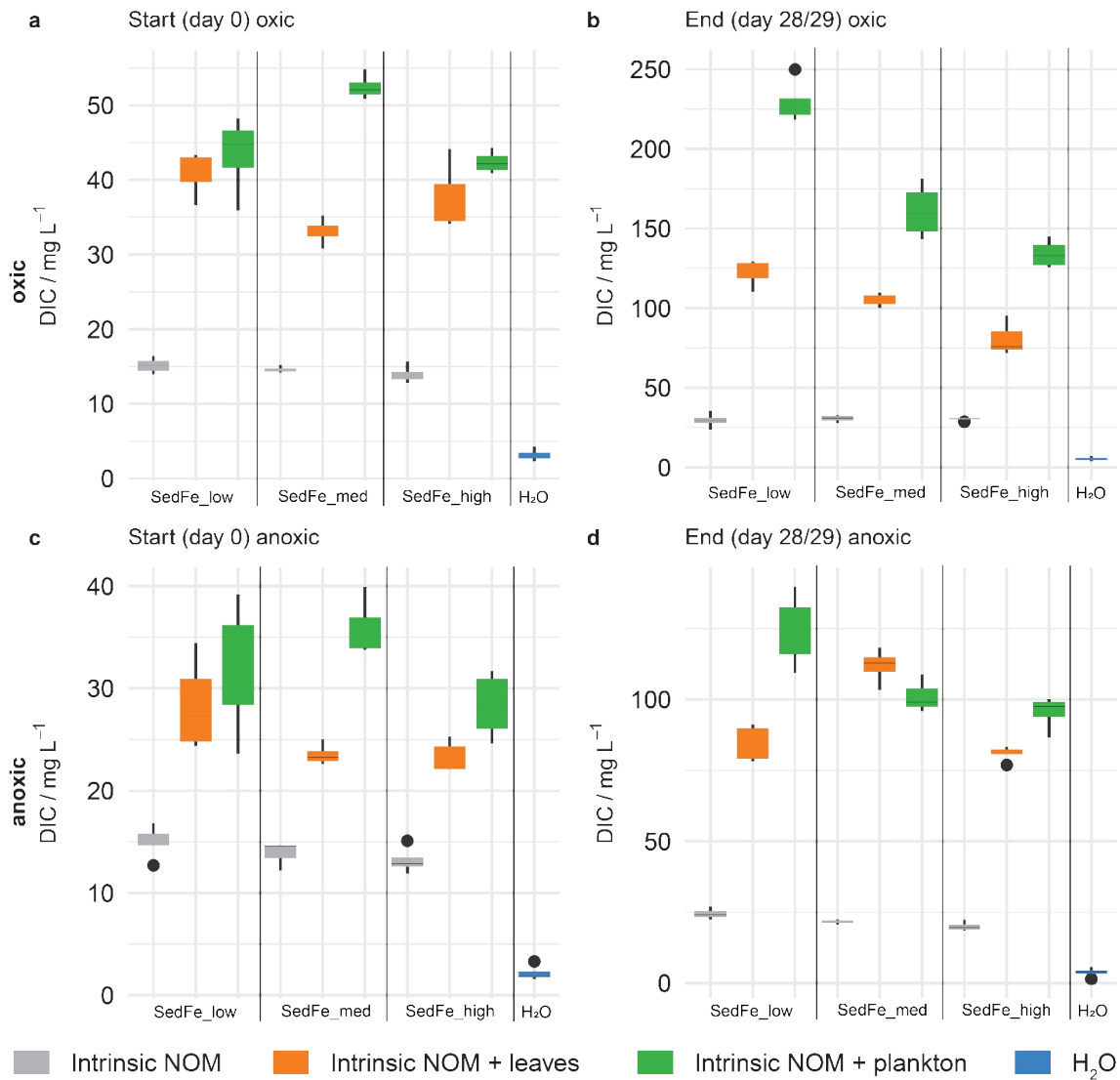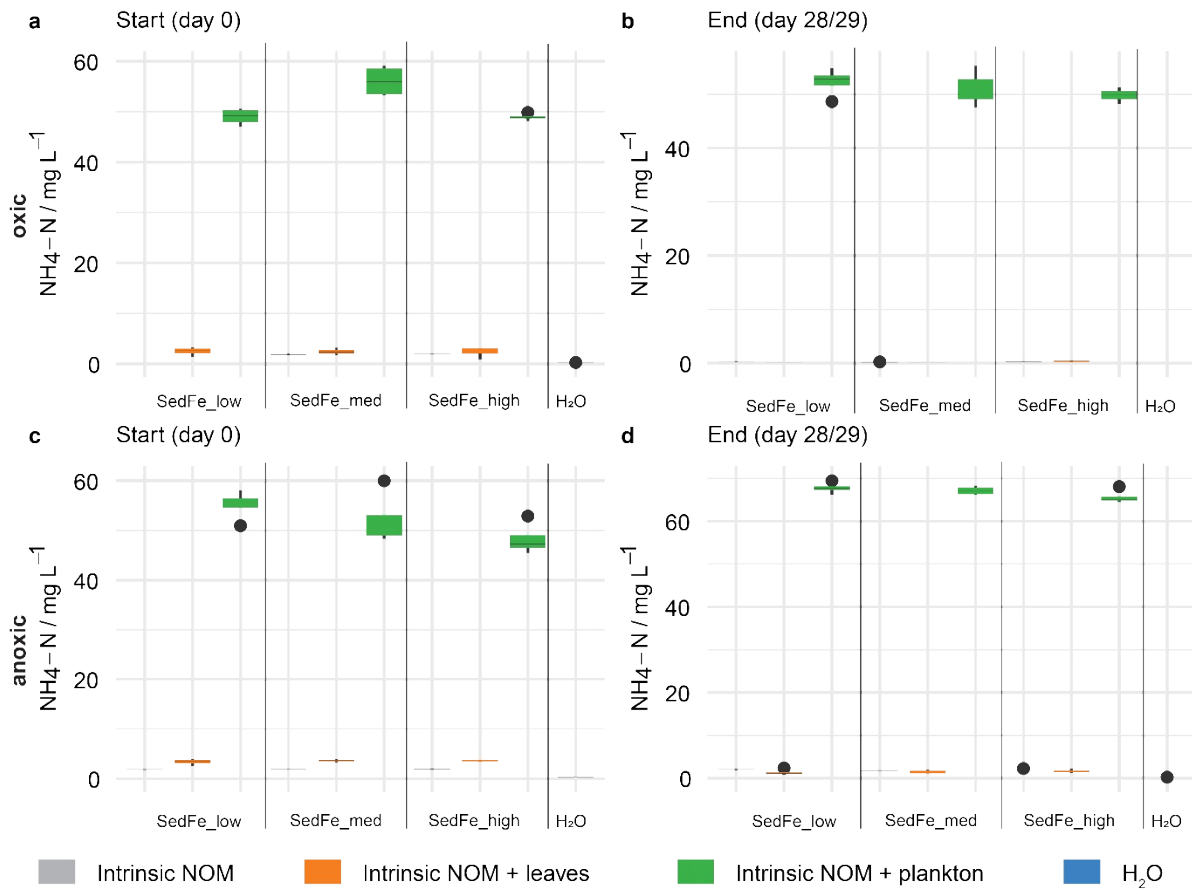
ESI-A Figure E: Aqueous concentrations of DIC at the beginning and at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Note the different axis ranges in the four panels. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers.
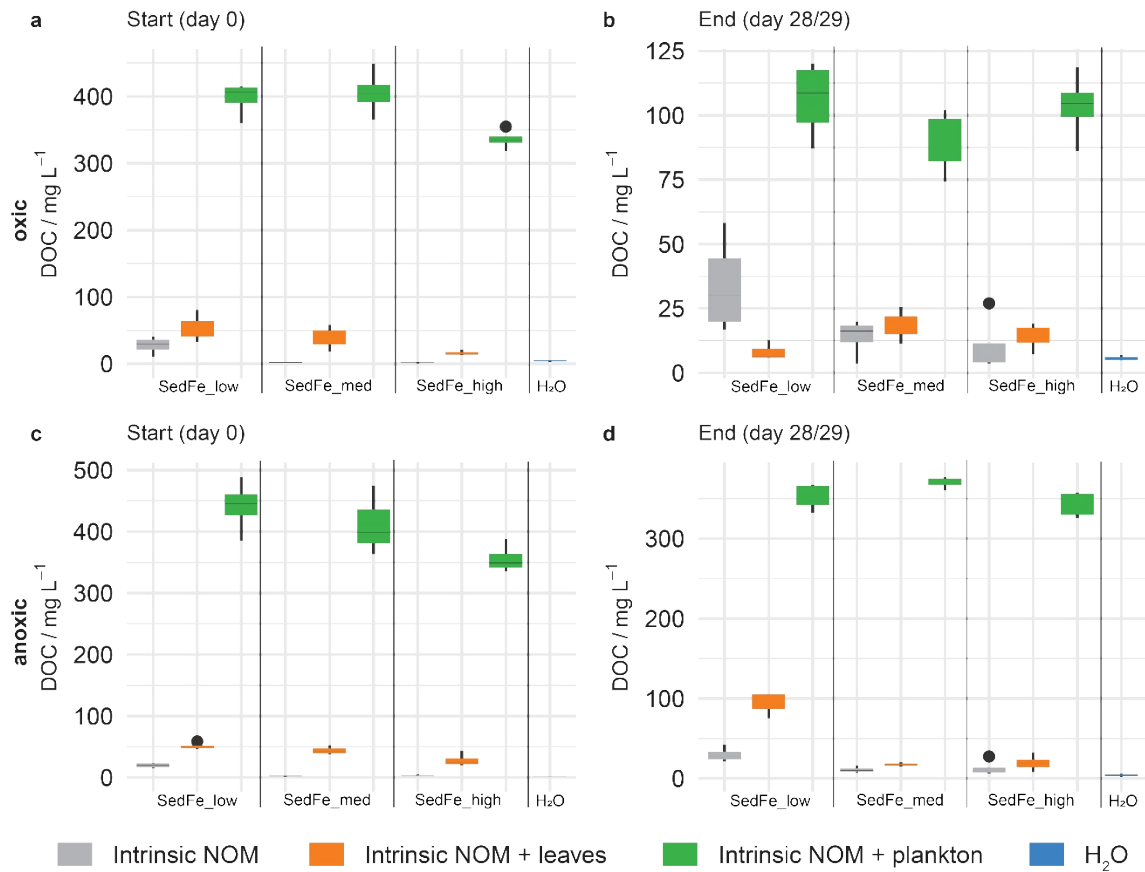
ESI-A Figure F: Aqueous concentrations of dissolved organic carbon (DOC) at the beginning and at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Note the different axis ranges in the four panels. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers.
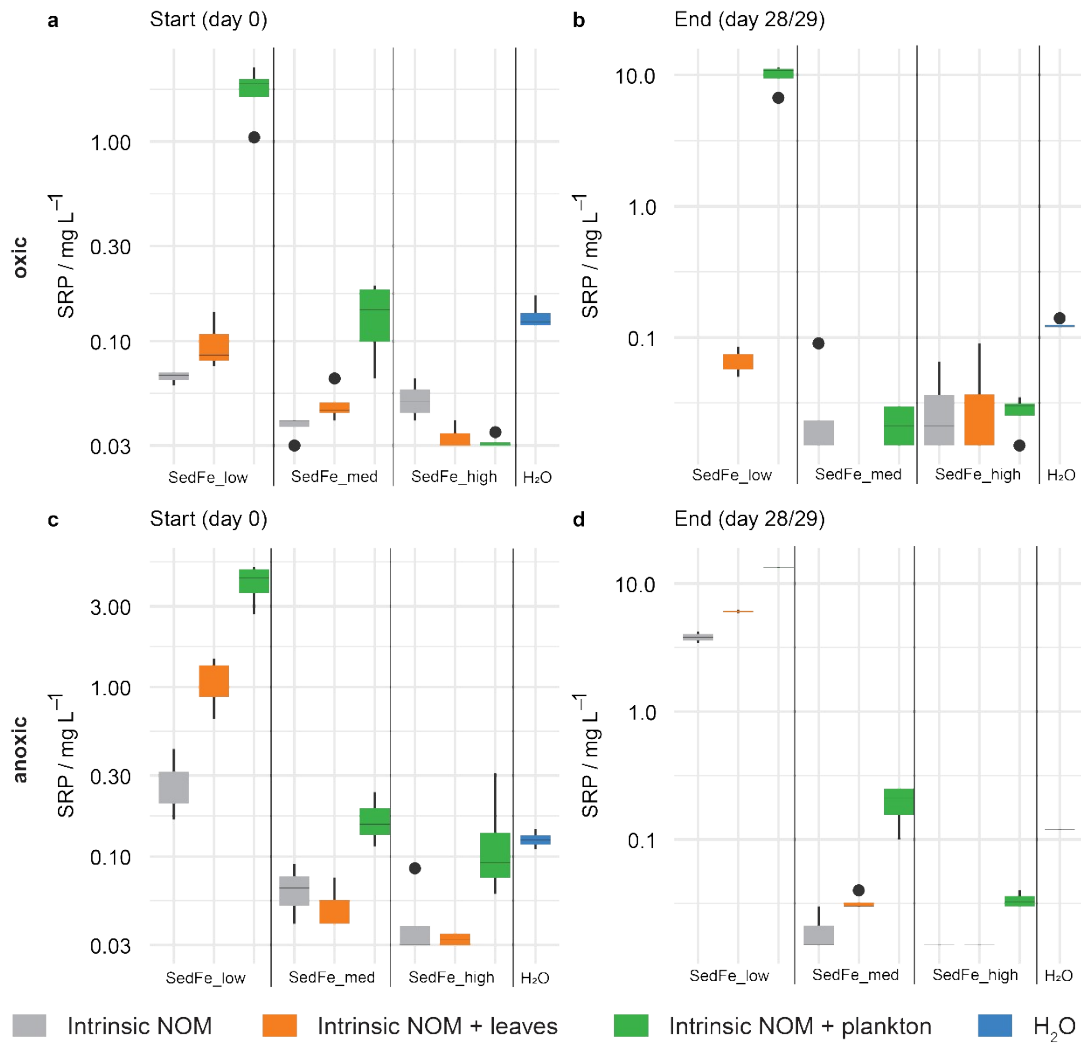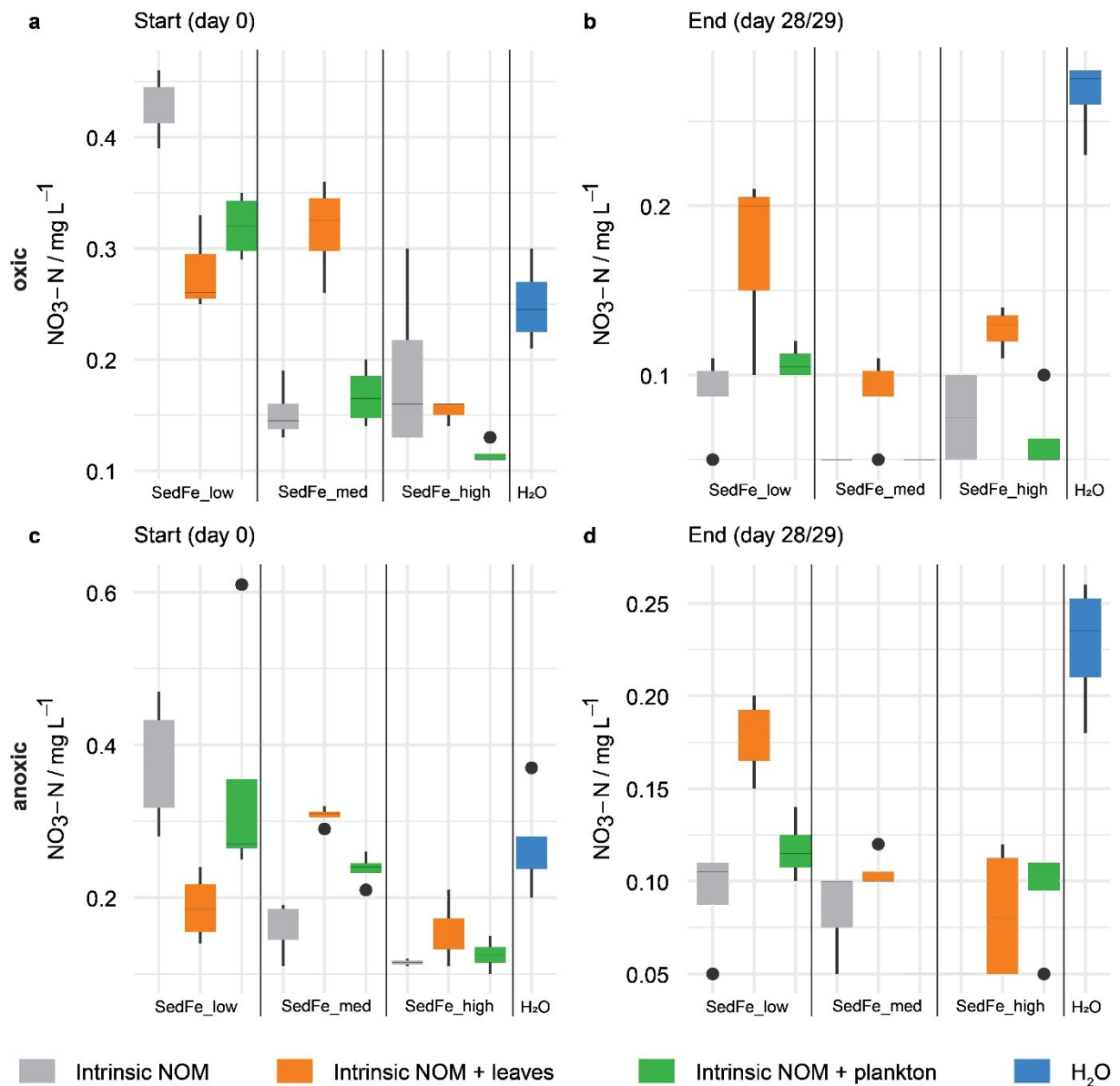
ESI-A Figure G: Aqueous concentrations of soluble reactive phosphorus (SRP) at the beginning and at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Note the different axis ranges in the four panels. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers.
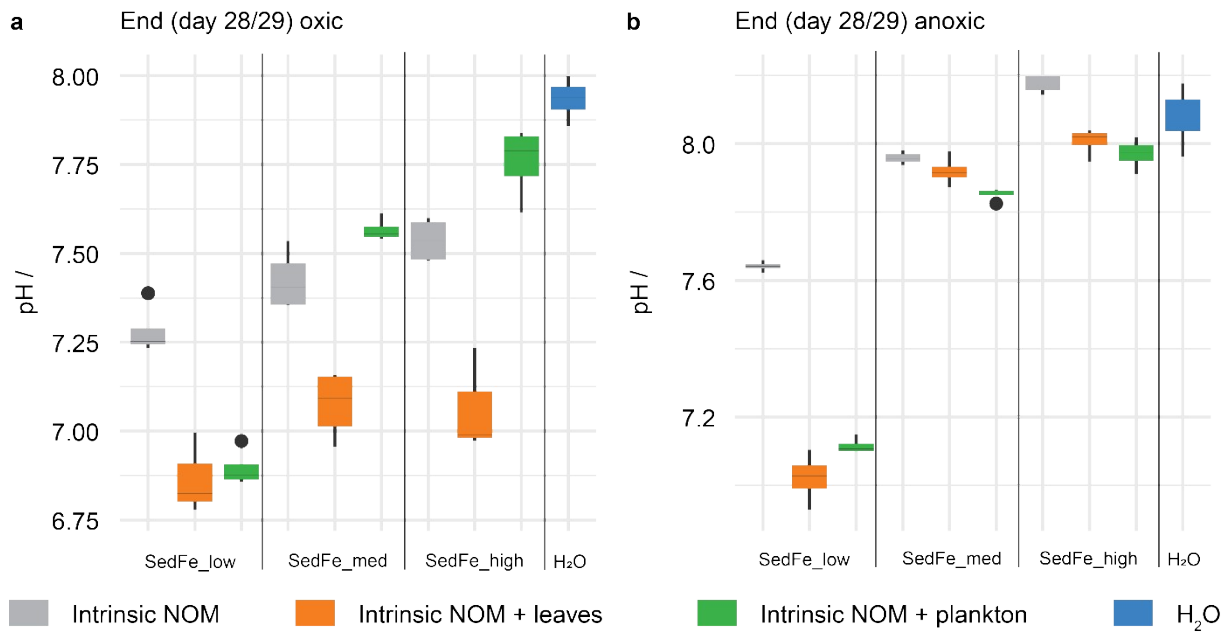
ESI-A Figure H: Aqueous concentrations of ammonium-nitrogen (NH_4-N) at the beginning and at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Note the different axis range in panel b. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers.

ESI-A Figure I: Aqueous concentrations of nitrate-nitrogen (NO_3-N) at the beginning and at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers. Note the different axis ranges in the four panels.

ESI-A Figure J: The pH in solution at final sampling at the end of the experiment. Panels a,b oxic conditions, panels c,d anoxic conditions. Boxes show median and lower and upper quartiles, whiskers min/max, and points mark outliers. Note the different axes limits in the two panels.