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IRON (II) OXIDATION KINETICS VARIABILITY IN THE ATLANTIC OCEAN AND DEVELOPMENT OF AN IMPROVED THEORETICAL EQUATION

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Abstract: During the GEOTRACES GA13 section cruise (FRidge), the iron(II) oxidation rate constants at six hydrothermal vent sites along the Mid-Atlantic Ridge were studied. Results showed high variability between samples collected within and outside the hydrothermally affected regions. Further iron(II) oxidation rate constant analysis experiments revealed that the presence of organic ligands and colloidal size particles delayed the oxidation process, while not affecting the overall pH dependency.
High volume samples were analysed across a range of temperatures (2-25℃) and pH (7-8) to extend the range of the existing multiparametric equation describing the oxidation rate constant change as a function of pH and temperature. The new equation covers a larger range of temperatures than previous published equations and provides consistently better statistical results, thus improving its applicability for global biogeochemical models.

Key words: Iron, iron(II) oxidation, hydrothermal, GEOTRACES.