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Modelling the vertical variation of iron in the oceanic mixed layer

L. Weber (1), C. Voelker (2), A. Oschlies (1), M. Schartau (3)

(1) Southampton Oceanography Centre, UK. (2) Alfred-Wegener Institut fuer Polar- und Meeresforschung, Germany. (3) Marine Sciences Research Center, SUNY Stony Brooks, USA.

The complexity of the iron biogeochemistry in seawater and the difficulty of direct measurement of chemical iron species complicate our understanding of biogeochemical dynamics of iron in seawater. We developed a one-dimensional water-column model of the speciation and biogeochemistry of iron which attempts to combine what is known about individual processes concerning the iron cycle. Compared to an earlier model that treated the surface mixed layer as homogeneous box, the one-dimensional approach taken here will allow to explicitly resolve photochemical processes that, because of the short associated time scales, can even generate vertical concentrations within the mixed layer. The model is used to examine the sensitivity of the simulated iron cycle and its key processes.