

Interactive comment on “Manganese in the world ocean: a first global model” by Marco van Hulten et al.

Anonymous Referee #1

Received and published: 4 August 2016

The threshold M_{nox} that is used to account for the homogeneous background concentration of dissolved Mn of about 0.10 nM to 0.15 nM observed throughout most of the deep ocean, may result from over simplification of the model. There might be very different K_{ox} and K_{red} values at upper (above ~300 m) and deeper (below ~300 m) part of the ocean. M_{diss} may be mainly derived from remineralization of sinking organic matter in the upper ocean, and from an equilibration with colloidal or fine particles via absorption/colloid formation processes in the deeper ocean. One would expect very different k_{red} values at different depths. In addition, M_{diss} may be mainly removed from the water column via oxidation to insoluble Mn(IV) with a rate that decreases with increasing depth due to lower dissolved oxygen concentration and lower pH at deeper depths, leading to very different k_{ox} values at these different depths. Thus both k values and their ratios K_{red}/k_{ox} are not homogeneous throughout the water column. Such

C1

difference may cause lower modelled M_{diss} than the observed values, thus requiring a threshold M_{nox} to account for higher M_{diss} at deeper depths.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-282, 2016.

C2