Response to Editor comments:

We would like to thank the Editor for her constructive comments.

Specific Comments

Comment 1. *Lines 102-106: this sentence is too long please break in smaller sentences.*

Response: We divided the sentence in two sentences in the revised paper, p. 6-7, l. 102-108, as is shown in following.

"The model estimates "anthropogenic" soluble Fe supply from both dust and combustion sources to the oceans in association with changes in air quality based on the Intergovernmental Panel on Climate Change (IPCC) emission data set. We use the term "anthropogenic" soluble Fe here as primary soluble Fe from oil combustion aerosols and secondary soluble Fe from both dust and combustion aerosols, due to the changes in emissions from fossil fuel use and biofuel combustion between the preindustrial era and the present day (Ito et al., 2014)."

Comment 2. *Lines 230, 231: mg dust L-1*

Response: We corrected the sentences, p. 12, l. 231-236, as is shown in following.

"Almost identical slopes were found at between 1 g dust L^{-1} in 0.05 mol L^{-1} sulfuric acid solution with 1 M $(NH_4)_2SO_4$ (pH = 2.0, red triangles) and 60 mg dust L^{-1} in 0.005 mol L^{-1} sulfuric acid solution without $(NH_4)_2SO_4$ (pH = 2.0, black circles) during a typical aerosol lifetime (Fig. 1). Thus we chose dust/liquid ratios of 1 g dust L^{-1} in sulfuric acid solution with 1 M ammonium sulfate to represent proton-promoted Fe dissolution scheme for mineral dust."

Comment 3: *Lines 238,239 remove the parenthesis at the end of (NH4)2SO4)*

Response: We corrected the sentence, p. 12, l. 237-240, as is shown in following.

"The addition of 0.03 M $Na_2C_2O_4$ accelerated the dissolution of Fe in 1 g dust L^{-1} solution, 0.05 M H_2SO_4 or 0.005 M H_2SO_4, with 1 M $(NH_4)_2SO_4$. Dissolved Fe concentration was 60% higher at 72 h in the 0.05 M H_2SO_4 and 1 M $(NH_4)_2SO_4$ dust suspensions with oxalate."

Comment 4: *Line 401: lower than what?*

Response: We corrected the sentence, p. 20, l. 402-405, as is shown in following.

"The suppression of Fe dissolution under low proton and low oxalate concentrations leads to the lower Fe solubility of mineral dust deposited to the ocean (0.64%–0.71%) on a global mean in present days (Table 4), compared to those estimated for mineral dust by previous modeling studies (1.4%–15%, see Table 5 in Hajima et al., 2014)."

Comment 5: *Line 425: from dust source regions*

Response: We corrected the sentence, p. 21, l. 428-431, as is shown in following.

"The model results suggest that the initial soluble Fe content from dust source regions such as South America (Patagonia), Australia, and southern Africa may be important for the supply of soluble Fe to the Southern Ocean."

Other technical correction

We corrected the caption in Fig. S6 from "the initial soluble Fe at emission" to "the primary soluble Fe", as is shown in following.

From

(c) ratio (%) of the soluble Fe deposition from the initial soluble Fe at emission to the total soluble Fe deposition in additional sensitivity simulations.

To

(c) ratio (%) of the soluble Fe deposition from the primary soluble Fe to the total soluble Fe deposition in additional sensitivity simulations.