Quantifying anthropogenic and natural iron deposition across Australia

M. STRZELEC[1]*, B.C. PROEMSE[1], M. GAULT-RINGOLD[2], P.W. BOYD[1,2], M.M.G. PERRON[1], A.R. BOWIE[1,2].

[1]Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, TAS, Australia (*correspondence:michal.strzelec@utas.edu.au)

[2]Antarctic Climate and Ecosystems CRC, University of Tasmania, Hobart, TAS, Australia.

Aerosols contain Fe and other micro-nutrients that after deposition to the ocean may be used by marine biota for photosynthesis, potentially increasing carbon dioxide uptake and ultimately influencing climate change. Australia is a significant source of mineral dust and biomass burning emissions on the global scale. Additionally, anthropogenic emission is significant for some regions of Australia. Despite the above mentioned, quantitative data on trace metal deposition in Australia and its surrounding oceans is limited. Total suspended particulates were collected on cellulose filters using high volume air samplers, followed by a three-stage leaching method using ultrapure water, ammonium-acetate buffer, and digestion in strong acids, to determine Fe solubility and total Fe concentrations. These two parameters were correlated with tracers of mineral dust, biomass burning and anthropogenic emission to assess their contribution. Our results (Table 1) provide more accurate in-field data for biogeochemical models for Australia region.

Site	Fe total (μg m^{-3})		Fe solubility (%)	
	In-field	Models [1]	In-field	Models [2]
S-W	0.15±0.12	0.1-1.0	0.6-6.0	6-8
N-E	0.10±0.05	0.1-1.0	4.9-11	4-8
S-E	0.06±0.04	0.04-0.1	2.3-23	4-8

Table 1: Atmospheric Iron deposition in Australia

[1] Mahowald et al. (2009) *Annu. Rev. Mar. Sci.* 1, 245-278.

[2] Mahowald et al.(2018) *Nat. Commun.*, 9(1) 2614.

This abstract is too long to be accepted for publication. Please revise it so that it fits into the column on one page.