

Referee Report

Factors controlling atmospheric DMS and its oxidation products (MSA and msSO_4^-) in the aerosol at Terra Nova Bay, Antarctica

by

Silvia Becagli et al.

This is a comprehensive report on two austral summer field campaigns that examined the biogenic compound DMS, and its oxidation by-products MSA and msSO_4^- at a coastal Antarctic site (Northern Victoria Land), in the vicinity of a polynya in the Ross Sea. The atmospheric measurements are augmented by seawater data on DMSP the precursor to DMS, together with various phytoplankton-related biological processes and parameters.

The manuscript treats an important topic as data on these compounds is quite limited in the Southern Ocean and Antarctic. The influence of the nearby polynya is also noteworthy. One aspect I think that could be improved is the relationship of aerosol concentration with sea ice change. Although the data on sea ice evolution is presented it is not discussed much in relation to the evolution of aerosols at the sampling sites. In Lines 405-409 the authors suggest the high MSA concentrations that preceded the DMS and phytoplankton peaks and may be due to long-range transport. For an alternative view which involves the release of these sulfur compounds during the period of sea ice melt, please see the recent analyses in the SO by Gabric et al. 2005, GBC v19, and in the Arctic by Gabric et al 2018 BAMS, v99.

The overall presentation is well structured and clear, and except for some minor issues the language is quite good. The document seems to have too many paragraphs which may be a formatting issue which arose in conversion to PDF --not sure.

However, the manuscript could be improved by a careful edit, and the authors should check their use of prepositions (English usage is annoyingly different to Italian here), some examples being :-

“presents the results on...” should be, “presents the results of...”

“DMS is formed in the breakdown...” should read, “DMS is formed by the breakdown..”

“the need of long-term measurements..” should read, “ the need for long-term measurements”

“We separated data in two classes..” should read, “We separated data into two classes”

The Figures are mostly good, although I found Figure 1 difficult to read even at 150% magnification. Please check the captions of all figures, as some are not accurate, eg Fig 1. In Figure 2, I suggest the use of a different plot symbol for each of the compounds, ditto in Figure 3.

Apart from the missing references listed above, the Bibliography is extensive and generally well formatted. However there are quite a few errors :-

Charlson et al. 1987 incorrect author name and missing journal

DiTullio et al 2003, missing journal name

Gondwe et al. 2003, errors in the sub and super scripts

Gabric et al 2005 incorrect journal name

Kloster et al 2005, missing journal name

Montes-Hugo et al 2009, problem with volume numbering

Suggest use of ENDNOTE to ensure format consistency.