

6.206 Source of SO₂ and fine sulfate particles (<0.45 μm) in the Arctic summer.

Early Career Scientist

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Abstract:

Aerosols play an important role in the Arctic climate change, and despite their importance, crucial gaps in our understanding/estimation of their effects and sources remain. Size-segregated aerosol particles were collected on board the Canadian Coast Guard Ship (CCGS) Amundsen in the Arctic during July 2014, to quantify the sulfate aerosol concentration and measure the sulfur isotopic composition to address the contribution of sea salt/non-sea salt and anthropogenic/biogenic sources to the growth of aerosol size fractions in the Arctic atmosphere. Results show that sea salt sulfate aerosols were especially high in coarse mode aerosols, however, more than 97% of fine aerosols (<0.45 μm) were from non-sea salt sources, and more than 63% of aerosols less than 0.49 microns in diameter (fine aerosol) and 86% of SO₂ were from biogenic sources. A comparison of the isotope values (δ³⁴S) for SO₂ and fine aerosols suggests that they originated from the same sources (except for two samples) and gas-to-particle conversion occurred during most sampling periods.