

EGU21-14162

<https://doi.org/10.5194/egusphere-egu21-14162>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Air-Sea Ammonia Fluxes Calculated from High-Resolution Summertime Observations Across the Atlantic Southern Ocean

Katye Altieri, Kurt Spence, and Shantelle Smith

University of Cape Town, Oceanography, South Africa

Oceanic ammonia emissions are the largest natural source of ammonia globally, but the magnitude of the air-sea flux in remote regions absent human influence remains uncertain. Here, we measured the concentration of surface ocean ammonium and atmospheric ammonia gas every two hours across a latitudinal transect (34.5°S to 61°S) of the Atlantic Southern Ocean during summer. Surface ocean ammonium concentrations ranged from undetectable to 0.36 μM and ammonia gas concentrations ranged from 0.6 to 5.1 nmol m^{-3} . Calculated ammonia fluxes ranged from -2.5 to -91 $\text{pmol m}^{-2} \text{s}^{-1}$, and were consistently from the atmosphere into the ocean, even in regions where surface ocean ammonium concentrations were relatively high. As expected, temperature was the dominant control on the air-sea ammonia flux across the latitudinal transect. However, a sensitivity analysis suggests that seasonality in the surface Southern Ocean nitrogen cycle may have a major influence on the direction of the ammonia flux.