



Spatio-temporal variations in marine ice nuclei concentration

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Ship and ground based measurements of ice nuclei concentrations are analyzed for their spatial and temporal variation. Ship based measurements extending over a wide area provide a measure of variation with geographic position and stationary measurements provide data for long term temporal variability. The field data covers a large temperature range of immersion freezing from -5°C to -40°C .

In the data it is found that the spatial variability is surprisingly small in a marine environment. The influence of heavily populated areas and dust from deserts is found to be limited to temperatures below -25°C and to elevate ice nuclei concentrations only regionally. In the presented measurements, temporal variability is larger than changes with location. Overall, measurements can be summarized by a common frequency distributions of concentration over a broad spatial and temporal range. Frequency distributions of measured concentrations at any temperature are positively skewed and can be approximated by log-normal distributions.