Impact of Road Salt Usage on Atmospheric Concentrations of Cl & Na PM 2.5

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Particulate Matter (PM) is a liquid or solid suspended in air that can be directly emitted into the atmosphere. High concentrations of PM smaller than 2.5 μm in diameter (aka PM2.5) are known to have negative health effects. Road salt application during winter represents an understudied source of PM2.5. This work investigates the potential relationship between road salt application and Cl & Na PM2.5 concentration in regards to air quality. Information on the elemental composition and concentration of PM2.5 is available for many cities across the United States through the Environmental Protection Agency and the Chemical Speciation Network. Snowfall data from the National Weather Service is used as a proxy for expected road salt concentrations. Here, overall daily Cl & Na PM2.5, monthly Cl PM2.5, and yearly Cl PM2.5 are compared to snowfall for Raleigh, NC, Milwaukee, WI, and Fargo, ND. The wintertime average concentrations of Cl & Na PM2.5 were twice as high as yearly average concentrations for Fargo, ND and Milwaukee, WI. Both cities have typical snowfall from 30-90”. In Raleigh, NC, a southern city that receives < 1” of snow annually, the two averages were the same. Average monthly Cl PM2.5 concentrations in Fargo and Milwaukee showed a moderate correlation with average monthly snowfall, whereas those from Raleigh did not. This work suggests that the application of road salt in cities with high snowfall may adversely affect air quality and should be studied further to understand potential impacts on public health.

Awards Won:
Fourth Award of $500