Accurate parameterization of sea salt emissions in Chemical Transport Models (CTMs) is important because naturally occurring aerosols contribute to ambient concentrations of particulate matter (PM). Natural and anthropogenic aerosols and gases interact chemically and physically, so predicting natural emissions correctly will affect the overall accuracy of the CTMs. AURAMS (A Unified, multi-pollutant size- and chemical-composition-resolved, episodic, Regional Air-quality Modelling System) is an off-line CTM driven by the regional Canadian operational weather forecast model, GEM (Global Environmental Multiscale). The Canadian Aerosol Module (CAM) within AURAMS is a size-segregated multi-component sectional aerosol algorithm dealing with major aerosol processes in the atmosphere, including generation of sea salt aerosols. Using a sectional approach, the aerosol size distribution is approximated by a set of 12 contiguous, non-overlapping and discrete particle size bins, handling aerodynamic diameters ranging from 0.01 to 41 mm.

The sea salt concentration in the surface model layer is given by:

\[ C_{SS} = \frac{Q_{ss} \cdot \rho_{NaCl}}{A_{surf}} \]

where \( V_{surf} \) is the 10 metre wind speed in m s\(^{-1}\). Coefficients \( a \) and \( b \) are a function of the region. Various parameterizations for sea salt fluxes are available in the literature. The default number flux function in AURAMS v1.3.1 is based on Monahan et al. (1996) for open ocean sea salt droplet generation through indirect bubble bursting. Measurements were taken. The dependence of PM\(_{2.5}\) on wind speed is weaker for smaller particles. The amount of sea salt that could be expected in summertime PM\(_{2.5}\) compared to annual PM\(_{2.5}\) mass at Halifax was measured at Sable Island in one case from the winter of 2005, compared to PM\(_{2.5}\) measured in November 2007. Wet removal as a sink is evident in the measurements during the hours rain was reported at Sable Island in November 2007. Strong winds associated with Post Tropical Storm Narine generated significant sea salt aerosol, as seen in PM\(_{2.5}\) measurements at Sable Island in November 2007. Wet removal as a sink is evident in the measurements during the hours rain was reported at Sable Island 3-4 November, 2007. Using the “Monahan Surf” hybrid parameterization, AURAMS predicted, on average, 8% of PM\(_{2.5}\) on 13-14 July was fine sea salt aerosol (Figure 12).

The analysis depicted in Figure 11 is missing Silicon, a large component of crustal material, as well as estimated particle-bound water (~13%). This could at least partially explain the high percentage (28%) of Unaccounted PM\(_{2.5}\) mass in Figure 11.

The Monahan’s sea salt flux parameterization in AURAMS is compared to estimated particle-bound water (~13%). Monahan’s function was developed for the open ocean and not intended for use in the surf zone. Comparisons of several parameterizations for sea salt flux in the CTM AURAMS showed that none produced a satisfactory representation of fine particulate material emissions from Atlantic Canadian sites during events when high mass concentrations were attributable to sea salt aerosol. In addition to finding a better modelled sea salt emission flux over the open ocean, it is desirable to include a parameterization developed specifically for the surf zone. Further study of seasonal correlations of wind speed, direction, particle mass, speciation and size distribution is needed to validate model predictions for coastal sites such as Halifax, as indicated by the fraction of NaCl in 24 hour speciation samples averaged over 6 sampling days in July 2007. It is about 1% of reconstructed PM\(_{2.5}\) mass (Figure 11). Using the “Monahan Surf” hybrid parameterization, AURAMS predicted, on average, 8% of PM\(_{2.5}\) on 13-14 July was fine sea salt aerosol (Figure 12).

The amount of sea salt that could be expected in summertime PM\(_{2.5}\) at a coastal site such as Halifax, as indicated by the fraction of NaCl in 24 hour filter samples averaged over 6 sampling days in July 2007, is about 1% of reconstructed PM\(_{2.5}\) mass (Figure 11). Using the “Monahan Surf” hybrid parameterization, AURAMS predicted, on average, 8% of PM\(_{2.5}\) on 13-14 July was fine sea salt aerosol (Figure 12).

The analysis depicted in Figure 11 is missing Silicon, a large component of crustal material, as well as estimated particle-bound water (~13%). This could at least partially explain the high percentage (28%) of Unaccounted PM\(_{2.5}\) mass in Figure 11.

The Monahan’s sea salt flux parameterization in AURAMS is compared to estimated particle-bound water (~13%). Monahan’s function was developed for the open ocean and not intended for use in the surf zone. Comparisons of several parameterizations for sea salt flux in the CTM AURAMS showed that none produced a satisfactory representation of fine particulate material emissions from Atlantic Canadian sites during events when high mass concentrations were attributable to sea salt aerosol. In addition to finding a better modelled sea salt emission flux over the open ocean, it is desirable to include a parameterization developed specifically for the surf zone. Further study of seasonal correlations of wind speed, direction, particle mass, speciation and size distribution is needed to validate model predictions for coastal sites such as Halifax, as indicated by the fraction of NaCl in 24 hour speciation samples averaged over 6 sampling days in July 2007. It is about 1% of reconstructed PM\(_{2.5}\) mass (Figure 11). Using the “Monahan Surf” hybrid parameterization, AURAMS predicted, on average, 8% of PM\(_{2.5}\) on 13-14 July was fine sea salt aerosol (Figure 12).

The analysis depicted in Figure 11 is missing Silicon, a large component of crustal material, as well as estimated particle-bound water (~13%). This could at least partially explain the high percentage (28%) of Unaccounted PM\(_{2.5}\) mass in Figure 11.

The Monahan’s sea salt flux parameterization in AURAMS is compared to estimated particle-bound water (~13%). Monahan’s function was developed for the open ocean and not intended for use in the surf zone. Comparisons of several parameterizations for sea salt flux in the CTM AURAMS showed that none produced a satisfactory representation of fine particulate material emissions from Atlantic Canadian sites during events when high mass concentrations were attributable to sea salt aerosol. In addition to finding a better modelled sea salt emission flux over the open ocean, it is desirable to include a parameterization developed specifically for the surf zone. Further study of seasonal correlations of wind speed, direction, particle mass, speciation and size distribution is needed to validate model predictions for coastal sites such as Halifax, as indicated by the fraction of NaCl in 24 hour speciation samples averaged over 6 sampling days in July 2007. It is about 1% of reconstructed PM\(_{2.5}\) mass (Figure 11). Using the “Monahan Surf” hybrid parameterization, AURAMS predicted, on average, 8% of PM\(_{2.5}\) on 13-14 July was fine sea salt aerosol (Figure 12).