3.056 Chemical characterization of wet deposition at a tropical urban city.

Early Career Scientist

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Abstract:

The chemical composition of rainwater has not been intensively studied in the urban area of Río Piedras, Puerto Rico. Through this research, we aimed to characterize the chemical composition of the wet deposition received in this region and contrast to the rainwater chemistry of a forested area located at El Verde Field Station in the National Forest El Yunque. Weekly sampling was conducted from 2014 to 2016 at the two sites. All samples collected were analyzed for pH, conductivity and concentrations of Ca^{2+}, Na^{+}, Mg^{2+}, NH_4^{+},K^{-}, SO_4^{2-}, NO_3^{-} and Cl^{-}. The highest records of conductivity were found in the Río Piedras station, with a mean of 48.64 µS/cm, while at El Verde the mean conductivity was 14.64 µS/cm. This notable difference could be due to the high concentrations of vehicles in the urban area, which emit many contaminants to the atmosphere capable of altering the chemical composition of rainwater. Cl^{-} was the dominant chemical species at both sites, but its concentration was higher at the urban station ($p<0.01$). A comparison between the sea-salt and non-sea salt fractions for this species was made and a strong correlation ($r \sim 0.98$) was found between Cl^{-} and Na^{+} at El Verde, which is different to what was found at Río Piedras, where there is a weak correlation between the two. The major source for Cl^{-} at El Verde appears to be mostly marine, which can be justified by its proximity to the ocean.