

8th International Conference on Fog, Fog Collection and Dew
Taipei, Taiwan, 14–19 July 2019
IFDA2019-173
© Author(s) 2019. CC Attribution 4.0 license.

Characterizing the variability of cloud water acidity at Mt. Bamboo in the West Pacific Ocean across two decades of northeast monsoon seasons

Stephen M. Griffith, Thuy Bui Thu, Wei-Ti Tseng, and Neng-Huei (George) Lin
National Central University, Department of Atmospheric Sciences, Taiwan (stegriff@ncu.edu.tw)

This study builds on the work of Thu et al., (IFDA2019-161), which analyzes the influence of Asian continental outflows on cloud water chemistry observed at Mt. Bamboo in northern Taiwan, and specifically focuses on the variability of the cloud water acidity. In addition to fog reducing visibility and impacting climate variability, acidic fog at mountain sites has a unique relationship with ecosystem health, contributing both nutrients and harmful inputs, and at this location may influence the air quality of a large metropolitan area downwind. In this work, the measured cloud water values of pH, LWC and the inorganic ion concentrations are used and several metrics of acid/base relationships, including the pA_i, fractional acidity (FA), and neutralization factors (NF) are derived to characterize the cloud water acidity and assess the overall variability at the site. Results from this study reveal that although the long-term trend of pH at the mountain site has not significantly changed over two decades, there is significant variability year-to-year and is driven by the acidifying and neutralizing potentials of the cloud water. In addition, our analysis suggests a complex and changing relationship between pH and FA over the two decades of data and is likely connected to changing source patterns, many of which are borne from Asian continental outflows and are highlighted by correlation analyses in this work. The variability analysis in this study provides important details to more comprehensively characterize the northeast monsoon season contributions to cloud water acidity, and indicates possible routes for further study moving forward.