ABSTRACT

On January 12, 2020, after 43 years, Taal Volcano erupted that resulted in ashfall incidents in several communities in Luzon island, Philippines. This study aims to describe the transport process and deposition of ashfall during the eruption over CALABARZON and National Capital Region by using eruption data, meteorological parameters, ashfall images and air quality data. Results from the ERA-5 reanalysis data, upper air data, and NOAA HYSPLIT forward and backward trajectories revealed that various wind speed and direction at different atmospheric pressure levels contributed to transport of ashfall at different areas. The presence of northeasterly winds as prevailing winds from January 12-16 influenced the movement of ash particles in the low level part of the atmosphere. High volcanic ash plume travelled northward affecting nearby areas. Areas such as the Provinces of Cavite, Laguna, Batangas, Rizal, and Cities of Quezon, Marikina, Muntinlupa, Taguig, Parañaque, Mandaluyong, Las Piñas and Pasig experienced ashfall as supported by ashfall images collected that underwent image analysis. Highest ashfall area was identified in Batangas Province. No images were collected on the southwestern part of the volcano, but satellite images showed the presence of ashfall in the area. Moreover, high concentration of total suspended particulates was observed in the morning of January 13 and 24-hour concentration from January 13-14 in Lipa City, Batangas. Emission flux on January 13 reached 399, 168 ug m^{-2} $hr.^{-1}$ which can be linked to the huge amount of particles released by the volcano. From January 12-16, 2020, PM_{10} and $PM_{2.5}$ concentration on January 12 from the Lung Center of the Philippines air quality monitoring station had the highest total emission flux equivalent to 17,460 ug $m^{-2}hr.^{-1}$. The study can serve as supplementary data in disaster risk reduction and management and forecasting future events.

Keywords: ashfall; deposition; eruption; Taal; transport