

Hand-held Total Ozone Column Concentration Measurements in the Philippines

Ronald Macatangay¹, Melliza Cruz^{1,2}, Gayana Hendawitharana^{1,3}, Francisco Moreno⁴, Maria Cecilia Galvez⁴, Edgar Vallar⁴ and Thiranan Sonkaew⁵

¹*Institute of Environmental Science and Meteorology, University of the Philippines, Diliman, Quezon City, Philippines, ronmcdo@gmail.com*

²*Manila Observatory, Quezon City, Philippines, liz@observatory.ph*

³*Department of Meteorology, Colombo, Sri Lanka, hwgayana@yahoo.com*

⁴*Physics Department, De La Salle University, Manila, Philippines, galvezcecil@gmail.com, vallaredgar@gmail.com*

⁵*Science Faculty, Lampang Rajabhat University, Lampang, Thailand, thiranan@lpru.ac.th*

Abstract: In this study, total ozone column concentrations (TOC) were measured from the ground using the handheld Microtops II Ozone Monitor and Sunphotometer at De La Salle University, Manila (14.567 N, 120.983 E) and Binan, Laguna (14.333N, 121.067E) in the Philippines during December 2012 and January 2013. Daily averages of TOC measured at the two experimental sites were compared to the data retrieved from the NASA EOS Aura satellite platform equipped with the Ozone Monitoring Instrument (OMI) using its overpass data in Taiwan (Taipei, 25.038 N Lat and 121.514 E Lon), which is the one nearest to the Philippines. Differences between the ground-based daily averaged concentrations and the corresponding overpass data ranged from 0-10 Dobson units with a correlation coefficient of 0.49. Three-day air mass back-trajectories were obtained at three different height levels (1 km, 10 km and 25 km). At the 25 km level, where the ozone vertical profile peaks, air mass coming from the East Philippine Sea during the 21st and the 23rd of December 2012 indicated higher TOC than on the 1st and the 19th of January 2013 where air masses originated from the West Philippine Sea. In the analysis, TOC was filtered based on the histogram of the atmospheric optical thickness. Further analysis using a more objective filtering technique will also be introduced in this study to improve the accuracy and precision of the handheld ozone measurements from the ground. These results, as well as measurements done in 2011, will be compared to OMI as well as to other available satellite data.

Keywords: ozone, satellite, back-trajectories, filtering, aerosol optical thickness