Geophysical Research Abstracts
Vol. 12, EGU2010-298, 2010
EGU General Assembly 2010

Geological and geotechnical characteristics of Metro Manila volcanic soils and their suitability for landfill soil liner

Edna Patricia Mendoza (1), Sandra Catane (1), Chelo Pascua (1), and Mark Albert Zarco (2)

(1) National Institute of Geological Sciences, University of the Philippines-Diliman, Quezon City, Philippines 1101 (edz.mendoza@gmail.com), (2) Institute of Civil Engineering, University of the Philippines-Diliman, Diliman, Quezon City, Philippines 1101

Due to the Philippines's island-arc setting, andesitic tuff and volcanic ash constitute two-thirds of the country's agricultural land. In situ weathering of these volcanic sediments produces volcanic soils. Metro Manila volcanic soils were studied to determine their suitability for landfill soil liner. The soils were analyzed using XRD and XRF, and were tested for geotechnical properties. The results show the presence of the smectite group, a swelling variety of clay. The smectite-type clays are weathering products of volcanic glasses which are dominant components of the parental rocks. The high amounts of Al2O3 indicate an Al-rich type of soil. The clay species is either di- or tri-octahedral type, which points to montmorillonite as the main clay species. Swelling clay lowers the permeability of soils and reduces the infiltration and lateral movement of leachates in the ground. Also, geotechnical tests revealed moderate to high plasticity indices and low hydraulic conductivity values. The study shows that the physicochemical characteristics of volcanic soils meet the criteria for a soil liner for future sanitary landfill projects as mandated by RA 9003, a recently ratified solid waste management act of the Philippines. Being widespread, volcanic soils can be viewed as an important resource of the country.