



Sedimentary record of the 2013 Typhoon Haiyan in Leyte Gulf, Philippines

Janneli Lea Soria (1), Adam Switzer (1,2), Jessica Pilarczyk (3), Fernando Siringan (4), Ma. Angelique Doctor (4), Nicole Khan (3), Hermann Fritz (5), Riovie Ramos (1), Sorvigenaleon Ildefonso (2), and Mikko Garcia (4)

(1) Asian School of the Environment, Nanyang Technological University, Singapore, (2) Earth Observatory of Singapore, Nanyang Technological University, Singapore, (3) Department of Marine and Coastal Science, Rutgers University, New Brunswick, NJ, USA, (4) Marine Science Institute, University of the Philippines, Diliman, Quezon City, Philippines, (5) School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA, USA

Overwash associated with the 5 to 8 m storm surge of Typhoon Haiyan has left washover sediments inland, surrounding the northwestern shores of Leyte Gulf. The Typhoon Haiyan sediments represent a modern sedimentary record of a high impact landfalling typhoon, and now form the platform for reconstructing pre-historical storm surge events in the Philippines. Long-term storm surge records provide foundation to understanding coastal responses and assessing future coastal risk, but data in tropical settings is still limited.

In this study, we mapped the thickness and extent of the Typhoon Haiyan deposit, and document the textural and compositional variations along four transects in two contrasting coastal environments. On the mixed siliciclastic-carbonate coast of Basey, the Typhoon Haiyan deposit is beige, poorly-sorted, silt to fine sand. The sediments deposited proximal to the coast were predominantly carbonate-rich, fine sand. Farther inland the sediments were predominantly silt containing less carbonate. In contrast, on the siliclastic coast of Tanauan, the Typhoon Haiyan deposit is predominantly gray, moderately- to well-sorted, fine to coarse sand. The generally coarse-grained and well-sorted Typhoon Haiyan deposit contained limited amount of carbonate and organic matter, and was most probably scoured from the beach. Post-typhoon satellite images, exposed coconut roots, and erosion scarps consistently indicate extensive beach erosion. Grasses were completely buried with the Typhoon Haiyan sediment indicating rapid deposition with little or no erosion on the back beach environments. Given that storm surge conditions were similar in these two sites, the significant differences in sediment grainsize, sorting, and composition can be likely attributed to local factors including variations in near-shore bathymetry and sediment source.