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An investigation of recent storm histories using Ground Penetrating Radar at Bay-Bay Spit, Bicol, Central Philippines

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The Philippine archipelago lies in the path of seasonal tropical cyclones, and much of the coast is prone to periodic inundation and overwash during storm surges. On example is typhoon Durian a category 3 storm that made landfall on the 30th November 2006, in Bicol province, on the east central Philippine coast. Satellite imagery from May 2007 reveal that Durian breached a sandy spit that runs southeast from the mouth of the Quinale River at Bay-Bay village towards Tabaco City. The imagery also showed that, although the breach site showed signs of partial recovery, geomorphological evidence of the inundation event associated with typhoon Durian still remains. In 2012 we mapped the geomorphological features of Durian. In June 2013 we returned to conduct Ground Penetrating Radar (GPR) surveys on the Bay-Bay spit to investigate potential subsurface evidence of previous storm events. The GPR surveys comprised five, 1.5 km, longshore profiles and 12 cross-shore profiles, of 50 m - 200 m in length. The GPR system used for this study was a Sensors and Software Noggin with 100 Mhz antennas. Near surface velocities were determine using Hyperbolae matching in order to estimate depth. Topographic and positional data were collected using a dGPS system. After minimal processing depth of penetration during the survey varied from 2 - 8 m. The cross-shore GPR profiles reveal at least two erosional events prior to 2006 typhoon Durian, with approximately 10 m of recovery and progradation between each erosion surface. The GPR profiles that captured the erosional features were revisited in September 2013 for trial pitting, stratigraphic description, and sediment sampling. Sediment cores were taken horizontally from the trench walls and vertically from the trench bases to date sediments using Optically Stimulated Luminescence (OSL), which eventually could constrain the timing of the erosional surfaces.