Patterns of megaclasts along the coast of Eastern Samar (Philippines) – Implications for Holocene extreme-wave events

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The Eastern Visayas region in the Philippines is hit by some of the most violent tropical cyclones on Earth on a regular basis, exemplified by Typhoon Haiyan, 7–9 November 2013, and a number of other category 4 and 5 events during the last decades. Moreover, strong earthquakes along the Philippine Trench have triggered several tsunamis in the historical past. Coastal flooding through extreme waves associated with these events represents a significant hazard for communities along the eastern coasts of Samar. However, not much is known about frequency-magnitude relationships of coastal flooding events and the maximum magnitude on centennial and millennial scales, which can be derived from geological traces and which have to be considered in a coastal hazard management process.

We investigated a large boulder field in Eastern Samar distributed over an elevated, intertidal palaeo-reef platform in order to understand mechanisms of boulder transport and to derive implications for the maximum spatial extent, height, and velocity of coastal flooding. In the field, we recorded location, shape, morphological features as well as length and orientation of the main axes of more than 250 boulders, the a-axes of which were between 1.5 and 10.7 m. Eight samples were taken for Th/U dating of post-depositional, secondary calcite flowstones and pre-depostional coral, and four samples were taken for radiocarbon dating of pre-depositional, sessil organisms attached to the boulders. We 3D-mapped the most important parts of the boulder field using an unmanned aerial vehicle (UAV) and created structure-from-motion (SfM) models of the most prominent boulders, which will be used for inverse modelling of transport flows. Samples of the most common coralline lithofacies were taken for density estimations. We used interviews with elders of the local community as well as multi-temporal analysis of satellite images to reconstruct recent flooding patterns and boulder movement during recent events; Pléiades and Worldview-3 scenes were acquired for time slices before and after Typhoon Haiyan as well as after Typhoon Hagupit (6 December 2014). First results will be presented.