

An Extreme Wave Event in Holocene Coral Reef, Western Luzon, Philippines

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Here we report an Extreme Wave event (EWE) that caused rapid backreef infilling about three hundred years ago or later at the west coast of Luzon, Philippines. Five cores, 17-29.1 m in length, were drilled from a Holocene coral reef at Paraoir. Results of ^{230}Th -dated fossil corals collected in the cores and on the ground surface showed that the reef flat developed in two stages. The reef margin was dated to start from $10,256 \pm 50$ yr BP (before 1950 AD) at 23.9 m below mean sea level (MSL) and ended about $6,654 \pm 29$ yr BP at 3.7 m below MSL with a stratigraphic order of fossil coral ^{230}Th dates. The back-reef zone was deposited by sediments of 818-324 yr BP old without an age-depth correlation. The evidences suggest that a back-reef moat remained empty throughout the development of the reef for about 6 kyr and was filled abruptly with a 26 m-thick sequence of rubble and bioclastics sometimes after 1626 AD. Field evidence, tsunami simulations and historical records indicate such a catastrophic sedimentation was probably caused by a single severe typhoon. Our study suggested that a reef flat can be built up abruptly by an EWE.