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# Constraining timing and origin of extreme wave events, Shirazuka Lowlands, Japan

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Tsunami and storm surges are major threats on coastal settlements. The Pacific Coast of southwest Japan is impacted by typhoons and tsunamis caused by earthquakes along the Nankai trough. This part of the Philippine Sea to Eurasia Plate subduction zone is expected to cause another earthquake and tsunami in near future. To improve the predictability of potential events, it is important to establish chronologies of former tsunamis as a basis for long-term recurrence intervals. Characterization of potential event deposits following a multi-proxy approach provides information about sediment source, transport dynamics and depositional processes.
Sandwiched between a mid-Pleistocene terrace and a beach ridge, the coastal lowlands at Shirasuka, are ideally situated to record evidence of typhoons and tsunamis. Sediment cores from the lowlands include seven potential extreme wave event deposits. Their age, roughly constrained from a radiocarbon chronology, is historical. However, since the radiocarbon plateau deteriorates the precision of radiocarbon dating, optically stimulated luminescence dating was tested at this site. Quartz, as the favoured mineral for dating young and potentially poorly bleached sediments failed due to low signal intensity, absence of a fast component, and sensitivity to IR stimulation. Instead, feldspar dating is applied, using a standard IR50 and the post-IR-IR130 protocol to account for both signal stability (anomalous fading) and bleachability of the relatively young age of the sediments (<1000 years). The promising feldspar luminescence properties revealed by both protocols may offer the potential to establish robust OSL ages for all seven recorded event deposits that, in the end, may help to refine the existing radiocarbon chronology.
Beside the establishment of a high-resolution OSL chronology, sedimentological, geochemical and microfaunal analyses allow a more detailed characterization of the event deposits. By applying the end-member modelling algorithm to grain-size data, as well as factor analysis and principle component analyses on sedimentological, geochemical and microfaunal data, discrimination between the sedimentary signatures of tsunamis and typhoon flooding will be achieved.
As a first result, four robust end-members allow the determination of sedimentation pattern of each event deposit. Based on granulometry and mineralogy of reference samples from different morphological features of the investigation area, the recent beach was identified as the major sediment source of the event deposits.