



The Fulong coastal area in northeast Taiwan: Late Holocene sedimentary phases including destruction and aggradation

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Coastal areas are often subject to rapid morphological transformations owing to varying processes such as sea level changes, tectonic uplift, and geomorphological changes by catastrophic storm events, followed by phases of resilience. The study sites in northeast Taiwan at Fulong beach and adjacent areas, situated close to a nuclear power plant construction site, give evidence of an aggradational phase, a destructive phase, and resilience by a second aggradational phase. According to OSL data, a first aeolian accumulation started on top of marine and peri-marine/fluvial sediments at about 3 ka and lasted about 1500 years, interrupted by one palaeosol. These data refer to an outcrop at a meander bluff at the southern bank of the Shuangsi river, not far from its present-day mouth. According to the morphological situation, this sand accumulation is only the remnant of a former greater dune system that has been eroded in its northern part. The former course of the Shuangsi and the location of its mouth are not known. The top of the outcrop is represented by two sand layers which are definitely younger than the lower sands as their deposition started about max. 630 years ago. The present-day dune system to the north of the river shows at least four dune ridges and the seaward aggradation is still continuing. The oldest dune ridge was sampled close to its top and dated to about 600 years ago (Dörschner et al. 2012).

About 3 km upstream, a sedimentary sequence at the river bank has been studied, comprising a lower silty deposit with organic remnants and layered tree trunks at its top. This deposit is considered to be of marine origin, probably a peri-marine situation. This fine-grained sediment is covered by coarse fluvial gravels, indicating one or several catastrophic events in this morphological environment. Above the gravels, another fine-grained sediment related to flood events with low energy has been found. Radiocarbon analyses of organic material in both fine-grained sediments yielded ages supporting the results from the coastline

The sedimentological records and the geomorphological situation give evidence of a short time period with one or several destructive events that destroyed an older dune system at the coast and may be linked to the deposition of the coarse gravels in the river profile. If the existing age estimates are interpreted in this sense, the time window for such an event is about 660 to 600 years ago.

The coast afterwards entered a phase of resilience: the new dune ridge system came into existence, and since then the process of a prograding coastline has been active and was supported by an uplift of about 2mm/a, which was calculated on the base of marine deposits found in two outcrops.

Dörschner, N., Reimann, T., Wenske, D., Lüthgens, C., Tsukamoto, S., Frechen, M., Böse, M., 2012: Reconstruction of the Holocene coastal development at Fulong Beach in northeastern Taiwan using optically stimulated luminescence (OSL) dating. *Quaternary International*, 263, 3-13.