Geophysical Research Abstracts
Vol. 17, EGU2015-15921, 2015
EGU General Assembly 2015

Optical dating of late Holocene storm surges from Schokland (Noordoostpolder, the Netherlands)

Don van den Biggelaar (1), Sjoerd Kluiving (1,2), Roland van Balen (3,4), Cronelils Kasse (3), Simon Troelstra (3), Maarten Prins (3), Jakob Wallinga (5), and Alice Versendaal (5)

(1) Institute for Geo- and Bioarchaeology, Faculty of Earth and Life Sciences, VU University Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, the Netherlands, (2) Department of Archaeology, Ancient History of Mediterranean Studies and Near Eastern Studies, Faculty of Arts, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, the Netherlands, (3) Cluster of Climate Change and Landscape Dynamics, Faculty of Earth and Life Sciences, VU University Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, the Netherlands, (4) TNO - Geological Survey of the Netherlands, Princetonlaan 6, 3584 CB Utrecht, the Netherlands, (5) Soil Geography and Landscape group & Netherlands Centre for Luminescence Dating, Wageningen University, PO Box 47, 6700 AA Wageningen, the Netherlands

Storm surges have a major impact on land use and human habitation in coastal regions. Our understanding of this impact can be improved by correlating long-term historical storm records with sedimentary evidence of storm surges, but so far few studies use such an approach. Here we present detailed geological and historical data on late Holocene storm surges from the former island Schokland, located in the northern part of Flevoland (central Netherlands).

During the late Holocene, Schokland transformed from a peat area that gradually inundated (∼1200 yr ago) via an island in a marine environment (∼400 yr ago) to a land-locked island in the reclaimed Province of Flevoland (∼70 yr ago). Deposits formed between 1200 and 70 year ago on lower parts of the island, consist of a stacked sequence of clay and sand layers, with the latter being deposited during storm surges.

We dated the sandy laminae of late Holocene storm surges in the clay deposit on Schokland to improve the age model of the island's flooding history during the last 1200 years. Samples for dating were obtained from a mechanical core at Schokland. The top of the peat underlying the clay and sand deposits was dated using 14C accelerator mass spectrometry (AMS) of terrestrial plant and seed material. Sandy intervals of the flood deposits were dated using a series of ten quartz OSL ages, which were obtained using state-of-the-art methods to deal with incomplete resetting of the OSL signal. These new dates, together with laboratory analyses on the clay deposit (thermogravimetric analysis, grain-size analyses, foraminifera, bivalves and ostracods) and a literature study show that storm surges had a major impact on both the sedimentary and the anthropogenic history of Schokland. The results show that the stacked clay sequence is younger than expected, indicating either an increasing sedimentation rate or reworking of the clay by storm surges. Furthermore, the results indicate that a correlation can be made between the sedimentary remains of late Holocene storm surges and several major storm surges mentioned in the historical sources that eroded parts of Schokland.