OSL dating of fine-grained quartz from Holocene Yangtze delta sediments - DTU Orbit (08/11/2017)

OSL dating of fine-grained quartz from Holocene Yangtze delta sediments

Holocene flood events in the Yangtze River are associated with variations in East Asian Summer Monsoon (EASM) precipitation, and so Yangtze delta sediments may preserve information about the frequency and magnitude of EASM precipitation. These flood/drought cycles of the EASM directly affect the living standards of East Asian population. However, despite its importance, little chronological control is available for the Yangtze Delta sediments; because biogenic carbonate only occurs sporadically, it has proved the difficulty to discuss sedimentation mechanisms and rates in any detail. In 2013 two sediment cores (YD13-G3 and H1) were taken from the Yangtze subaqueous delta to investigate precipitation history. In this study, we investigate the potential of quartz OSL dating of the fine silt fraction (fine-grained quartz; 4-11 μm) from these cores to estimate the depositional age of the sediments. We test whether: (1) Yangtze subaqueous delta sediments contain quartz with suitable characteristics for dating, and (2) quartz grains are well-bleached during/before the transportation process, by examining a modern analogue of suspended particulate matter, and by cross-checking with the doses derived from infrared stimulated luminescence (IRSL) signals (both IR_{50} and $pIRIR_{160}$) from feldspar in polymineral fine grains. We find that both the quartz and feldspar luminescence characteristics are satisfactory (quartz dose recovery ratio 1.067 ± 0.004; n = 250, $pIRIR_{160}$ dose recovery ratio 1.01 ± 0.02; n = 151). Modern suspended particulate matter has measured quartz equivalent doses between 0.1 and 0.2 Gy, suggesting that this material was sufficiently bleached during/before transportation to allow dating of Holocene sediments (mean dose rates of ~3 Gy ka^{-1}). OSL ages of 44 samples from the 2 cores show apparently rapid accumulation at ~6 ka between 9.65 and 5.50 m in core H1 and ~2 ka throughout core G3 and between 5.0 and 0.0 m in core H1. The $pIRIR_{160}$ signals suggest less light exposure of the core top sediments and of those from the transition layer between ~6 ka to ~2 ka, although there is no evidence for incomplete bleaching of quartz. The question remains as to whether significant deposition took place only at these two times, or whether the record has been disturbed by erosion/reworking.

General information

State: Published
Organisations: Center for Nuclear Technologies, Radiation Physics, University of Tokyo, Nanjing Normal University, Hokkaido University, Nanjing University, Aarhus University
Authors: Sugisaki, S. (Ekstern), Buylaert, J. (Intern), Murray, A. (Ekstern), Tada, R. (Ekstern), Zheng, H. (Ekstern), Ke, W. (Ekstern), Saito, K. (Ekstern), Chao, L. (Ekstern), Li, S. (Ekstern), Irino, T. (Ekstern)
Pages: 226-232
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information

Journal: Quaternary Geochronology
Volume: 30
Issue number: Part B
ISSN (Print): 1871-1014
Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 1

Scopus rating (2016): CiteScore 2.3 SJR 1.703 SNIP 0.949

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1

Scopus rating (2015): SJR 2.067 SNIP 1.336 CiteScore 3.22

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1

Scopus rating (2014): SJR 1.941 SNIP 1.227 CiteScore 2.86

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 2.439 SNIP 1.354 CiteScore 2.89

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 1

Scopus rating (2012): SJR 2.742 SNIP 1.865 CiteScore 3.77

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.493 SNIP 1.57 CiteScore 3.29
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.472 SNIP 1.651
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.939 SNIP 1.274
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.273 SNIP 1.049
Scopus rating (2007): SJR 0.866 SNIP 0.98
Original language: English
OSL, Yangtze delta, Holocene, Fine-grains, Quartz, Polymineral, IR50, pIRIR160, Quaternary
DOIs:
10.1016/j.quageo.2015.02.021
Publication: Research - peer-review › Journal article – Annual report year: 2015