

Optically stimulated luminescence dating back to 100ka and sedimentation rates of dark versus light layers in the Japan Basin

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Sediments in the Japan and Yamato Basins record millennial-scale changes in the East Asian Monsoon as alternations of dark and light layers. The gray-scale profile showing this millennial-scale variability has been correlated with the $d^{18}O$ record from Greenland ice cores (GISP2). However, this correlation between millennial and orbital scale changes becomes less certain during the last interglacial and the Holocene period, largely as a result of a paucity of biogenic carbonate used for ^{14}C and isotope stratigraphy; there is significant age uncertainty over this time period. We have used optically stimulated luminescence (OSL) dating of fine-grained detrital quartz (that are aeolian in origin) to provide high-resolution numerical age models for cores U1424C and U1425C drilled in the southeastern margin of the Japan Basin, and the Yamato Rise, during IODP Expedition 346.

We report our attempts to: 1) assess whether surface sediment of the cores are consistent with modern age; 2) test the reliability of OSL ages by comparison with tephra chronology and orbitally-tuned age models based on the correlation between the GRA record and the LR04 stack; 3) date cores U1424C and U1425C to construct a robust 120 ky age model with a resolution of 10 ky; and 4) conduct high-resolution dating of several pairs of dark and light layers to estimate short term changes in sedimentation rate, in particular over the last ~30 ky. We show OSL dating of fine aeolian silt in Japan Sea sediments shows great potential to establish independent numerical chronologies, and this is especially useful in cores where isotope stratigraphies and/or gray-scale signatures are poorly reconciled.

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