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Holocene Deposition History of the Backarc-Opening Lanyang Basin, northern Taiwan

Yu-Chang Chan (1) and Yu-Chung Hsieh (2)

(1) Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (yuchang@earth.sinica.edu.tw), (2) Central Geological Survey, Ministry of Economic Affairs, Taipei, Taiwan (hsiehyc@moeacgs.gov.tw)

The Okinawa Trough is an actively opening backarc basin and its southernmost tip is located in the Lanyang Basin in northern Taiwan. The triangular Lanyang Basin has well-preserved sedimentary records which provide opportunities for understanding the subsidence and sedimentary processes at the tip of the Okinawa Trough. To better examine the deposition and tectonic history of the Lanyang Basin, we analyzed data from 13 boreholes and used C14 dates to reconstruct basin sedimentary layers during the Holocene time. The borehole depths and their correspondent C14 ages are used to reconstruct the overall age models in the Lanyang Basin. The sedimentation rates from the borehole locations vary significantly from 0.5 to 2.0 cm/yr. Age models were fitted using quadratic equations instead of linear equations. The linear age models, although commonly used by previous studies, may not be desirable because most age distributions show decreasing sedimentation rates, particularly after 6 ky BP. Six boreholes show very good fit using quadratic equations in the age models and five boreholes, mostly located along the coastal areas, show relatively linear relations. Two other boreholes do not have enough C14 dates and the reconstructed age models are less reliable in the two locations. Contour maps of sedimentation rates, including 3, 6, 9 and 12 ky BP, are derived from the interpolated sedimentation rates through the quadratic age models for the 13 boreholes. Based on our 3D reconstruction of age models, the pattern of sedimentary layers in the Lanyang Basin can be simply explained by the basin shape and the propagation of sediment fronts during the Holocene time. It also avoids unwarranted inference of local faults or inaccurate estimates of subsidence rates in the backarc-opening environment.