New residence times of the Holocene reworked shells on the west coast of Bohai Bay, ChinaNew residence times of the Holocene reworked shells on the west coast of Bohai Bay, China

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Shelly cheniers and shell-rich beds found intercalated in near-shore marine muds and sandy sediments can be used to indicate the location of ancient shorelines, and help to estimate the height of sea level. However, dating the deposition of material within cheniers and shell-rich beds is not straightforward because much of this material is transported and re-worked, creating an unknown temporal off-set, i.e., the residence time, between the death of a shell and its subsequent entombment. To quantify the residence time during the Holocene on a section of the northern Chinese coastline a total 47 shelly subsamples were taken from 17 discrete layers identified on the west coast of Bohai Bay. This material was AMS ^{14}C dated and the calibrated ages were systematically compared.

The subsamples were categorized by type as articulated and disarticulated bivalves, gastropod shells, and undifferentiated shell-hash. It was found that within most individual layers the calibrated ages of the subsamples got younger relative to the amount of apparent post-mortem re-working the material had been subject to. For examples, the ^{14}C ages of the bivalve samples trended younger in this order: shell-hash →split shells →articulated shells. We propose that the younger subsample age determined within an individual layer will be the closest to the actual depositional age of the material dated. Using this approach at four Holocene sites we find residence times which range from 100 to 1260 cal yrs, with two average values of 600 cal yrs for the original ^{14}C dates older than 1 ka cal BP and 100 cal yrs for the original ^{14}C dates younger than 1 ka cal BP, respectively. Using this semi-empirical estimation of the shell residence times we have refined the existing chronology of the Holocene chenier ridges on the west coast of Bohai Bay.

Keywords: Reworked shells, Single layer, Residence time, Calibration, Coast of Bohai Bay

