

New ^{14}C ages of late Quaternary spring-discharge deposits in southern Arizona, USA using minute gastropods

JEFFREY S. PIGATI Department of Geosciences, University of Arizona, Tucson AZ 85721

JAY QUADE Department of Geosciences, University of Arizona, Tucson AZ 85721

TIMOTHY M. SHANAHAN Department of Geosciences, University of Arizona, Tucson AZ 85721

Radiocarbon ages derived from terrestrial mollusk shells are often anomalously old because many snails consume limestone and incorporate the “dead” carbon during shell formation. Numerous investigations, including the classic Goodfriend and Stipp (1983) study, have found that the magnitude of this anomaly is highly variable and can approach 3000 ^{14}C yrs. However, these studies have focused primarily on larger taxa and the observed ^{14}C deficiencies were thought to apply to all gastropods, large and small. Based on ^{14}C measurements of live-collected specimens, it appears that at least some minute gastropods (*Pupilla blandi*, *Euconulus fulvus*, *Succineidae*) yield reliable ^{14}C ages even when limestone and/or highly ^{14}C -deficient water is readily available.

In this study, we ^{14}C -dated minute gastropods to establish chronological constraints on the deposition of the Coro Marl, a late Pleistocene spring-fed marsh deposit exposed in discontinuous outcrops over a 150 km stretch of the San Pedro Valley in southern Arizona, USA. The marl is positioned ~15 m above the modern water table throughout the valley, and represents an interval of enhanced spring discharge and elevated water table conditions in what is now the junction between the Sonoran and Chihuahuan Deserts. The Coro Marl is somewhat unique in that, unlike most paleowetland deposits, it does not contain organic macrofossils (which are ideal for ^{14}C dating), and therefore it has not been possible to obtain reliable dates from the unit itself. Radiocarbon ages of minute gastropods recovered from the marl indicate that elevated water-table conditions were continually maintained in the San Pedro Valley between >38 and 13 ^{14}C kyrs ago. These results not only constrain the timing of wet conditions here, but also illustrate the potential utility of minute gastropods for ^{14}C dating Quaternary deposits.