

Radiocarbon

Late Holocene marine radiocarbon reservoir correction for the southern and eastern coasts of South Africa

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Abstract:

The marine reservoir effect is the difference in radiocarbon (^{14}C) between the atmosphere and the marine surface ocean. To overcome the dating errors induced, it is necessary to correct marine ^{14}C ages for this effect. ΔR is the difference between the marine ^{14}C age and the marine calibration curve based on an ocean-atmosphere box diffusion model, which accounts for the time delay in diffusion of carbon into the ocean from the atmosphere and biosphere. This global assessment, however, requires computation of a regional ΔR value for calibration to cater for studies based on a local scale. In this paper the marine reservoir effect is assessed for the southern and eastern coasts of South Africa using ^{14}C dating on pre-1950 marine shells of known age. The resultant ΔR values enable a more complete understanding of the marine reservoir effect along the southern and eastern coastal zone of South Africa. ^{14}C age determinations were conducted on 15 shell samples of known age and the results, combined with previously published values, were used to calculate regional marine reservoir correction values. The east coast has a weighted mean ΔR of 121 ± 16 ^{14}C yr, while the south coast has a weighted mean ΔR of 187 ± 18 ^{14}C yr.