

LATE HOLOCENE SEA-LEVEL CHANGES IN HAWAII AND THE PACIFIC AND THEIR IMPLICATIONS FOR UNDERSTANDING MODERN COASTAL CHANGES

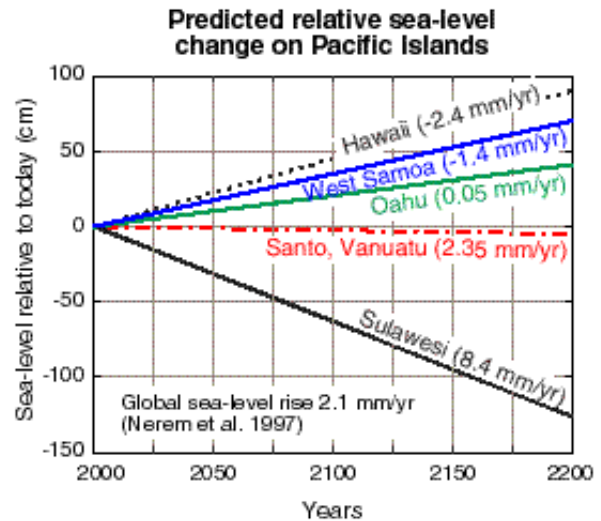
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ABSTRACT

Recent studies of coastal geology on Pacific Islands including Oahu and Kauai (Hawaii) show that sea level was 1-2 m higher than today between 1500 and 5000 years ago. Numerous low-lying coastal areas comprised of carbonate sands and reef terraces owe their existence to nearshore processes that shaped the coast during this recent sea-level highstand. Many of these coastlines face an undesirable fate of long-term erosion in an uncertain future of climate warming and sea-level rise next century. While global sea-level rise estimates range 1 - 3 mm/yr (0.4 - 1.2 in/decade), the rate of relative sea-level rise on individual Pacific Islands can be significantly different depending on whether uplift or subsidence characterizes island tectonics. Studies of fossil shorelines (reefs, beach complexes) and archaeological sites, once located at or

Figure 1. Because of differential land and sea movements, islands experience different rates of relative sea-level change. For example, while the Island of Hawaii will undergo submergence of nearly 50 cm by the year 2100, uplifting islands like Sulawesi will emerge and experience a sea-level fall of ~65 cm by 2100.



near mean sea level but now emerged above the sea, provide us with evidence of natural sea-level variability and island movements in the past. An improved understanding of past nearshore processes, including the maximum elevation and timing of the sea-

level highstand, and the rates of change over time, enables us to better predict changes we can expect in the future. We will show how fossil shoreline geology extends the record of historical sea-level change and coastal evolution back into the middle Holocene.

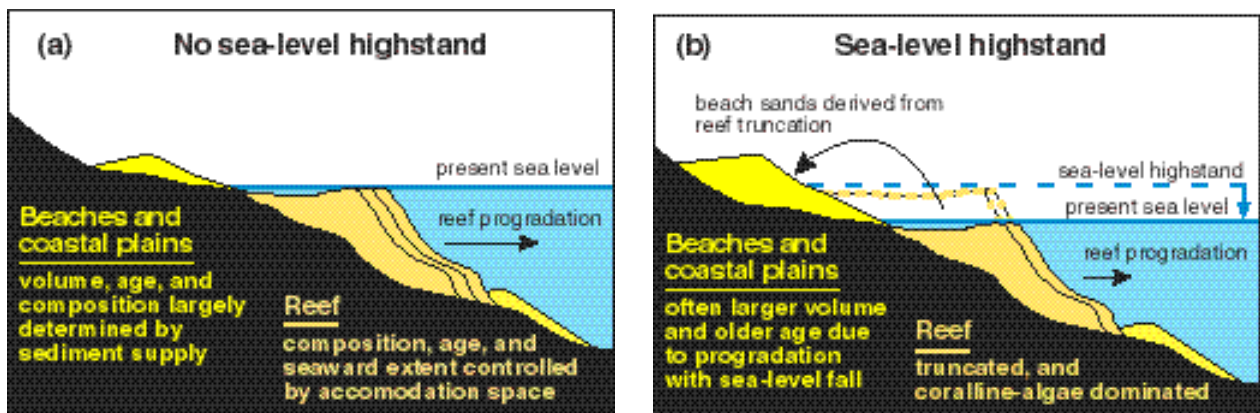


Figure 2. Different rates of relative sea-level change in the past have a pronounced influence on the evolution of coastal environments and reef growth. Important to many low-lying coastal communities today that are established on coastal plains, formed during a higher than present middle to late Holocene sea-level highstand, is a better knowledge of the natural rates of shoreline accretion and erosion in the past. With these data we can better predict future coastal change and better manage our coastal environments.