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What's up with Qatar? How eustasy and neotectonics influenced the late Pleistocene and Holocene sea-level history of Qatar

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The evolution of coastal plains, the present day shape, and surface hydrology of Qatar are related to changes in relative sea level. Several factors acting on different time scales have contributed to sea level changes. These include tectonism and glacioeustasy. The peninsula shape is the surface expression of the Qatar Arch, one of the largest structural features of the Arabian Plate. It plunges northward into the Zagros foredeep. The Arabian Gulf initially formed during the Tertiary period as a foreland basin due to the uplift of the Zagros Mountains.

Previous studies indicate the Arabian Gulf was an arid fluvial plain during the Last Glacial Maximum, 18,000 years before present (BP). The Gulf floor was a likely route for people migrating between Iran and Arabia. 14,000 years BP the sea level started rising, flooding the Gulf. The period between 14,000-7000 years BP was marked by a rapid rise (1 m/100 yr) driven by the melting of the polar ice caps. Age dating of Qatar coastal deposits indicate the rate of rise decreased as the sea level approached present day, 7000 years BP. Most coastal deposits are relicts of a Holocene sea-level highstand, dating from 7000-3000 years BP. Holocene beaches at 2-4 meter elevations and up to 15 km inland are relicts of this highstand. Similar beaches are found elsewhere along the Gulf. During this period coral reefs formed a discontinuous fringe around the windward and oblique Qatar coastlines. A drop of sea level approximately 2000 years BP may account for the demise of the fringing reefs.

The occurrence of Late Pleistocene to Miocene fluvial gravel deposits of the Hofuf Formation 20 to 40 meters above sea level are interpreted as being related to long-term tectonic uplift, the evolution of the Zagros foredeep and structural tilting of the Arabian plate. Pleistocene shoreline deposits above present sea level dating from 30,000-40,000 years BP are interpreted as part of the same structural flexural event.

Thus, data from Pleistocene to present suggest that the sea-level history of Qatar reflects relatively high frequency changes driven by eustasy superimposed on a long-term pattern of tectonic uplift.