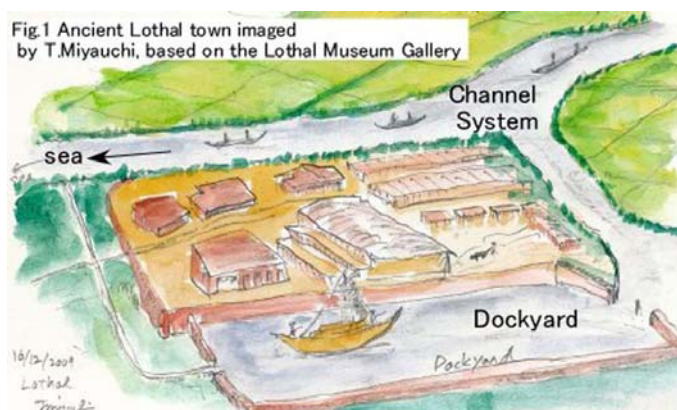


Late Holocene coastal environmental change affecting the mutation of bay-facing Harappan sites in the Indus civilization

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The Indus civilization is one of the four great ancient civilizations, which developed around the Indus River and along the northern coastal area of Arabian Sea ca.8500 to 3300 years ago. This age is geologically called Holocene which is characterized by global environmental changes demonstrated by glacio-eustatic sea level rise and transgression after the last glacial termination. Therefore, the mature of bay-facing Harappan sites was significantly



influenced by vertical sea level changes and horizontal shifts of coastlines. We inspected late Quaternary geomorphic developments and their related to relative sea level change around two representative sites, Lothal site and Kanmer site in Gjarat, India, analyzing geological data and Corona satellite images. The obtained results indicated the clear influence of geomorphic environmental change in coastal plains to the mutation of Indus civilization.

The Lothal site (ca.2500-1900 B.C.) is in the Cambay coastal plain which is characterized by geomorphic configuration of present and emerged tidal mud flats locally overlain by flood plains. Two marine terraces (MT1 and MT2) composed of emerged tidal flats are elevated in 15m and 10m. MT1 is assigned to MIS5 stage and MT2 to MIS1 stage (Prasad and Gupta, 1999). The settlement town, 12 m in elevation, is exactly founded on the artificial mound of flood plain over MT2-forming marine sediments. This geomorphological condition and the dockyard adjacent to the town imply that ancient Lothal town had located and developed with marine trading by shipping transportation, using the surrounding channel system (Fig.1). As successive relative sea level fall and regression occurred afterward, shipping became impossible at high tide and Lothal likely declined.

The Kanmer site several thousands years B.C. is situated on the cuesta mound (32m in elevation) about 7 km inland from the Little Rann which is a brackish marsh, especially sea-water invaded in summer wet season. Even though mid Holocene transgression reached to inland further than the present coastline of the Rann, shipping transportation was probably difficult due to relative steep river profile and horizontal distance of about 5 km from Kanmer and the mid Holocene coastline. Then land and shipping transportation was probably together. As the Rann was reduced by successive marine regression, the distance by land transportation increased and shipping trade decayed gradually. Thus, ancient Kanmer town might have been finally abandoned. We need to examine this hypothesis by further geological survey to identify mid Holocene coastline and its related sediments exactly.

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