Chilka Lagoon is the largest brackish water lagoon in Asia. Mangroves are halophytic plants that grow on the shoreline and migrate landward and seaward with respect to transgression or regression; hence they are considered important sea-level indicators. Pollen analysis of mangrove sediments act as good indicators of sea-level fluctuations and for palaeoclimatic interpretations. Mangrove ecosystem dynamics in the Chilka Lagoon during the Holocene were studied through pollen analysis of a sediment core. The palynological investigation of the 360 cm deep core collected from the northeastern region of the lagoon indicates the dominance of mangroves between 9,380 to 5,450 cal yrs B.P. This can be attributed to high precipitation and humidity, as a result of which the mangrove forest had well established following sea-level stabilization. Thereafter, between 5,450 to 2,310 cal yrs B.P., a gradual decline of mangroves and sudden spurt in the midland taxa has been observed probably due to relatively dry climate. The reappearance of mangroves at the study site occurred for a short time span with a return of brackish water estuarine environment for the reflorescing of mangrove taxa. Around 1,970 cal yrs B.P., a major shift in the vegetational pattern has been noticed; midland and freshwater taxa have replaced the mangroves from the site. This can mainly be attributed to environmental factors resulting due to topographical changes leading to imbalances in fresh-marine water interface. During the later phase, the continuity of mangrove development and dynamics in the lagoon was interrupted by fluctuating sea-levels.

*Keywords*: Mangrove, palynology, Holocene, palaeoclimate, sea-level fluctuations.