

barriers to migrate over the backbarrier muds, further exacerbating the compaction. Penland et al. (1985) predict that at present rates of sea level rise, the Chandelieu Islands and Isles Dernieres will be lost during the next 100 years. Because the loading in this region is naturally-induced and the affected area so large, the only functional remedial measure would be to remove the levees in the delta region in hopes of restoring the sediment supply and deposition rate. Although proven successful on a local scale, this is not a cost-effective nor practical solution on a regional basis.

Terminal Island, California - This classic example of the increase in relative sea level due to man-induced subsidence demonstrates many of the possible consequences of natural sea level rise. Due to withdrawal of oil and gas from the Wilmington Oil Field, an area 5 km wide and 6.5 km long subsided an average of about 1.5 m, and encompassed Terminal Island and a portion of Long Beach, California. In some areas the overall subsidence reached 7 m and resulted in considerable damage to harbor facilities as relative sea level rose. This damage required substantial remedial efforts including diking in areas of extreme subsidence, reconstruction of damaged facilities, and bridge repair. The compaction was arrested by injecting water into several of the existing wells in order to maintain pore pressure as the production wells continued operation. It should be stressed that the rate of increase in relative sea level in this instance was much greater than any expected rates due to eustatic or neotectonic changes.

Japan - Several regions of Japan have experienced large rates of subsidence due to compaction, generally caused by overpumping of groundwater. Ground elevations in Niigata Prefecture and the cities of Osaka and Tokyo have dropped as much as 4 m in the past 40 years, sometimes reaching rates as high as 16 cm/yr (Takeuchi et al., 1970). Fig. 3.3 displays the isolines of the total amount of land subsidence in Osaka from 1935 to 1968. The subsidence is greatest near the coast (280 cm) and small (40 cm) in the hilly region in the center of the city where the compactible stratum is thin. Fig. 3.4a displays monthly measurements of groundwater elevation and Fig. 3.4b shows the corresponding monthly rates of compaction. The two are clearly correlated. The period where subsidence stopped is due to destruction of the city during the bombing of World War II when pumping of groundwater ceased. The installation of an industrial water system and the reduction in pumping