

year periods, then averaging over the two ends of the resulting data to obtain a change in sea level from which the rate is determined. The results are presented regionally and on a global basis. The effects of glacio-eustatic adjustment to the last ice age are very apparent in the data with relative sea level (RSL) rising and lowering in most low and high latitudes, respectively. The possible effects of earthquakes in causing sudden displacements and altering the trend after the earthquake are illustrated. As an example, the tide gage at Messina, Italy recorded an abrupt increase in RSL of 57 cm during the earthquake of 1908. Anthropogenic effects, primarily the extraction of water and hydrocarbons, causing compaction are noted with Venice, Italy particularly evident as a consequence of ground water pumping. In attempting to infer global rates from the available data, it is noted that if the earth is divided into 30° latitude and longitude sectors, a total of 72 compartments result of which 71 have marine coasts. The data distribution in these compartments is very non-uniform. Most of the tide gages (70%) are situated in only 4 compartments whereas there are no data in 70% of the compartments. Long-term tide gage data in the southern hemisphere are particularly sparse with over 97% of the stations examined by Pirazzoli in the northern hemisphere. Without the assumption that the results from the northern hemisphere are globally representative, the available data are clearly inadequate. Fig. 2.3 presents a distribution of the tide gage locations according to the longitude-latitude compartments noted earlier. Fig. 2.4, also from Pirazzoli, presents the distribution of tide gages and median trend of RSL by 5° increments of latitude. The earlier noted effect of relative rises in the mid-latitudes and lowering RSL in the higher latitudes is evident.

Pirazzoli concludes that the results presented by most investigators ($\ll 1$ mm/yr) probably are an overestimation of the ESLR. Local and regional factors including tectonic movements and oceanic factors are generally larger than eustatic factors. The bias due to downwarping as a result of loading of the continental shelves by sediment transport and deposition is noted. Finally, when centimeter accuracy is attainable from satellite altimetry, the potential to contour the open ocean is regarded as a major advance in our general knowledge of eustatic sea level rise rates which have both good geographic coverage and are free from much of the contamination which attends measurements of tide gages located along the coastline.