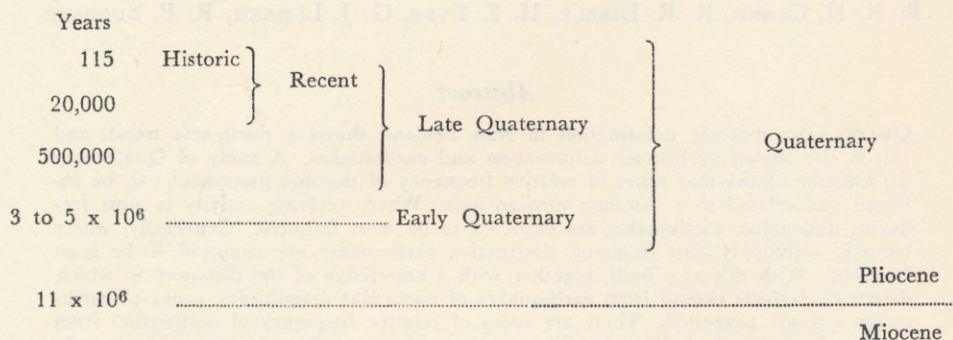


Given sufficient time, major earthquakes can occur anywhere; but some areas have earthquakes more frequently than others, and some have virtually none. Calculated risks are inherent in any zoning scheme anywhere, and these risks should be assessed in terms of probability of destruction from major earthquakes within a given period of time.

GEOLOGICAL SETTING FOR LATE QUATERNARY TECTONIC MOVEMENT

In the following discussion various periods of geological time are referred to, and these are listed below. The lengths of time involved are not known exactly but the orders of magnitude are likely to be correct.



The most seismically active regions of the earth are in belts of late Tertiary and Quaternary deformation, and one of these belts runs through New Zealand. The tectonic activity of which the present day earthquakes are a manifestation is not a new phase, but continues from the geologic past.

Pliocene and Early Quaternary sediments were originally deposited almost horizontally and the present dips (angles of slope) of their bedding planes register the sum of the tectonic movements since deposition. Figure 1, on which the dips are shown, indicates the long term tectonic setting in which the Late Quaternary deformation has taken place. This figure shows angles of dips, averaged where many observations are available, of Early Quaternary and Pliocene beds, and is compiled from New Zealand Geological Survey records.

The absence of observations in substantial areas of Figure 1 results from the absence of preserved Pliocene and Early Quaternary deposits that would have registered deformation within these areas. The only one of these which can be reasonably inferred not to have suffered deformation in the Pliocene and Early Quaternary is North Auckland. North of where observations are recorded on Fig. 1, strata even older than Pliocene are not deformed. Thus, two broad Quaternary tectonic regions can be distinguished:

(a) The North Auckland Peninsula. This region has not experienced measurable deformation since the Miocene, and apart from local volcanic activity, appears to have been substantially stable during the Quaternary.

(b) The "Quaternary Tectonic Zone". This comprises the remainder of the country. Its north-west limit can be fairly closely defined from the mouth of the Waikato River through the Hauraki Gulf, but the south-east limit lies beyond the New Zealand coast.