

TSUNAMIITE SEDIMENTOLOGY AND STUDIES OF TECTONICS IN GEOHISTORY

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Tsunamiite sedimentology provides valuable information about local and global geotectonic history, together with tsunami-induced and seismic disaster prevention. Recently, the study of modern tsunamiites has developed rapidly with marked success. Furthermore, its achievements are going to become one of central attraction in geosciences. For instance, several "trench-type earthquakes in historical, archaeological and the Quaternary geologic time, which have not been documented, were newly recognized based on studies in coastal plains and sedimentary core investigation in ponds near the sea side of the Pacific and Japan Sea. Also, the cyclicity and recurrence time of earthquakes have been better examined.

Because of the rare chance of preservation, however, more ancient geological coastal tsunamiites do not reveal sufficient records of seismicity. To the contrary, general high preservation potential of submarine tsunamiites is to be noted. There is some difficulty, however, in reading sedimentary records of submarine tsunamiites, because of the lack of scientific data of tsunami wave and tsunami-induced currents just above the sea floor.

The Miocene seismic Tsubutegaura tsunamiites in Japan (i.e. Shiki & Yamazaki, 1996) and homogenites in the eastern Mediterranean of the Bronze Age (i.e., Cita *et al.*, 1996) provide successful examples of deep-sea tsunamiites studies.

Several important features of submarine tsunamiites are to be noted. For instance:

- Tsunamiites can be found in areas of very different environmental situations.
- Popular misunderstandings about tsunamiites are that tsunamiites develop anywhere in the sedimentary basin and occupy very broad area. It is to be noted that high energy results in violent erosion together with a lot of deposition.
- Tined, or multiple, alternated bedding by currents of two opposite or different direction are very positive, but not decisive, records of going and returning of tsunami waves.
- Rip-up clasts of originally soft muddy sediments, being "giant" in some cases, reveal peculiar nature of tsunami waves.

It is wonderful that the study of the Tsubutegaura Tsunamiites is going to clarify successfully specific fault activities and "high frequency seismic periods" of different orders in the Miocene time related to the Japan Sea opening.