CHAPTER-III

METHODOLOGY AND DATABASE

3.1 Introduction

To fulfill the research objective/s, the study was carried out mainly through extensive field work which is an integral part of any geological investigation. The ultimate results and conclusions depend primarily on the methods of investigation. So, it is always necessary to be careful while doing the field work and the procedures to be adopted. The whole study was conducted in three phases, viz, pre-field work, field work and post field work phase.

3.2 Methodology

The various steps followed during the present study are briefly described below. However, the detail methodologies are discussed in respective chapters.

(i) A base map of the study area has been prepared by using the Survey of India toposheets. Satellite images of Landsat (MSS, TM and ETM+), and SRTM digital elevation model (DEM) data were interpreted in consultation with various published research articles and documents to delineate the structural features viz. fault, thrust, lineament and structural trend lines of the lithological units.
Geomorphological mapping of the area have been carried out along with the geological structures to identify the neotectonic activities in the area. From these suitable sites for the palaeoseismological study have been identified.

(ii) Various secondary data have been collected from different sources and analytical methods published in standard book and journals are adopted in the present study.

(iii) The field work was carried out during several winter seasons to trench in the selected sites to locate the seismites. Detail logging have been done along the profiles. Samples have been collected for TL/OSL and $^{14}$C dating following standard procedures outlined for the purpose by various dating laboratories.

(iv) Sketch, diagrams have been prepared and photographs of important features were taken. Measurements of liquefaction features, attitudes of the structures have been recorded in the field.

(v) Disturbed samples were collected in polythene bags and undisturbed samples were collected in polyvinyl tubes.

(vi) Textural analysis of the sediments has been done in the laboratory following sieve and pipette methods.

(vii) The seismites have been dated using TL/OSL and carbon dating methods.
3.2.1 Pre-field

To identify the sites for palaeoseismological investigation, a detailed base map of the study area was prepared using the Survey of India toposheets. In addition remotely sensed data and SRTM data were used to delineate the structural features like fault, lineament, trend line, lithology etc.

Various secondary data have been collected from different sources and analytical methods published in standard books and journals are adopted for the analysis.

3.2.2 During fieldwork

Samples were collected from different parts of the seismite section with utmost care to avoid mixing from other horizons. The collection of sample was done with a PVC pipe of one and half inch diameter. At first, the area was unearthed on one side. For this, a trench was made to expose the section. After this, necessary care has been taken for selecting the right sample. Then a small piece of PVC pipe was pushed inside the area and the right part of the sample was taken out for TL dating purpose. After that, again a necessary amount of sample was taken out for sedimentological study. The section is photographed and representative sketches have been prepared.
3.2.3 Post-field

The collected samples were carefully brought to the laboratory. The samples collected for TL dating were taken to the Thermo-luminescence dating laboratory at the Department of Physics, Manipur University and Wadia Institute of Himalayan Geology. The details of samples preparation and investigation for TL Dating of the samples has been discussed in Chapter V.

The other part of the collected samples for sedimentological study was brought to the sedimentological laboratory at the Department of Geological Sciences, Gauhati University for mechanical analysis. Mechanical analysis is a process by which the relative proportions of the particles of various sizes in the sediment are determined. In the laboratory, mechanical analysis of the sediment is done systematically by the composite sieve and pipette method, after Krunbein and Pettijohn (1938). The method is governed by the following principles and theories of their operation-

(i) Desegregation of samples into individual grains.
(ii) selective of grade scale
(iii) setting velocities of the particles and
(iv) dispersion and coagulation of suspension

The details of sedimentological investigation of the samples are described in separate chapter