CHAPTER 2
REVIEW OF LITERATURE

2.1. INTRODUCTION

The review of literature is a pre-requisite aspect of every well defined research which not only enhances our knowledge but also help to bridging the gap of our understanding on the selected research topic. As mentioned earlier, the present research work is an attempt to address the issue of Pan - Gondwanic reconstruction on the basis of thermo - chronological study of high grade rocks around the Umpyrtha - Patharkhammah region in the central part of the Shillong Plateau. The concept of the Gondwana assembly and break up has been an important but controversial topic since the days of Wegener's discovery of continental drift theory. However, with the advent of precise dating technology, presently, many high grade terrains across the world can provide geochronological and petrological implications to constrain different models for correlation and connection, among the dispersed fragments of the Gondwana supercontinent and also to understand the evolution of Gondwana earth system through time. The relevant scientific contributions in national and international levels, which offered an idea on selection of the present research topic, are presented in the following pages.

2.2. PREVIOUS LITERATURE ON THE SHILLONG PLATEAU

Barring a few unpublished records of the Geological Survey of India, there is no published literature with regards to the area under investigation. Compared to other parts of India, published works on the Precambrian rocks of the Shillong Plateau is relatively rare. However, the geological information on the Northeast India, especially the Shillong Plateau, is known from several geologists (viz., Oldham, 1858; Dasgupta, 1934; Pascoe, 1950; Mazumdar, 1976; Murthy et al., 1976; Lal et al., 1978). Mazumdar (1976) and Murthy et al. (1976) summarized the stratigraphic succession of the Shillong Plateau while the structure and deformational history of western and eastern part of the plateau was reported by Bardoloi et al., (1994) and Mazumdar et al., (1997) respectively. On the basis of modern petrology, detailed petrological study on the Precambrian rocks of Sonapahar area in Meghalaya, was reported by Lal et al., (1978).
Several workers (Crawford, 1969; Van Breeman et al., 1989; Ghosh et al., 1991; Ghosh et al., 2005, Yin et al., 2010) determined the age of granite plutons, albeit elsewhere in the Shillong Plateau. It is important to mention that there was no available report on radiometric age from the Shillong Plateau prior to Chatterjee et al. (2007) which reported for the first time, the chemical age data on high grade metapelites from Sonapahar and Garo-Goalpara areas. However, new age data of the Shillong Plateau is known from the recent works of Maibam and Deomurari (2007) and Chatterjee et al. (2011). Recently, Kumar et al. (2017) determined the age of granite gneiss and granite from several areas in the Shillong Plateau and Mikir Hills on the basis of U-Pb SHRIMP zircon geochronology.

2.3. PROBLEM SPECIFIC LITERATURE SURVEY

The global scale reconstruction of the Gondwanaland has attracted several geoscientists across the world including Indian subcontinent, (viz. Zhao et al., 1995; Liu et al., 2006; Boger et al., 2001; Harley, 2003; Fitzsimons, 2000, 2003; Chatterjee et al., 2007, 2011; Kelsey et al., 2008; Clark and Subbarao, 1971; Shaw et al., 1997). All these authors attempted to propose a model for global scale reconstruction of Gondwana supercontinent. In recent attempts at Pan-Gondwanic reconstruction, several researchers (Fitzsimons, 2000; Boger et al., 2001; Harley, 2003) have emphasized the close temporal relationship and evolutionary history between the granulites of the Eastern Ghats (EGB), and the middle to late-Mesoproterozoic (Grenvillian, ~1 Ga) granulites of East Antarctica and western Australia. In fact, a Pan-African suture separating the Meso/Neoproterozoic and the Archean/Palaeoproterozoic crustal domains passing through the Prydz Bay has been proposed by Boger et al., (2001). However extension of the suture in CGC is somewhat cloudy. Maji et al. (2008) ruled out the existence of suspected continuation of the Early Cambrian Prydz Bay suture within the CGC due to the lack of Early Paleozoic ages. Chatterjee et al. (2007) demonstrated the extension of the Pan-African suture in between Sonapahar and Garo Goalpara region in the Shillong Plateau. According to Chatterjee et al., (2011) the western part (the Garo-Goalpara region) of the Gneissic Complex of the Shillong plateau resembles the Eastern Indian Tectonic Zone (EITZ)
while Late Cambrian metamorphism, felsic magmatism and deformation in the central part may be correlated with the Pan-African collision between Indian plate and Australo-Antarctic plate during the assembly of East Gondwana, consistent with paleogeographic reconstruction based on paleomagnetic data. Research contributions of Torsvik et al. (2001a, 2001b, 2008), Powell and Pisarevsky (2002), Collins and Pisarevsky (2005), Gregory et al. (2009), and Pradhan et al. (2010) support a Pan-African collision as mentioned above. The work of Zhao et al. (1995), Boger et al. (2001), Fitzsimons (2003) and Kelsey et al., (2008) further support Pan-African tectonism and suturing of older crustal areas.

2.4. DISCUSSION

The present review shows that the issue of global scale reconstruction of Gondwana supercontinent has been well addressed in several countries as well as the different Proterozoic crustal domains in India. This information was lacking in the entire northeastern India, particularly, in the Shillong Plateau, prior to the publication of Chatterjee et al., (2007). Based on recent thermo-chronological data from Sonapahar and Garo Goalpara areas, Chatterjee et al., 2007 argued the existence of northward extension of the Prydz Bay suture which was passing through the Shillong Plateau.