

U-Pb detrital zircon age dating from the Aileu Formation of Timor-Leste; Estimate depositional age and provenance of the sediment

*Jovita Elisa Fatima da Costa¹, Shoichi Kiyokawa¹, Yukiyasu Tsutsumi²

1. Kyushu University, 2. National Museum of Nature and Science

The Aileu Formation is a part of allochthonous metamorphic complexes distributed a 110km long and 40 km wide in Timor-Leste. It occupies most of the north-west of Timor-Leste and crops out along the north coast from Manatutu to the West Timor border and passing through to the south (Audley Charles, 1968). It is considerable lithological variation and metamorphic grade varies between lower greenschist to upper amphibolite facies (Beery and Grady, 1981). Our research area is affected by greenschist metamorphism and comprises an extensive succession of mostly terrigenous metasedimentary rock. The previous study of the north coast suggests that detrital zircon U-Pb from metasandstone, shows three groups at 270-440Ma, 860-1240, and 1480-1870Ma, and the metamorphic age also identified by $^{40}\text{Ar}/^{39}\text{Ar}$ of hornblende cooling ages of 10–6 Ma (Elly et al, (2014)). The Aileu Formation contain east-west foliation and north-south widely distributed. However, it's not a well-known south area of metasedimentary origin and depositional age. This study, we collect 3 samples of meta-sandstone transect north-south about 20 km wide. We analyzed U-Pb detrital zircon by using LA-ICP-MS.

Petrographically the 3 samples composed majorities of fine, fine medium grain of quartz-rich sandstone weakly deform and foliated. The three samples composed less than 2% muscovite, biotite, plagioclase, and another accessory mineral include zircon. Texturally immature characterized by sub-angular to sub-rounded and fresh of mica. These three samples are almost consisting of the same morphological characteristic of zircon grain.

The U-Pb age distribution of detrital zircon result from the concordant dataset reflected similar characteristic for all three samples and shows 270-420 Ma 900-1300Ma and 1400-1900 Ma. Grain younger than 270 Ma and older than 1900 Ma makes up 4% of the population. The most significant age peak, at 283-290 Ma indicated that the distribution of sediment coming from early Permian source rocks. The youngest zircon and main peaks are 239.87 Ma and 283-290 Ma, we consider this for maximum deposition age in the south which is the same as the north area. We suggest that the Sedimentation age of the south area of Aileu Formation after middle Triassic. These age from the previous study (north coast) and this study (north-south) shows the similarity characteristic for all samples. The Aileu Formation might be formed a fold and thrust belt and resemble sequences stacked north to south. Source sediment for Aileu Formation is compatible with a sediment source located in South East Asia as part of the now fragmented Sula Spur (Ely 2014). Sula spur is containing a Paleozoic granite and metamorphic basement which is extending from west of New Guinee and include the Bangai and Sula island.

Keywords: U/Pb Age of detrital zircon, Aileu Formation , Metasandstone