Search for the ejecta deposits of the 0.79 Ma impact (source of Australasian tektite) in NE Thailand

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Impacts of extraterrestrial bodies can cause catastrophic effects on Earth's environment. For example, the Cretaceous-Paleogene mass extinction event was accepted to be caused by the impact of an asteroid of ca. 10 km in diameter (Alvarez et al., 1980; Schulte et al., 2010). A large extraterrestrial impact produces a crater and spreads pulverized, melted, and vaporized rock over large areas forming an ejecta layer. The morphology and the size of the impact crater and the distribution pattern of the ejecta depend on the size, velocity, and angle of the impacting body. Therefore, a crater and an ejecta layer provide information on the nature of the impact event (Melosh, 2011; French, 1998). Ejecta deposits contain shock indicater such as tektite and shocked quartz. Tektites are spherical glassy droplets solidified from the melt of the target rock formed by impact events (Glass and Simonson, 2012; McCall, 2001). Tektites are reported from 4 limited areas called strewn fields and the source craters for 3 out of 4 strewn fields were discovered. The exception is Australasian tektite strewn field, the largest and the youngest strewn field among the four, whose source crater is not yet discovered although its location is estimated as in the east part of Indochina Peninsula (Glass and Koeberl, 2006; Ma et al., 2004; Prasad et al., 2007; Schnetzler, 1992). Consequently, the nature of this large impact event (the size of the source crater is estimated as about 40 km in diameter by Glass and Koeberl (2006)) is not well understood. Although microtektite layers were identified at many marine sites, the ejecta layer has never been identified on land.This is one of the reasons why the source crater has not been found. There are several sites where Australasian tektites are reported from a reddish brown gravel layer called "laterite" layer or the base of the overlying muddy sand layer in NE Thailand (Fiske et al., 1996, 1999; Songtham et al., 2011, 2012; Tamura, 1992). However, the presence of tektite (and/or shocked quartz) is not enough to identify the ejecta deposit because of the possibility of re-deposition (Fiske et al., 1996; Koeberl and Glass, 2000; Langbroek, 2015).Size distribution analysis, petrographic observation and chemical composition analysis of spherical grains were conducted on samples obtained from the basal gravel layer under the "laterite" layer, the "laterite" layer and the muddy sand layer that overlies the "laterite" layer at Krahad and Kok Yai sections in NE Thailand to explore the evidence of impact.The preliminary result of examination will be presented at the meeting.

Keywords: extraterrestrial impact, Australasian tektite, Shocked quartz

