

Paleomagnetic re-examination of ca. 3.46 Ga dacite in the Pilbara Craton: a positive field test?

*Yoichi Usui¹, Manabu Nishizawa¹, Masafumi Saitoh¹, Kenichiro Tani², Takazo Shibuya¹, Tomoyo Okumura¹

1.Japan Agency for Marine-Earth Science and Technology, 2.National Museum of Nature and Science

Dacite and basalt from the Duffer Formation in the Pilbara Craton were used in a positive fold test for ca. 3.46 Ga remanence (McElhinny and Sananayake, 1980). This has been the oldest paleomagnetic field test, only tied by recent conglomerate tests from the Barberton Greenstone Belt (Usui et al., 2009; Biggin et al., 2011). However, the reliability of the fold test was questioned because of the potentially complex deformation in the area. To better understand the remanence of the Duffer Formation, we conducted paleomagnetic study on dacitic agglomerates apparently overlying the dacite lava. Typically, agglomerates yielded three remanence components, similarly to the lavas measured by McElhinny and Sananayake (1980). However, the so-called "magnetite component", which was reported to pass the fold test, and the "hematite component", which did not pass the fold test, both revealed directional difference between the agglomerates and the lavas. On the other hand, multiple clasts taken from single outcrops yielded different directions. This possibly reflects relatively low temperature deposition of the agglomerates and effectively forms a positive conglomerate test. Alternatively, the clasts may be remagnetized to various extents. Further rock magnetic investigation is necessary to distinguish these two possibilities.

Keywords: Archean, paleomagnetism