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Paleomagnetic intensity of Aso pyroclastic flows: Additional results with LTD-DHT Shaw method, Thellier method with pTRM

Toru Maruuchi[1*], Hidetoshi Shibuya[1], Nobutatsu Mochizuki[2]

[1]Department of Earth Sci., Kumamoto Univ., [2]Pri., Org., Inn., & Exc., Kumamoto Univ.

For the sake to calibrate the absolute value of the relative paleointensity (RPI) variation curve drawn from sediment cores, Takai et al. (2002) proposed to use pyroclastic ?ows co-bearing with wide spread tephras. The pyroclastic ?ow deposites (welded tuffs) prepare volcanic rocks with TRM, which let us determine absolute paleointensity, and the tephras prepare the correlation with sediment stratigraphy. While 4 out of 6 welded tuffs are consistent with Sint-800 paleointensity variation curve, two welded tuff, Aso-2 and Aso-4, show weaker and stronger than Sint-800 beyond the error, respectively.
At the last JpGU Meeting, We revisited the paleointensity study of Aso-2 and Aso-4 welded tuffs, adding LTD- DHT Shaw method, the pTRM-tail check in Thellier experiment. This time, we reevaluate the paleointensities of Aso pyroclastic flows (Aso-1, -2, -3, -4) by applying LTD-DHT Shaw method to volcanic glass shards included in Aso-1, -2, and -4 welded tuffs, and as well as whole rock samoles from Aso-1, Aso-3 welded tuffs.
We prepared 17 samples (these contain 4 volcanic glass shard samples) from 3 sites of Aso-1 welded tuff for LTD-DHT Shaw method experiments, and obtained 9 paleointensities (these contain 3 volcanic glass shard samples) satisfied a set of strict criteria. They yield an average paleointensity of 21.3 +/- 5.8 (an mean paleointensity of volcaniic glass is 19.4 +/- 3.5) uT, which is smaller than 31.0 +/- 3.4uT provided by Takai et al. (2002).
For Aso-2 welded tuff, 8 volcanic glass shard samples from 3 sites were submitted to LTD-DHT Shaw method, and 2 passed the set of criteria. They give an average paleointensity of 21.1 +/- 2.5 uT, which is virtually identical to 20.2 +/- 1.0uT (27 samples) given by Takai et al. (2002).
For Aso-3 welded tuff, we performed LTD-DHT Shaw method for 5 samples from one site. It gives a average paleointensity of 50.5 +/- 8.9 uT, which is higher than 31.8 +/- 3.6 uT given by Takai et al. (2002). But we need to perform more experiments because the Aso-3 paleointensities determined in this study are scattered.
Three sites were set for Aso-4 volcanic glass shards, and 8 samples were submitted to LTD-DHT Shaw method. Two samples from one site passed the same criteria, and yield a mean paleointensity of 33.0 +/- 2.3 uT. Although it is smaller than Thellier results, it is larger than the Sint-800 at the time of Aso-4.
Aso-1 result in this study is more consistent with the Sint-800 at that time than Takai et al. (200 2). But for Aso-2 and Aso-4, their new reliable paleointensity results suggest that the discrepancy from the Sint-800 is not attributed to the experimental problems.
On the other hand, the study of the RPI variation curve have advanced, and Channel et al. (2009) constructed new RPI variation curve (PISO-1500). We compare the paleointensities of our study with the PISO-1500. As a result, the paleointensity of Aso-4 are also consistent with PISO-1500 within the standard error in addition to Aso-1, Aso-3. These results support the PISO-1500. However, the problem of the discrepancy for Aso-2 record still remain.

Keywords: paleointensity, pyroclastic flow, tephra, Sint-800, PISO-1500, volcanic glass