

# Evolution of Akan Caldera, East Hokkaido, indicated by analysis of lithic fragments in pumice fall deposits

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Akan Caldera, East Hokkaido, Japan, shows a rectangular shape, 24\*13 km in diameter. The caldera was formed by at least 18 eruptions producing large-volume pyroclastic flows and plinian falls during 1.2Ma~0.15Ma (Ak-1~Ak-18 in descending order: Hasegawa et al., 2004). Because their sources are covered by later volcanism and it is difficult to draw isopach maps due to poor exposure, their detailed source regions have not been determined. Based on component analysis of lithic fragments and glass chemistry of obsidians in pumice fall deposits, we can determine the source regions of Ak-1~ Ak-10 (0.5Ma~0.15Ma) pumice fall deposits.

The dominant lithic in Ak-1 and Ak-2 is altered rock (more than 90wt.%). Diorite is characteristically recognized in Ak-1 and Ak-2. Lithic fragments in Ak-3~Ak-5 are altered rock (ca. 40wt.%), dacite (20-36wt.%), andesite (16-27wt.%) and basalt (6-8wt.%). On the other hand, those in Ak-6~Ak-10 are andesite (40-45wt.%), altered rock (39-44wt.%), dacite (4-9wt.%) and minor amount of basalt (less than 3wt.%). We grouped Ak-1~Ak-10 into three groups: group A (Ak-1 and Ak-2), group B (Ak-3~Ak-5) and group C (Ak-6~Ak-10). The differences in lithic component proportions between group A~ group C suggest that three groups were derived from distinct sources with different geology of basement. Obsidian clasts are also recognized in Ak-1~Ak-10. There are two types of obsidian: juvenile obsidian and accessory obsidian. Group A contains minor amounts of juvenile obsidian. On the other hand, in group B, accessory obsidian in Ak-3 corresponds to that of juvenile obsidian in Ak-4 or Ak-5. In addition, in group C, accessory obsidian in Ak-6 correlates with juvenile obsidian in Ak-7 or Ak-8. These suggest that vent areas of group B and C should be the same or close together within each group.

In summary, caldera-forming eruptions of Akan Caldera were derived from at least three distinct source regions, suggesting that successive plinian eruptions had occurred with changing source regions. Thus, it could be concluded that Akan Caldera would be multiple caldera. It would be consistent with the rectangular shape of the caldera.