New $^{40}Ar/^{39}Ar$ and K-Ar ages from Macolod Corridor, SW Luzon, Philippines: Implication for its volcanic history

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Macolod Corridor, southwestern Luzon, Philippines, is an extensive Quaternary volcanic field including Taal caldera and many monogenetic/polygenetic volcanoes. Recently reported K-Ar or ^{14}C ages (Listanco, 1994; Sudo *et al.*, 2000) suggest that several volcanoes have younger ages than e.g., 0.14 Ma.

However, the history of the possible caldera, located at the central lobe of the lake Laguma de Bay, at the north of Macolod Corridor has not been well understood. Radiometric dates remain few other than the K-Ar age, 1.84±0.07 Ma (error: 1σ), from an essential scoria (sample name 013006; Sudo *et al.*, 2000) with a size of ~30 cm in the pyloclastic (scoria) flow at the northeastern rim, or the ^{14}C ages of 5000 to 47000 yBP, from pyroclastic materials between Laguna de Bay and Metropolitan Manila.

In this study, the essential scoria (sample name P4-2), smaller than 10 cm, included in the pyroclactic (scoria) flow near Teresa city located at the north of Laguna de Bay, and the scoria, 013006, have been dated at the new $^{40}Ar/^{39}Ar$ chronology laboratory in the University of Potsdam. The system used consists of a continuous CO_2 laser, Micromass 5400 noble gas mass spectrometer and the ultra-high vacuum tubes adopting SAES getters and a cold trap. The prepared samples were irradiated for 96 hours at the reactor in the Geesthacht Neutron Facility (fast neutron flux: $1x10^{12}$ n/cm^2/s) together with the Fish Canyon Tuff sanidine and crystals of CaF_2 and K_2SO_4.

The obtained $^{40}Ar/^{39}Ar$ plateau ages are 1.85±0.01 Ma and 1.83±0.02 Ma from P4-2, while 1.92±0.03 Ma from 013006. With the K-Ar age, 1.82±0.05 Ma (unpublished), obtained from the scoria in the same outcrop for 013006, all the ages show agreement within 2 sigma error. These ages would be the constraints for solving the history of the caldera at Laguna de Bay.

References

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Gabbros drilled by IODP Leg 305, 30°N, Mid-Atlantic Ridge

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IODP Hole 1309D (Legs 304/305) penetrated 1415 m into the core-complex of the Atlantis Massif at 30°N, Mid-Atlantic Ridge. Of the 75% recovered rock, 96% is gabbroic. Possibly, a larger-scale magmatic cycle is preserved between 600 und 1240 mbsf, as marked by olivine-rich troctolites at the base and more common gabbronorites near the top. In detail, however, internal magmatic contacts are numerous with more evolved rocks intruding into less evolved ones. Here we present an overview of the 800-1200 mbsf interval and a detailed study of the transition from evolved rocks below 1235 mbsf to overlying primitive gabbros.

Geochemically, there is a good correlation between the REE in cpx, the Mg# in cpx, and lithological evolution. The data can be modeled as increments of batch fractionation ranging from 5 to >80% from a primitive N-MORB. There is no immediate need for magma replenishment. The rims of nearly all clinopyroxenes were overprinted by an evolved melt. A three stage model is required to explain the data set: (1) a cumulus phase; (2) displacement of residual melt and formation of new cumulate bodies from it. These two processes can explain the presence of well-equilibrated, but differently evolved cores of clinopyroxene. (3) Compaction of residual melt and differentation of it as it migrates through the cumulus pile. This stage explains the late overprint of the clinopyroxene rims.