Monogenic volcanoes of Patagonian back-arc province, southern Argentina

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Fig.1. Map of Patagonia, indicating back-arc basaltic volcano province.

In southern Andes back-arc region, behind the South Volcanic Zone (SVZ, 33° S~46° S) and Austral Volcanic Zone (AVZ, 49° S~52° S), hundreds of monogenic basaltic volcanoes take place (Fig.1), forming numerous cinder cones and lava flows (e.g. Ramos et al, 1982; Ramos and Kay, 1992). The eruption age ranges from the Oligocene to the Recent. The lava flows cover top of the sedimentary plateaux, forming table mountains, so-called "meseta" (Fig.2). In many cases, the plateau top lava is composed of only one cooling unit, less than 10 m total thick. Accumulated lava flows are also observed, and they are generally made up of less than four flow units of as much as of 30 m total thick. Some young lava flows fill glacial valleys, showing lava cascade (Fig.3). Certain lava flows and scoria falls layers are very fresh (Fig.4).

Weathering, wind erosion, and glacial denudation expose cross section of the cinder cones and their underground structure, which makes possible the elaboration of their general structure (Fig.5). Young cones show fresh volcanic morphology almost without degradation (Fig.5A). Old cones loose surface non-welded scoria blanket, and remain their basal core part made up of welded scoria and spatter (Fig.5B). Glacial erosion sometimes shows vertical section of the cinder cones (Fig.5C). Advanced denudation exposes sill-like subvolcanic intrusive rock bodies (Fig.5C, 5D) and feeder dykes (Fig.5E).

Fig.2. Table cloth-like lava flow covering plateau composed of sedimentary formations, Condor Cliff, Santa Cruz Province.

References

Ramos, A. and Kay, S.M. 1992. Southern Patagonian plateau basalts and deformation: backarc testimony of ridge collision. *Tectonophysics*, **205**, 261-282.

Ramos, V.A., Niemeyer, H., Skarmeta, J., and Muñoz, J. 1982. The magmatic evolution of the Austral Patagonian Andes. *In*. Cordani , U. Munizaga, F. eds. Magmatic Evolution of the Andes. *Earth Sci. Rev.*, **18**, 411-443.

Fig.3. Cascade fall of basaltic lava flow formed during a recent eruption, Río Colorado, southern end of Mendoza Province.

Fig.4. Flesh scoria fall field, Payún Matru National Park, Mendoza Province.
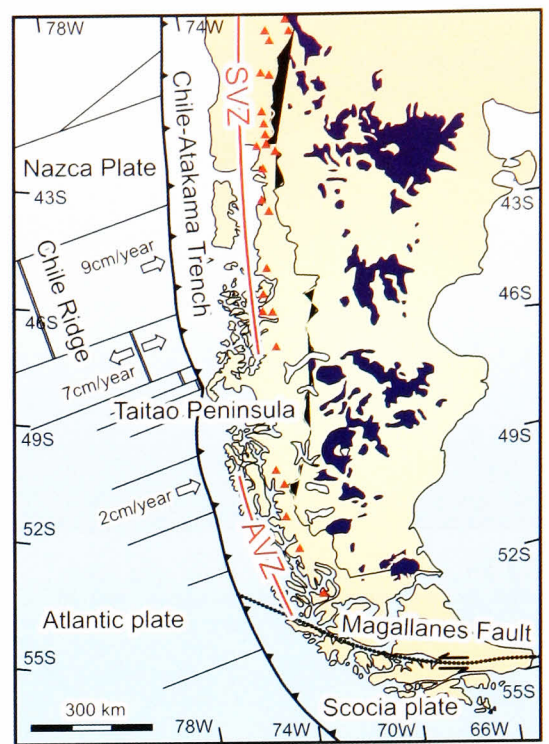
Fig.5A. Very fresh cinder cone that takes place by the Colorado River, southern end of Mendoza Province.

Fig.5B. Eroded cinder cones observed at Tres Cerros, Santa Cruz Province. In spite of degradation of the cinder cones, no regional denudation is observed.
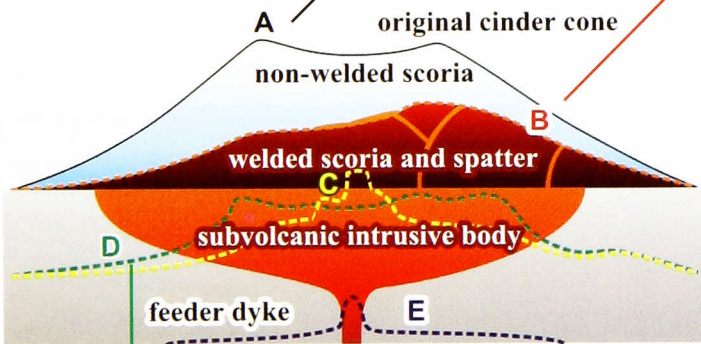

A   original cinder cone

non-welded scoria

B

welded scoria and spatter

C

subvolcanic intrusive body

D

feeder dyke   E

Fig.5C. A schematic cross-section of Patagonian cinder cones, elaborated by field observations of the monogenic volcanoes. The volcanic and subvolcanic bodies shown in the figures 5A~5E correspond respectively to the level, A~E.

Fig.5C. Deeply eroded cinder cone and its subvolcanic intrusive rock body exposed by glacial erosion, Cerro Ventana, Santa Cruz Province. Top of this hill is composed of welded scoria, and basal part is made up of sill-like intrusive body.

Fig.5D. Sill-like subvolcanic intrusive basaltic rock body, Cerro Colhue Uapi, Chubut Province.

Fig.5E. Feeder dyke observed at San Bernardo, Chubut Province.