Comunicaciones, N° 35 (1985): 89 - 91
Departamento de Geología – Universidad de Chile Santiago

UN PALEORIFT CRETACICO EN EL NOROESTE ARGENTINO: APROXIMACION PETROLOGICA

CRETACEOUS PALEORIFT IN NORTHWESTERN ARGENTINA: PETROLOGICAL APPROACH

MIGUEL A. GALLISKI & JOSE G. VIRAMONTE
Universidad Nacional de Salta-Conicet, Buenos Aires 177, 4400 Salta-Argentina

According to stratigraphic, tectonic and metalogenetic evidence for the development of the Cretacic-Early Eocene basin in northwestern Argentina (Salta group), Bianucci and Homovc (1982) first and Sureda et al (1985) later, have outlined the possibility of a rift model for it.

The aim of this paper, is to give a preliminary comprehensive review of the magmatic activity related to the Cretacic - Paleocene basin evolution, with emphasis on its petrological aspects; this seems to support coherently the presence of the sequence of rift development.

Three main magmatic phases are recognized (Salfity et al , 1984). The oldest one, 130-100 Ma old, has an early stage with the Rangel, Tusaquillas, Abra Laite, Aguilar and Possibly Hornillos anorogenic plutonic bodies and a volcanic stage with Alto de las Salinas complex and the lowest levels of Basalto de Isonza. The second one, 75-80 Ma old, includes Basalto Las Conchas. The last one, 60-65 Ma old consists of lamproitic dykes (Omarini et al , 1983), the basalt of Yacoraite Formation and the lower levels of Santa Bárbara subgroup.

Magmatic rocks do not form a continuous cover and large areas are free of magmatism. Moreover the older series occurs with preference along the border of the graben, whereas the younger ones are principally located in the center of the structure. The geochemical and petrological aspects of this magmatism are quite complex and include rock varieties with subalkaline and strongly to midly alkaline trends, with both sodic and potassic types.

The Aguilar plutonic complex (Aguilar-Abra Laite, 118 Ma, Linares y Latorre, 1975) has subalkaline affinity (granodiorites, subalkaline granites with minor alkaline granites) whereas the Rangel (123-129 Ma, Halpern y Latorre, 1973) and Hornillos (?) plutonic bodies are predominantly alkaline granites and syenites.

There are variations within the volcanic suites but most of them are strongly alkaline and poorly evolved. In the southtern end of the rift (Cadillal Formation-Alto de las Salinas complex) two different phases could be recognized: the first one (128-112 Ma Bossi and Wampler, 1969) characterized by alkaline trachytes, partially ultrapotassic, and the second one (103-97 Ma, ibid) has high K foidites (nepheline-leucitic normative).

The upper levels of Basalto de Isonza, interbedded within La Yesera Formation (99-96 Ma, Valencio et al , 1976) are basanites, whereas the volcanics belonging to Basalto Las Conchas (78-76 Ma, Valencio "et al" 1976; Reyes et al , 1976) are basanites, mugearites and tephriphonolites that carry abundant peridotitic mantle derived xenoliths.

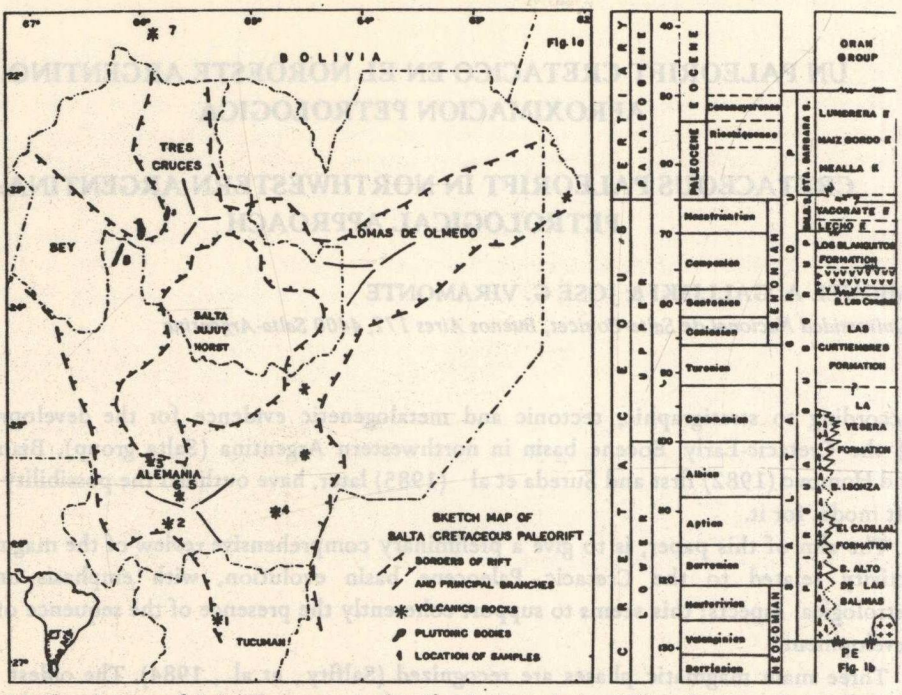

Fig.1a. Sketch map of Salta Cretaceous paleorift. 1. Alto de las Salinas Compex; 2. Las Conchas Basalt; 3. Isonza Basalt; 4. Cuesta de Cámara Hawaiite; 5. Alemania Tephriphonolite; 6. Lamproitic dyke, 7. Entre Ríos, Tupiza Basalt; 8. Range Stock.

Fig.1a.Mapa esquemático del paleorift Cretácico de Salta. 1. Complejo Alto de las Salinas; 2. Basalto Las Conchas; 3. Basalto Isonza; 4. Hawaita Cuesta de Cámara; 5. Tefrifonolita Alemania; 6. Dique Lamproítico; 7. Basalto Entre Ríos, Tupiza; 8. Stock Rangel.

Fig.1b. Generalizated stratigraphical colum of Salta Group (Alemania sub-basin), after Salfity (1980)

Fig.1b. Columna estratigráfica generalizada del Grupo Salta (Sub-cuenca Alemania), según Salfity (1980).

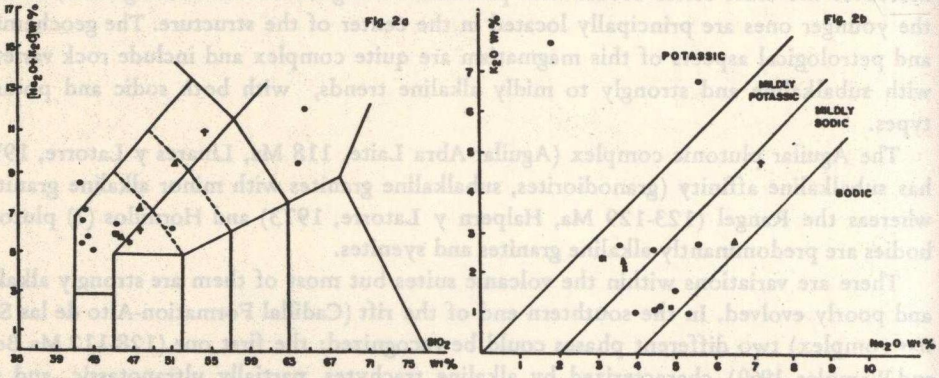

Fig.2a.TAS diagram (after Zanettin, 1984).

Fig.2a. Diagrama TAS, según Zanettin (1984).

Fig.2b. K_2O/Na_2O diagram.

Fig.2b. Diagrama K_2O/Na_2O.

Análisis de rocas volcánicas (Analysis of volcanic rocks):

○ Complejo Alto de Las Salinas; ● Basalto Las Conchas ■ Basalto Isonza

▲ Basalto entre Ríos (Tupiza) + Cuesta de Cámara X Tefrifonolita Alemania

* Dique Lamproítico

This unit is volumetrically the most important volcanic complex in the region. In the northern branch of the rift (Tupiza, Bolivia) the predominant rocks are basanites and tephriphonolites.

The association of this type of volcanism (see Fig. 2a-2b) within distensive taphrogenic basin, supports the hypothesis of a Cretaceous-Paleocene paleorift system.

This system extends northwards beyond the Bolivian-Argentine boundary and would connect westwards with the Chilean basin (?). Its geometric features have been outlined at the upper limit of Pirgua subgroup; we based our drawing, with little changes, on Bianucci y Homovc, (1982), Salfity (1982), and Schwab, (1984), (see Fig. la), paleogeographical reconstructions.

Following the terminology proposed by Barberi et al , (1982) and based on its magmatic, tectonic and sedimentary features it is possible to suggest that the above mentioned basin was an intracratonic paleorift of "low volcanicity type". This feature was active between early Cretaceous to Eocene times. Later on, the Incaic diastrophic phase terminates it. Its development probably was due to a thermotectonic process that causes epeirogenesis and continental crustal attenuation and may be connected, in a back-arc position, to the subduction process that was happening at that moment along the western border of South America.

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