REGIONAL DEVELOPMENT OF THE SALTA GROUP FACIES IN THE ARGENTINE PUNA

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ABSTRACT

The influence of the San Pablo high during deposition of the Salta Group in the extreme northwest of Argentina is shown. The synrift deposits (Pirgua Subgroup) and postrift deposits (Balbuena and Santa Bárbara Subgroup) of this Group were laid down during the Cretaceous-Eocene time lapse.

KEY WORDS
Argentina, Cretaceous, Salta Group, Yacoraite, limestones, anoxic environment.

INTRODUCTION

The San Pablo high was a positive element which governed the deposition of the (Cretaceous-Eocene) Salta Group in the northwest corner of Argentina, the south of Bolivia and northeast Chile.
Special attention has been paid to the Balbuena Subgroup, in which the calcareous nature of the Yacoraite Formation facies has made it possible to detect subtle paleogeographic changes and significant regional modifications in the development of these facies.
To this end, a series of cross sections of the Salta Group in

the Argentine Puna (Figure 1) were studied in detail, especially those of the Balbuena Subgroup. These sections are grouped round the southern flank of the San Pablo ridge, which in this region shows a NW-SE strike.

GEOLOGICAL SETTING

The synrift deposits of the Pirgua Subgroup show a typical basal conglomerate facies, such as those of Cuevas and Linán

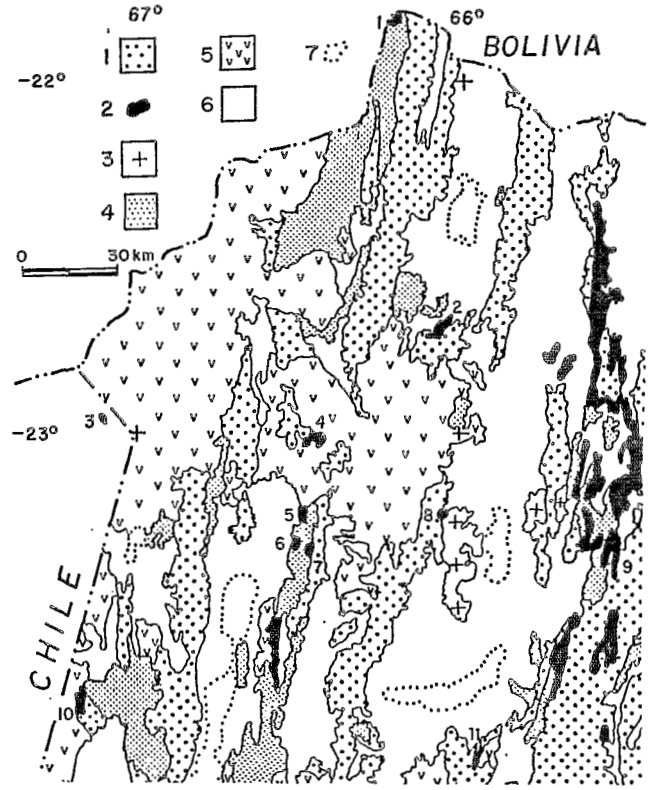


FIGURE 1. Geological map of the North Argentine Puna. 1 Pre-Cretaceous basement, 2 Salta Group, 3 Cretaceous Granitoid, 4 Neogene sediments, 5 Neogene volcanic rocks, 6 Quaternary, 7 Salar. Control points: 1-Chaupiorco, 2-Casa Colorada, 3-Poquis, 4-Coranzuli, 5-Calvario, 6-Lipán, 7-Cuevas, 8-Queñoal, 9-Yacoraite, 10-Huaitiquina, 11- Chirincho.

of the Sey depocenter, although with sandy and even conglomeratic facies. In the Tres Cruces depocenter it contains typical pelitic facies (Figure 2).

BALBUENA SUBGROUP

The lithology of the predominant units found in the Yacoraite Formation in the area of the San Pablo high indicates they were laid down under the depositional conditions found in pelitic and calcareous ooze environments. These sedimentary settings remained in great part below the oxygen exhaustion level, or if they did not arrive at such a situation were favored by euxinic conditions which governed the nature of their facies. However, inundation was not permanent, as the deposits are interbedded with records of rocks from environments of shallower depths and higher energy.
In this proximal basin are the Yacoraite Formation deposits are far from showing the typical high-energy limestone facies -oxygenated, light-colored and having interbedded shallow sequences- seen in other areas of the basin border, such as those surrounding the Salta-Jujuy high.
The main lithologic characteristics of the Balbuena Subgroup -especially those of the Yacoraite Formation- are given below, grouped according to the main facies, and including microscopic examination data.
The Balbuena Subgroup lies on an Ordovician basement in Chaupiorco, Casa Colorada, Coranzuli?, Poquis and Queñoal? (Figures 1 and 3). In some cases it contains the coarsely stratified sandy deposits of the Lecho Formation in its base.

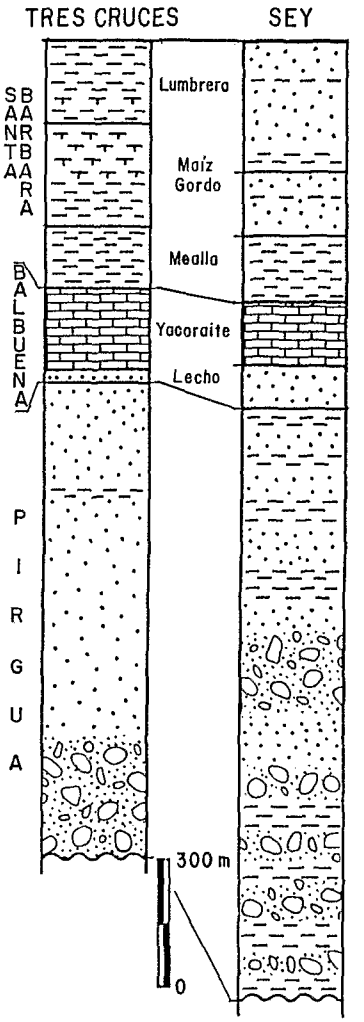
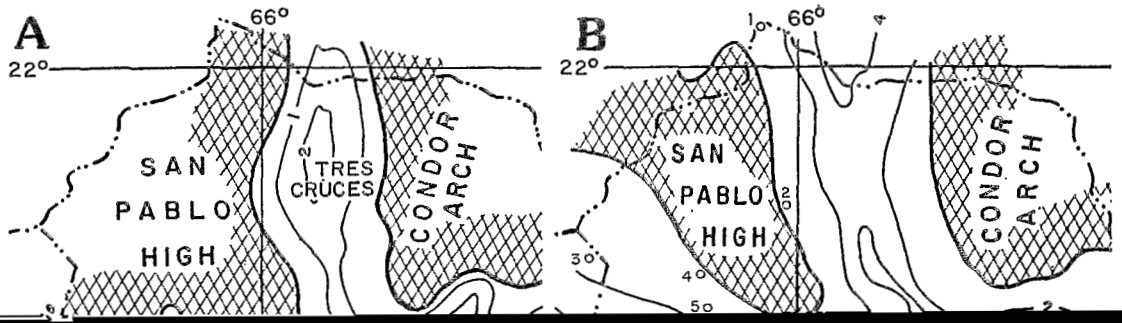


FIGURE 2. Composite stratigraphic columns of the Salta Group in the Tres Cruces and Sey depocenters.

These deposits usually include conglomerates containing quartz fragments, and Ordovician sedimentary and extrusive rock fragments from the Puna.The Lecho Formation facies are generally in keeping with those of the rest of the basin, and point to a distal braided system setting, influenced by eolian processes which created inter-dunes. This setting has been considered that of a prior clastic platform, in relation to the transgressive carbonate depositions of the Yacoraite Formation. When the Lecho Formation is not present as a lithologic unit, the facies in the basal portion of the Yacoraite Formation acquire characteristics similar to it.
The lower section of the Yacoraite Formation contains a stretch of high-energy arenaceous and arenaceous-calcareous rocks which frequently lie directly on the Paleozoic basement. It is formed of fine to medium grained gray, white and green sandstones, containing quartz, potash feldspar, scarce plagioclase, hornblende, zircon, and scattered lithic grains, plus small phosphatic bone fragments. Above this set of sediments lie limestones of medium to high energy characteristics (wackestones, packstones, and grainstones), containing diverse oolites, intraclasts, abundant ostracods, gastropods, fish remains and other bone fragments, and scarce organic matter. Immediately above these lies a low-energy sequence -probably representative of the first regional flooding episode under reducing conditions- made up of greenish gray lime mudstone and green, gray and black shales, containing pyrite and other sulphides, scarce collophane, abundant widespread organic matter -probably vegetable in origin- and scarce gypsum and anhydrite.
The upper section of the Yacoraite Formation shows that the relatively deeper environment, associated with anoxic conditions, continued until the end of deposition. This was only briefly interrupted by several shallowing pulses, combined with terrigenous supplies, the formation of the skeletal and nonskeletal grain limestones, the growth of algal stromatolites, and the intrabasinal fragmentation od sediments through subaerial exposure. These sediments are intercalated by thin isolated tuff and tuffite levels.
Thus, a rhythmic sedimentation of dark pelitic rocks and laminated scarcely bioturbated carbonates characterizes the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