STRUCTURE AND EVOLUTION OF THE CALINGASTA-PUCHUZUN AREA IN THE WESTERN MARGIN OF THE PRECORDILLERA OF ARGENTINA

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RESUMEN: Bloques limitados por fallas Norte-Sur, inversas de alto angulo que inclinan al Este y sobrecorrimientos que inclinan al Oeste. presentan distintas estructuras y secuencias como resultado de su historia pre-terciaria. Sobre las Formaciones ordovicicas, plegadas en zig zag, con ejes de RAz 315°, yacen discordantemente unidades devonicas y mas jovenes con plegamiento suave y ejes Norte-Sur. El Triasico cubre al conjunto con inclinacion al poniente.

KEY WORDS: Precordillera-Paleozoic-Structure-Tectonics

INTRODUCTION

The western margin of the Argentine Precordillera at the Rio San Juan section is composed of several elongated blocks of North-South trend. Sedimentary sequences show different structural styles due to their different pre-Tertiary evolution. Andean trends mask a late Devonian compressive episode and possibly a late Ordovician transpressional one. The stratigraphy and main structural characteristics of the Precordillera have been summarized in Ramos et al., 1986, and will not be described here. Quartino et al., 1973 carried out a regional survey and revised and reorganized the stratigraphic nomenclature. Sessarego, 1988 and Selles-Martinez 1992 have studied the stratigraphy and structure of the area north of the Rio San Juan. Evidences from sedimentary and paleontological records lead the author (Selles-Martinez, 1988) to the idea that a common history linked the Precordillera of Argentina and the Appalachians of North American during Cambrian to late Ordovician times. Paleomagnetic information is still scarce and a definitive position can not still be taken, (Mena y Selles-Martinez,

1989). The understanding of pre-Andean, and most important, pre-Gondwanide structures is an important key for testing whether or not the Precordillera is a displaced, accreted or autochthonous terrane. This paper is a contribution to the analysis of structural features of outcropping units and a first approach to discriminate deformational episodes in the area. Petrological, isotopic and paleomagnetic studies are still been carried to clarify this scenario.

GEOLOGICAL SETTING

Five principal blocks (Tontal, Del Salto-Rio Seco, Del Alto de los Pajaritos and El Carrizal ones) are limited by faults running N-S, dipping to the east as Eastern and Western Tontal Fault (high angle, reverse) and overthrusts dipping about 30° to the East. Most of the contacts between formations are of tectonic origin and it is very difficult to determine their relationships, even in the same block. Figure 1 is a geologic sketch of the area.

CONCLUSIONS

The Eastern Tontal Fault bounds the Tontal Block (composed by Ordovician silts and sandstones and gabbroic intrusives) to the west. Tight folds with axis trending N-NE are representative of the structure in the area. The Tontal Fault Zone includes Western Tontal Fault showing horses and splays of different scales, mixing Ordovician and Permo-Triassic units. The Del Salto-Rio Seco Tectonic Window is one of the most interesting structures in the area, and its internal structure and evolution is far of being completely understood. North-South and transverse faults define minor blocks. The structure of El Planchon and El Salto Fms. is a broad anticline with minor refolding. Pencil structure in the former evidences that deformation in the area never reached cleavage stage at least after Devonian times. Codo Fm. forms a broad anticline in both margins of the river, bounded to the East by the conglomerates of El Raton Fm. The contact is clearly an unconformity in the vicinity of km 117 Creek, but becomes tectonic to the north due to a more intense deformation associated with the proximity of a blind thrust in the anticline core. Homoclinal sequences of Uspallata Group outcrop in the center of Rio Seco Creek, and are tectonically linked to El Planchon Fm. to the E, which is in turn separated by another fault from Carbonic clastics of El Raton Fm. Western and Eastern Tontal Faults rise Alcaparrosa Fm. at Sierra del Tigre. In the Alto de los Pajaritos Block the outcropping of the angular unconformity between Don Polo and Codo Fm. is outstanding. Don Polo clastics are folded in a tight to chevron style. Bulbous hinges, saddle reefs, en echelon quarts veins and cleavage crenulation are common features, but delicate ichnofossils have been preserved. Milonitic textures in the same Fm. shows that at least some horizons have undergone intense shearing (decollement

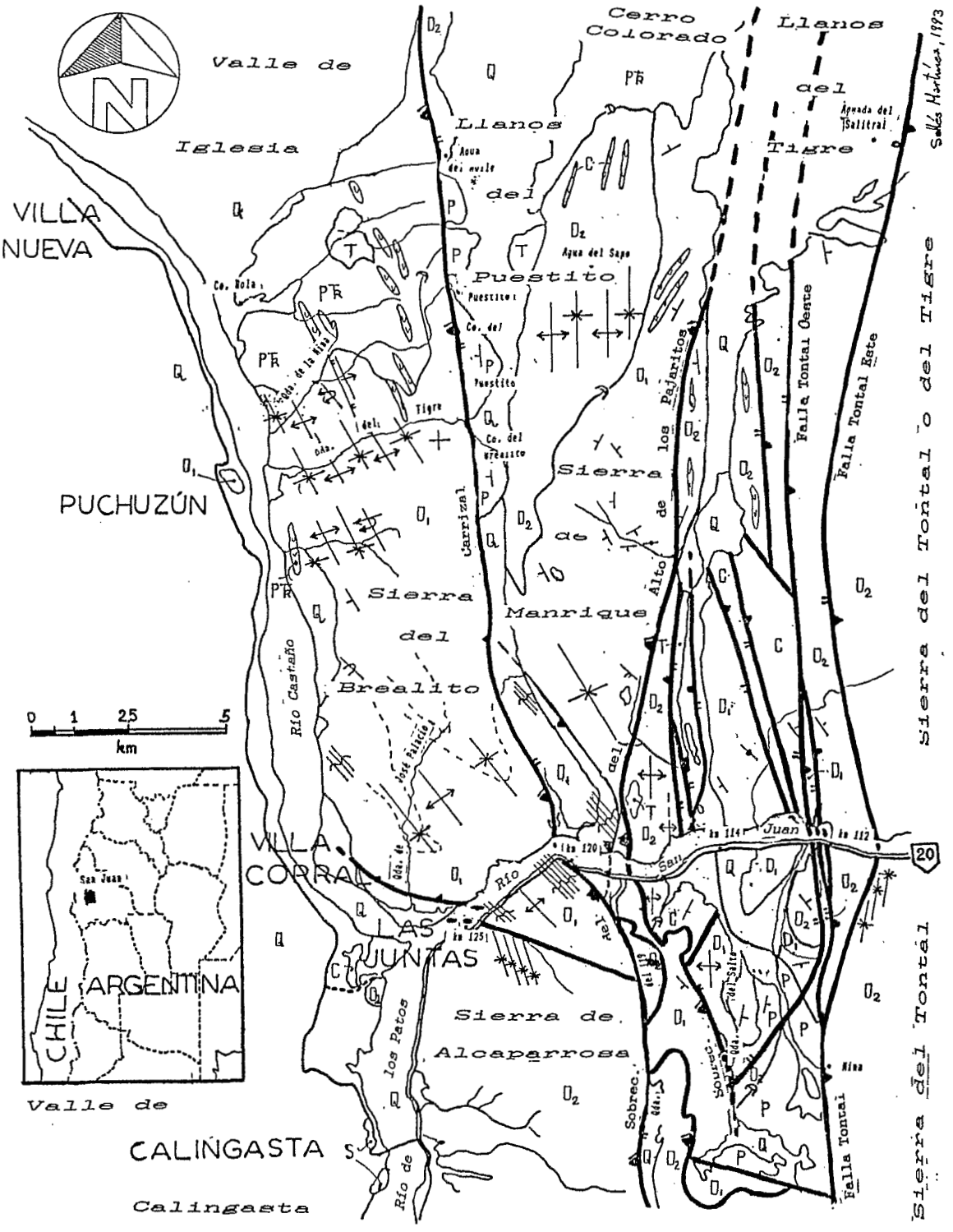

Figure 1: Geological and structural sketch of the Rio San Juan area (westernmost Precordillera of Argentina).
O_1= Don Polo Fm; O_2= Alcaparrosa Fm; S= Calingasta Fm; D_1= El Planchon Fm; D_2= Codo Fm; C= El Raton and La Capilla Fm; P= El Salto Fm; PTr= Choiyoi Fm; Tr= Uspallata G; T= Tertiary; Q= Quaternary.

surfaces?) possibly in ordovician times. Fold axes in Don Polo Fm. trend Az 315 and NE flanks are frequently overturned. Well developed kink bands in this and next Block show coherent with a folding episode with main compressional stress directed SW-NE followed by vertical shearing to the NE. Folds in Codo Fm. are opened with N-S trending axes. Younger units in this Block show homoclinal to the west. In the westernmost block, the El Carrizal one, Alcaparrosa Fm. is tightly folded with axes running to Az 340, a fault, trending Az 315 (50m wide fault zone) is the western limit of the outcrops of Don Polo Fm. in the southern margin of the San Juan River (km 125 Creek). The structure follows the same structural pattern in the northern portion of the block where Ordovician clastics are umcomformably covered by Choiyoi ignimbrites (Qda. de la Mina area). This Triassic volcanics deep gently to the west. The region shows thin-skinned style for Andean structures, which are in part reactivation of ancient ones, (like Tontal Fault). The sinistral displacement shown by the El Carrizal Thrust at the Rio San Juan valley is interpreted as a lateral ramp, cutting upsequence and has acted as a discontinuity during more recent deformation leading to a small amount of sinistral displacement on this surface and probably on a hidden fault along the river valley resulting in a counterclockwise rotation of fold axis in the vicinity of the river, and also helpd for the displacements of El Raton Fm. outcrops north of km 117. This sinistral shear has not affected Tontal Faults.

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