Oligocene Extensional Tectonics at the Main Andes. Valle del Cura Basin, San Juan Province, Argentina

Diego A. Winocur* and Víctor A. Ramos
Instituto de Estudios Andinos (CONICET-UBA), Pabellón II, Ciudad Universitaria, CABA, Argentina.

*E-mail: Winocur@gl.fcen.uba.ar

1 Introduction

The main objective of this work is to present evidences of an extensional period at Oligocene times in the Pampean Flat Slab segment of the Central Andes. The Argentine Frontal Cordillera between 29º and 30º south latitude has a particular geological interest (Figure 1). From the tectonic point of view is located in the middle of the Pampean Flat Slab subduction zone of the Central Andes. The structure presents a great complexity due to changes in the stress patterns that have occurred since the Paleozoic to the present. The dominant structural style is thick-skinned due to the tectonic inversion of the previous extensional faults. The region was studied by many authors focused at the Tertiary volcanic sequences. The first of these studies was realized by Maksaev et al., (1984); Nasi et al., (1990); Kay et al. (1987, 1988, 1991) and Ramos et al., (1987) who recognized these sequences in the Argentinean side. New chronological data where published by Martin et al. 1997; Limarino et al. 1999; Bissig et al., 2001; Litvak and Page (2002); Mpodozis and Kay (2003); Litvak et al. 2005; Charchaflié et al. 2007; Winocur and Ramos (2008, 2011).

2 Method, Samples, Results

The surveyed area show many different sectors in different units with robust evidence of synextensional sedimentation affected at the Tilito Formation (Figure 3a). This figure shows several outcrops with extensional sets of faults in a road section (Figure 1a) sited at the right margin of Guanaco Zonzo creek. The outcrops correspond to the dacitic tuffs of the Tilito Formation affected by two normal
of N-S strike faults with about one meter observed displacement (see the hunter for scale). These volcanic sequences are dated about two kilometers to the north yielding ages of 24.5 ± 0.2 Ma by U/Pb in zircon (Charchafié et al., 2007).

Evidence of extensional faults was founded 40 km SE of the first one, sited at the south part of Valle del Cura river. This outcrop shows a similar extensional structural setting affecting a series of volcaniclastic deposits of the Tilito Formation. The strikes are similar to the first one, but displacements are smaller than one meter (Figure 3b). This sequence corresponds to the Tilito Formation, and was dated by Bissig et al. (2001) in 23.9 ± 0.3 Ma by Ar/Ar method in biotite.

### 3 Discussion and Comments

Several authors have proposed an extensional regime for the Abanico and Coya Machalí basins in regions further south during the Oligocene as Godoy et al. (1999) and Charrier et al. (2002). However at these latitudes Winocur and Ramos (2008; 2011) were the first who proposed the extensional regime for the Oligocene times at these latitudes. This period was characterized by a generalized extension coeval with an active calc-alkaline volcanic arc in an extensional Andean type subduction (Winocur and Ramos, 2008; 2011). This study presents some evidences of the Oligocene extensional tectonics in the Main Andes at these latitudes.

**Figure 2.** Schematic simplified stratigraphy of Valle del Cura.

Based on the present observations, complemented with existing geochronological and geochemical data we made conclude that for the Oligocene times a magmatic arc occupied the axial part of the Main Andes between 29º and 30º (Winocur 2010; Winocur et al. in prep.) under an extensional tectonic regime during the time of deposition of Tilito Formation.

### References


Mpodozis, C. and Kay, S.M., 2003. Neogene tectonics, ages and mineralization along the transition zone between the El Indio and


Thiele, R., 1964. Reconocimiento geológico de la Alta Cordillera de


Figure 1: Location map of the study zone at the Valle del Cura basin between the Cordillera de Colangüil and the Chile international limit.

Figure 3: a. View a road section of the Tilito Formation affected by extensional faults at the Guanaco Zonzo Creek. b. Extensional setting affecting a volcaniclastic sequence of Tilito Formation at the Valle del Cura river.