



The development of miocene extensional and short-lived basin in the Andean broken foreland: The Conglomerado Los Patos, Northwestern Argentina



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ABSTRACT

The Conglomerado Los Patos is a coarse-grained clastic unit that crops out irregularly in the San Antonio de los Cobres Valley in the Puna, Northwestern Argentina. It covers different units of the Cretaceous–Paleogene Salta Group by means of an angular unconformity and, in turn, is overlaid in angular unconformity by the Viscachayoc Ignimbrite (13 ± 0.3 Ma) or by late Miocene tuffs.

Three lithofacies have been identified in the Corte Blanco locality; 1) Bouldery matrix-supported conglomerate (Gmm); 2) Clast-supported conglomerate (Gch) and 3) Imbricated clast-supported conglomerate (Gci). The stratigraphic pattern displays a general fining upward trend. The sedimentary facies association suggests gravitational flow processes and sedimentation in alluvial fan settings, from proximal to medial fan positions, together with a slope decrease upsection. Provenance studies reveal sediments sourced from Precambrian to Ordovician units located to the southwest, except for volcanic clasts in the Gmm facies that shows U/Pb age of 14.5 ± 0.5 Ma. This new age represents the maximum depositional age for the Conglomerado Los Patos, and it documents that deposition took place simultaneously during a period of increased tectonic and volcanic activity in the area.

The structural analysis of the San Antonio de los Cobres Valley and the available thermochronological ages, indicate active N-S main thrusts and NW-SE transpressive and locally normal faults during the middle Miocene. In this context, we interpret the Conglomerado Los Patos to represent sedimentation in a small, extensional and short-lived basin associated with the compressional Andean setting.

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1. Introduction

In recent years, several contributions have improved the knowledge of the Andean foreland system in the northwestern Argentina. In particular, research has developed new insights and concepts on tectonics, sedimentation and volcanism (Coutand et al., 2001; Carrapa et al., 2005; Petrinovic et al., 2006; Hongn et al., 2007; Strecker et al., 2007; Mazzuoli et al., 2008; Folkes et al., 2011; Guzmán et al., 2011; del Papa et al., 2013; Canavan et al., 2014). The most important improvements include: the existence of an Eocene broken foreland basin in the Puna and in the Eastern Cordillera, the role of the inversion of the Cretaceous normal faults and basement heterogeneities in the deformation and in the generation of the double vergence structures, the existence of orogen-

oblique transfer zones between double vergence master thrusts, the presence of Eocene growth-strata in the continental hinterland, and the increment of Paleogene and early Miocene ages of uplift and exhumation data (Carrapa and DeCelles, 2008; Payrola Bosio et al., 2009; Carrapa et al., 2011; Hongn et al., 2011; del Papa et al., 2013). The described scenario suggests the hypothesis that isolated basins –connected or disconnected–developed, with distinct evolutions. Thus, the new challenge in Northwest Argentina is to recognize and differentiate these basins, and also to interpret their tectono-stratigraphic signature in the context of the complex foreland system.

The Conglomerado Los Patos is a clastic sedimentary unit that crops out near the village of San Antonio de los Cobres, close to the eastern border of the Puna (Fig. 1). There are no previous detailed studies of this unit, which is most likely due to its discontinued, isolated outcrops and its low preserved thickness. Nevertheless, its position on the border of the Puna, its stratigraphic relationships, and particular features of the sediments suggest the Conglomerado

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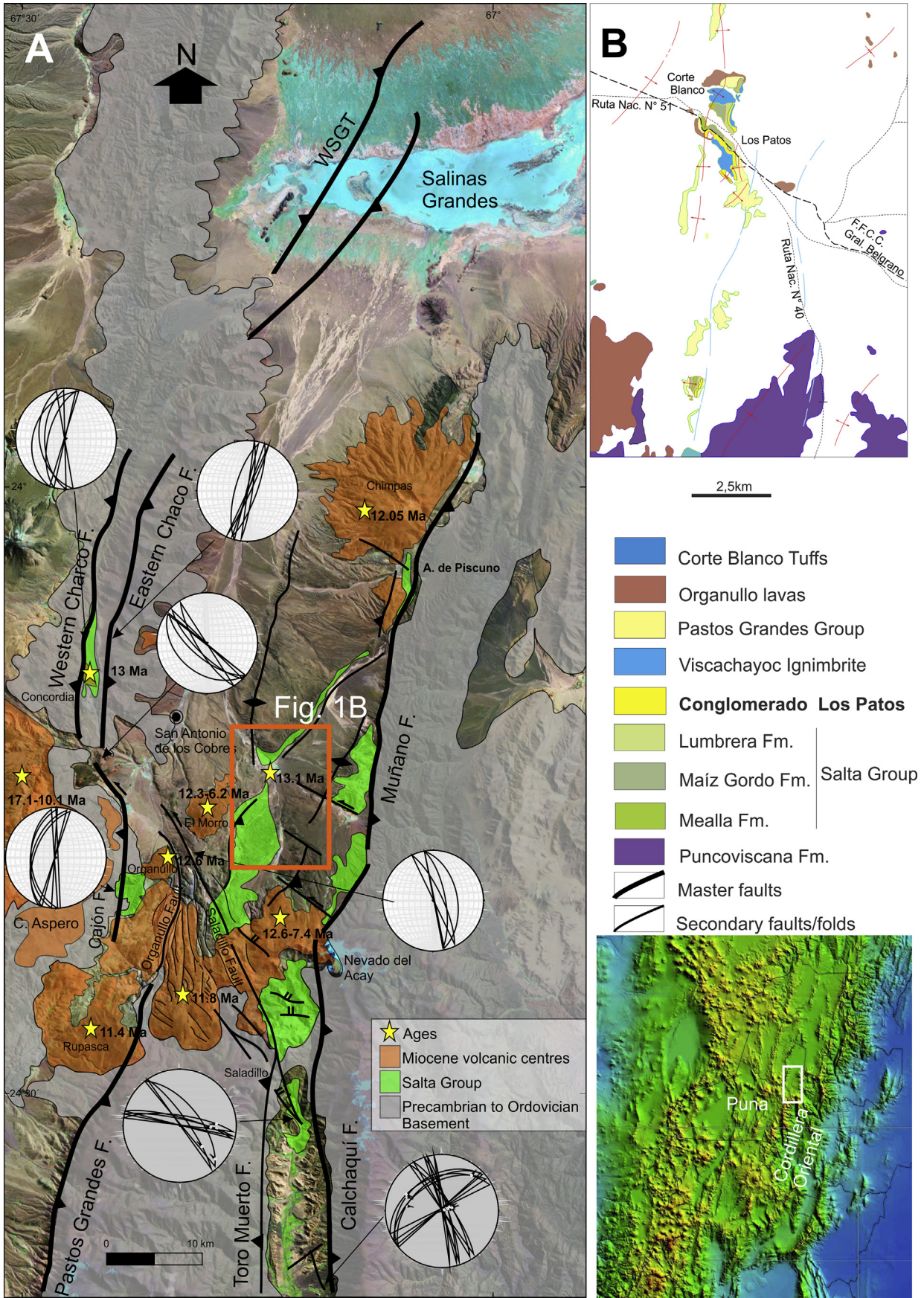


Fig. 1. A. Regional map of major structures and outcrops of the units described in the text. B. Local map of outcrops and main structures at Corte Blanco. Modified from Donato and Vergani (1988); Blasco et al. (1996); Petrinovic et al. (1999); Arnosio (2002); Riller et al. (2001).

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