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Project: Petrographic study of the provenance of the Tordillo Formation in Southern Mendoza, Argentina.

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The Tordillo Formation, of Kimmeridgian age, is one of the most widespread units of the Neuquén-Aconcagua basin, a Mesozoic retroarc basin in west-central Argentina. It consists of a thick (up to 1100 m) succession of red sandstones with minor conglomerates and shales deposited in fluvial environments and associated eolian fields and playa lakes (Legarreta y Uliana 1999). The sedimentary environments and facies changes of the Tordillo Formation have been studied in detail; however, its sediment sources in southern Mendoza are known from scarce studies in punctual localities.

Since the pioneering work of Gerth (1925), it is affirmed that the source of sediment for the Tordillo Formation in this area were the volcanics of the Río Damas Formation, located to the west. The Río Damas Formation is a thick (up to 4000 m) pile of retroarc, mostly andesitic lava flows (Charrier *et al.* 2007). In the easternmost outcrops of the Tordillo Formation, were proximal facies are found, a sediment supply of the basement has been reported in conglomerates (Legarreta *et al.* 1993, Lo Forte 1996). The basement of the basin is the Choiyoi Group, which consists of a plutonic association of granites and tonalites and a volcanic association composed mostly of rhyolitic ignimbrites (Llambías *et al.* 1993). At present, it crops out to the east of the study area, in the Cordillera Frontal.

Recent work (Mescua and Ramos 2006, and unpublished information) has shown that clasts of acidic volcanics are an important component in the sandstones in localities in the basin axis. This component is most probably related to the volcanic association of the Choiyoi Group; therefore, sediment supply of the basement has reached the inner sector of the basin, where a mixture of basement and retroarc (intermediate to basic) volcanic clasts are observed.

The purpose of this project was to undertake extensive fieldwork to study key localities in southern Mendoza (34º15' -35º30' S) where the Tordillo Formation crops out, in order to perform a comprehensive study of the provenance of this unit in the study area.

IAS funding was used to study the Tordillo Formation at five localities (Arroyo Moro, Cerro Chivato, Arroyo La Manga, Los Molles and Río Tordillo) throughout the basin, and for preparation of microscopic slides of the samples collected.

Field studies included the measurement of outcrop profiles and the sistematic sampling of each locality for petrographic studies of provenance. A variable number of samples (5-17) was collected from each locality depending on thickness of the Tordillo Formation and the participation of sandstones with respect to conglomerates and shales. 48 samples were sent to the University of Buenos Aires for preparation of microscopic thin sections, which will be ready between February and March 2009.

Preliminary field observations were already included in a paper to be published in the Revista de la Asociación Geológica Argentina (Mescua *et al.*, 2008), where IAS was acknowledged as one of the funding institutions.

We expect to have the final results of the project during 2009. A reconstruction of the sediment sources for the Tordillo Fromation throughout the southern Mendoza sector of the Neuquén-Aconcagua basin will be obtained. Taking into account studies from other

sectors of the basin, our work will allow a better knowledge of the Kimmeridgian basin dynamics, as well as gaining insight on the tectonic setting in which the Tordillo Formation was deposited. Furthermore, the applicability of the Dickinson *et al.* (1983) diagram of tectonic provenance to our case study will be evaluated.

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