

U-PB ZIRCON PROVENANCE OF SILURIAN-DEVONIAN SEDIMENTARY SEQUENCES FROM ARGENTINEAN NORTH PATAGONIA AND SIERRA DE LA VENTANA REGIONS: TECTONIC HISTORY IMPLICATIONS

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INTRODUCTION

Silurian-Devonian sedimentary units in the Atlantic margin of Argentina are developed in between 37° 30'-41° 42' S and 65° 23'-58° 45' W, partially covering the eastern North Patagonian Massif and the Ventania system that include the Ciaromecú basin. The study regions where located at 600-800 km from the paleo-Pacific plate edge. The units present comparable lithostratigraphic characteristics and evolution on a shallow marine shelf-type environment. Different paleogeographic models are known: Ramos (1984, 2008), Dalla Salda et al. (1992), Pankhurst et al. (2006) and Gregori et al. (2008). The main objective that motivated this research was to constrain the sedimentary provenance and tectonic setting evolution, using U-Pb isotopic studies on detrital zircons.

GEOLOGICAL SETTING

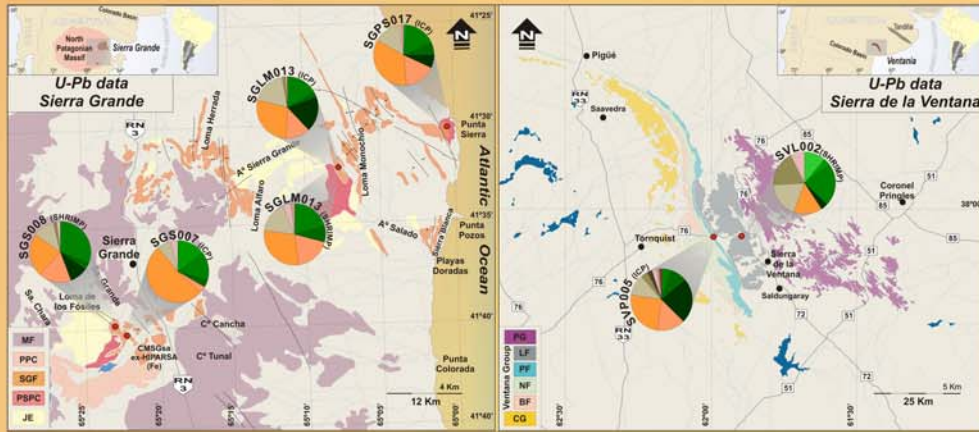
The study region is characterized by tectonic terranes (Ramos, 1988) collided during different orogenies. i) The Río de la Plata craton. ii) the Pampean terrane. iii) the Cuyania terrane; whereas iv) the Chilena terrane collided at the end of the Devonian. The great Patagonia terrane (including the Malvinas plateau) is located towards the south.



Ramos (1984) proposed that the Patagonia allochthonous terrane collided with South American crust along the Río Colorado zone in Upper Paleozoic times and deformed the Ventania system into a fold and thrust belt. In more recent reviews of the tectonic evolution of Patagonia, Ramos (2008) and Pankhurst et al. (2006) includes an Early Paleozoic collision with the southern Desado Massif. The pre-Silurian basement of northern Patagonia composed by different metamorphic and magmatic belts has been recognized by several authors.

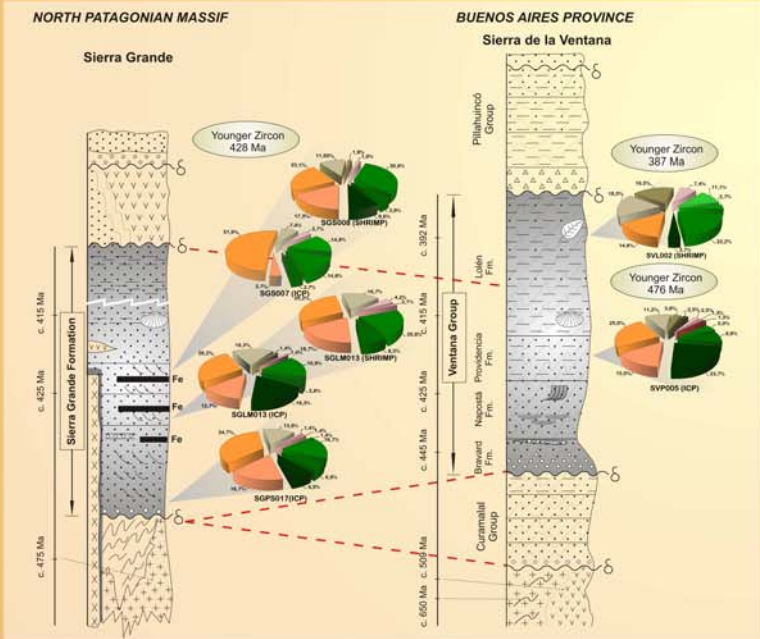
The Silurian-Devonian Sierra Grande Fm unconformable covers the Neoproterozoic-Cambrian basement rocks and shows ductile deformation. The Ventania system, with a Neoproterozoic-Cambrian basement and a Paleozoic sedimentary cover, form a typical curved ranges string of NW-SE direction.

The samples obtained from different levels of the Sierra Grande Fm are the typical quartz-rich sandstones. One sample was obtained at the base of the formation, while another was taken from the middle part of the section and two samples from the top. The sample analyzed from the upper part of the Ventana Group is medium-grained quartz-rich sandstone of the top section of the Providencia Fm. One sample was selected from the upper levels of the Lolén Fm and consists of quartz-mica rich sandstone.



RESULTS

The U-Pb (LA-ICP-MS & SHRIMP) isotopic age data from both study areas show there are clearly similarities in main frequencies peaks of zircon ages from the Sierra Grande Fm and the Providencia Fm (Ventana Group) is shown. The main sedimentary sources of detrital zircons are of Cambrian-Ordovician and Neoproterozoic pattern age, while a secondary mode is Mesoproterozoic. Zircons from the older cratonic sources are scarcely recorded in both regions. The sample from the upper section of the Lolén Fm (Ventana Group) shows an important change in the sedimentary provenance, with a main mode of Mesoproterozoic detrital zircons.



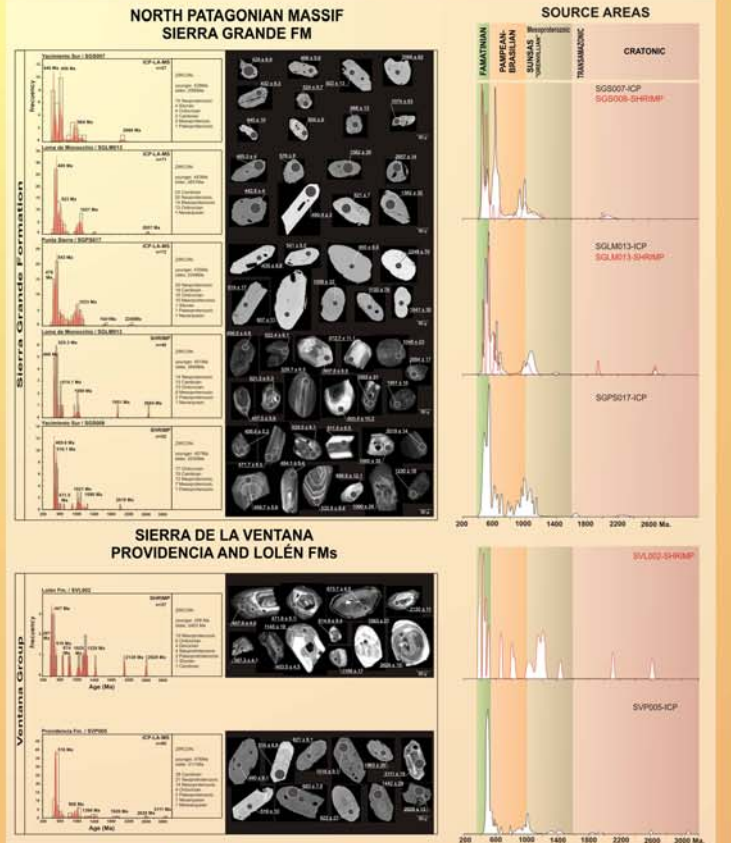
CONCLUSIONS:

- These data show that are striking similarities in the main age distributions and frequency peaks of detrital zircon ages between the Sierra Grande Formation and the Providencia Formation (Ventana Group).
- The main sedimentary sources of detrital zircons are of Cambrian-Ordovician and Neoproterozoic in age, while a secondary mode is Mesoproterozoic.
- Zircons from the older cratonic sources (Mesoarchean-Paleoproterozoic ages) are scarcely recorded.
- The sample from the upper section of the Lolén Formation (upper Ventana Group) shows an important change in the sedimentary provenance, with a main mode of Mesoproterozoic detrital zircons.
- We proposed detrital source areas considering the orogenic cycles known for southwest South America: Famatinian, Pampean (Brasiliano), Sunsas or "Grenvillian" and Transamazonian.
- With all these information the paleogeographic models that best fit with our data are those that represent the continuation of the Pampean terrane (and Famatinian magmatic arc) towards the North Patagonian Massif during Silurian-Devonian times.

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Samples	n	FAMATINIAN					PAMPEAN-BRASILIANO		SUNASAS			Mesoproterozoic			TRANS-AMAZONIAN		
		Dev.	Sil.	Ord.	Upper Camb.	Middle Camb.	Lower Camb.	Neo-proter.	M2	M1	M1	Neo-proter.	Meso-arch.	Meso-arch.			
SGS007-ICP	27	14.8%	14.8%	3.7%	3.7%	3.7%	51.9%	7.4%				3.7%					
SGS008-SHRIMP	52	30.8%	3.9%	9.6%	17.3%	23.1%	11.9%	1.9%									
SGLM013-SHRIMP	71	15.9%	2.8%	18.3%	12.7%	28.2%	18.3%	1.4%									
SGPS017-ICP	72	1.4%	16.7%	6.9%	6.9%	16.7%	34.7%	13.9%									
SVPO05-ICP	80		5.0%	8.8%	23.7%	15.0%	25.0%	11.2%	3.8%	2.5%	2.5%	1.3%	1.3%				
SVL002-SHRIMP	27	11.1%	3.7%	22.2%	3.7%		14.8%	18.5%	18.5%								