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Middle Triassic trachytic lava flows associated with coeval dyke swarm in the North Patagonian Massif: A postorogenic magmatism related to extensional collapse of the Gondwanide orogen

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1. Introduction

The Marifil Volcanic Complex is an extensive magmatic and pyroclastic unit included in the Chon Aike Siliceous Large Igneous Province (SLIP) (Malvicini and Llambías, 1974; Cortés, 1981; Pankhurst et al., 1998). It was first considered as the Jurassic thick rhyolitic plateau overlaying mesosilicic lava flows (Malvicini and Llambías, 1974). Cortés (1981) extended this unit including the underlying possibly Triassic mesosilicic rocks, and the epiclastic succession of the Puesto Piris Formation (Núñez et al., 1975). Modern works increased the quality and amount of the geochronological data of the Marfil volcanism using Rb-Sr and Ar-Ar methods. Rapela and Pankhurst (1993), Pankhurst and Rapela (1995), Pankhurst et al. (1998, 2000) and Féraud et al. (1999) establish a lapse between 188 and 165 Ma for the eruption of the Marifil Volcanic Complex. Still, there are some Middle Triassic K-Ar ages from the Marifil volcanism which differ from the Jurassic Ar-Ar and Rb-Sr data (Fig. 1; Vallés, 1978; Cortés, 1981; Genovese, 1995). A U-Pb zircon crystallization age of a mesosilicic dyke swarm opened the possibility for a major Triassic magmatic process (González et al., 2014b, 2016).

The dyke swarm has been linked to a postorogenic extension related to changes in the subduction along the southwestern margin of Gondwana (Uliana et al., 1985; González. et al., 2014b, 2016). On the contrary, the origin of the rhyolitic plateau of the Marifil Volcanic Complex has been associated with the Karoo within-plate magmatic event (Pankhurst et al., 1998, 2000; Riley et al., 2001).

The mesosilicic rocks at the base of Marfifil Volcanic Complex are trachytes (see section 3.3). As they cover Permian granitoids and have a similar composition to the Triassic dyke swarm is possible that the Marifil Volcanic Complex comprise two different geotectonic and magmatic processes.

A section near Arroyo Ventana where the Monasa volcanic rocks are well-exposed was selected to investigate the trachytic base of the Marifil Volcanic Complex (Fig. 1; Franchi et al., 2001). A field description and mapping of the outcropping units and a petrographic characterization of the mesosilicic rocks were performed. Additionally, a geochemical analysis and a geochronological study were made over a trachyte from a lava flow. The characterization of the mesosilicic rocks as well as the obtained U-Pb zircon age allow us to separate the trachytes from the rhyolites. We extend the Monasa Formation to include Triassic mesosilicic rocks and separate it from the Marifil Volcanic Complex. Additionally we focus on other areas of the North Patagonian Massif where temporally equivalent rocks crop out and present similar stratigraphic relations. The presence of similar rocks, temporally equivalent and with analogous stratigraphic relations allow us to proposed the existence of a magmatic process widespread in the North Patagonian Massif possible associated to a Triassic postorogenic extensional regime.

2. Geologic setting

The studied area is close to Arroyo Ventana (41°38′41.10″S; 66°

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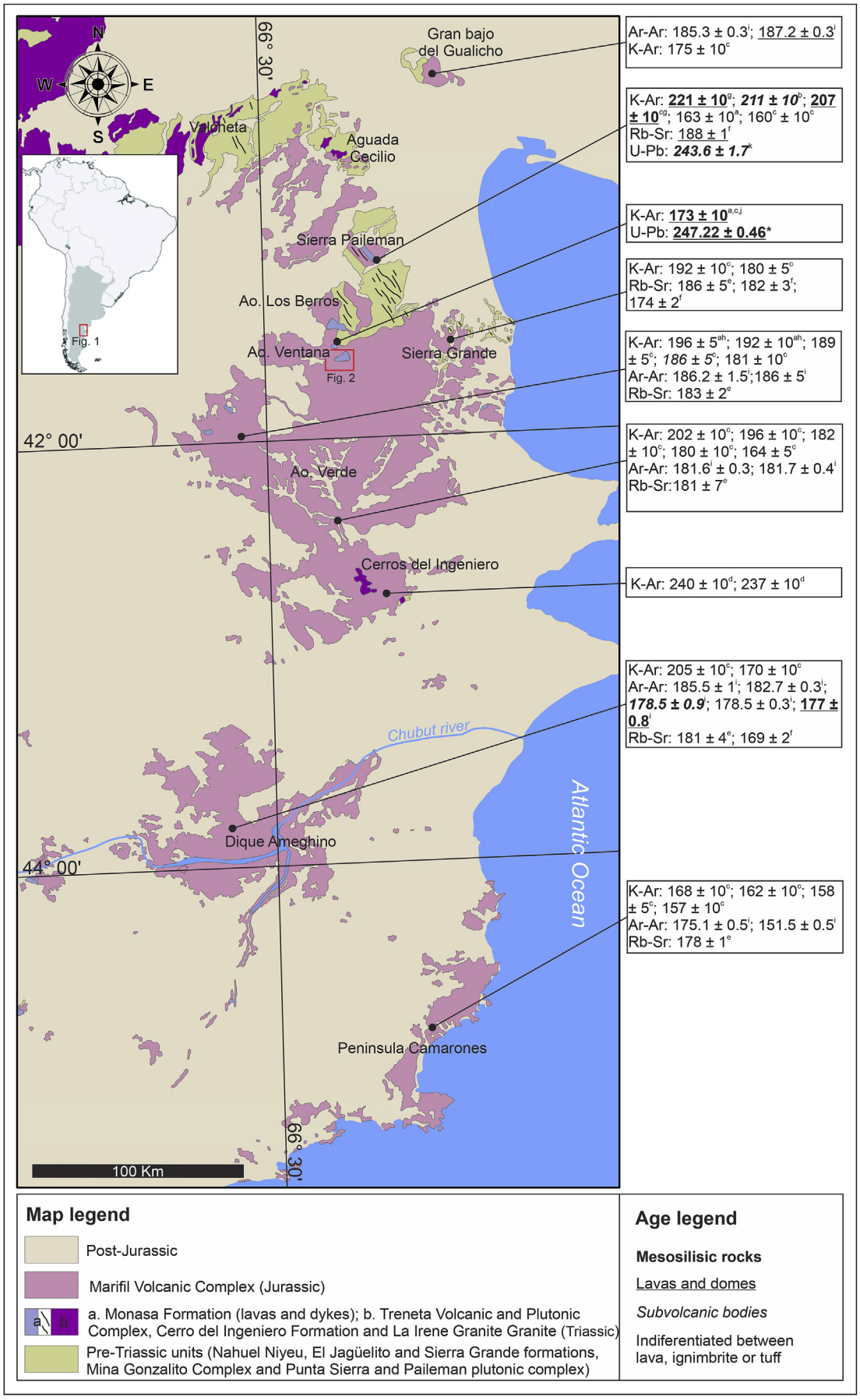

Fig. 1. The outcrops of the Marifil Vocanic Complex in the eastern North Patagonian Massif showing known radimetric ages for each one. References, a: Núñez et al., 1975; b: Vallés, 1978; c: Cortés, 1981; d: Haller, 1981; e: Rapela and Pankhurst, 1993; f: Pankhurst and Rapela, 1995; g: Genovese, 1995; h: Busteros et al., 1998; i: Féraud et al., 1999; j: Franchi et al., 2001; k: González et al., 2014b; * this work. Map simplified from Busteros et al. (1998), Caminos (2001), Franchi et al. (2001), Haller (1981), Lizuaín et al. (1995).