



Porphyry, epithermal, and orogenic gold prospectivity of Argentina



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ABSTRACT

This paper presents a review of the available information on the significant porphyry, epithermal, and orogenic gold districts in Argentina, including the tectonic, geological, and structural settings of large deposits or deposits that have been exploited in the past. Based on this review of the geology and mineralization, targeting models are developed for epithermal and orogenic gold systems, in order to produce GIS-based prospectivity models. Using publicly available digital geoscience data, weights of evidence and fuzzy logic prospectivity maps were generated for epithermal and orogenic gold mineralization in Argentina. The results of the prospectivity mapping highlight existing gold deposits within known mineralized districts throughout Argentina, as well as other highly prospective areas with no known deposits within these districts. Additionally, areas within Argentina that have no known gold mineralization (based on publically available information) were highlighted as being highly prospective based on the models used.

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1. Introduction

Argentina is known for several world-class gold deposits such as those in the El Indio–Pascua gold district which hosts the Veladero and Pascua–Lama high sulfidation epithermal gold deposits (only the Pascua deposit is located in Argentina, with the Lama deposit being on the Chilean side of the border), and the Deseado Massif gold district which hosts, amongst others, the Cerro Vanguardia low sulfidation epithermal gold–silver deposit (see references in Fogliata and Hagemann, 2011a). Based on the presence of these world-class gold deposits and other significant deposits (Fig. 1), other locations within Argentina may be considered prospective for gold mineralization due to their similar geological, structural, and tectonic settings.

This study attempts to draw together the available information on known and emerging porphyry, epithermal, and orogenic gold districts in Argentina, and present a brief and succinct review of their geological, tectonic, structural settings and mineralization. Additionally, discussion of how this information can be integrated into a GIS-based prospectivity analysis and the implications for country-wide exploration targeting is presented. The ability to translate the potential targeting criteria indicated in the review of the geology and mineralization into inputs used to generate GIS-based prospectivity maps is limited by the availability of existing data at the country-scale (c.f. Billa et al., 2004); however, the results of the prospectivity analysis are still able to highlight

known gold districts, and provide some potential targets for further analysis.

2. Review of significant gold districts in Argentina

Geological provinces in Argentina are differentiated by characteristic tectono-stratigraphy, structural style, time epochs, and geomorphology. In this paper we choose to focus on nine significant gold districts for which detailed scientific literature was available relevant to this project. These include the following gold districts: Northwestern Argentina, Culampajá, Farallón Negro–Bajo de la Alumbraera, El Indio–Pascua, Nevados del Famatina, Casposo–Castaño, Sierras Pampeanas, Chubut, and Deseado Massif. Below a brief description of the regional district geology and deposit settings is provided. For a more detailed description of the districts and deposits we refer to the detailed references provided. Note that in each gold province only major deposits or deposits that have been exploited in the past are described. For further detailed information about gold districts and deposits see the classic ore deposit handbook Recursos Minerales de la República Argentina (Zappettini, 1999) or a recent summary by Fogliata and Hagemann (2011a).

2.1. North-western Argentina gold district in Jujuy, Salta and Catamarca provinces (Orogenic)

The Puna plateau (Puna geological province) in Jujuy, Salta, and Catamarca provinces marks the highest part of the Andes in northwest Argentina and is an extension of the Bolivian Altiplano. The Puna plateau consists of two Ordovician NNE trending magmatic–sedimentary

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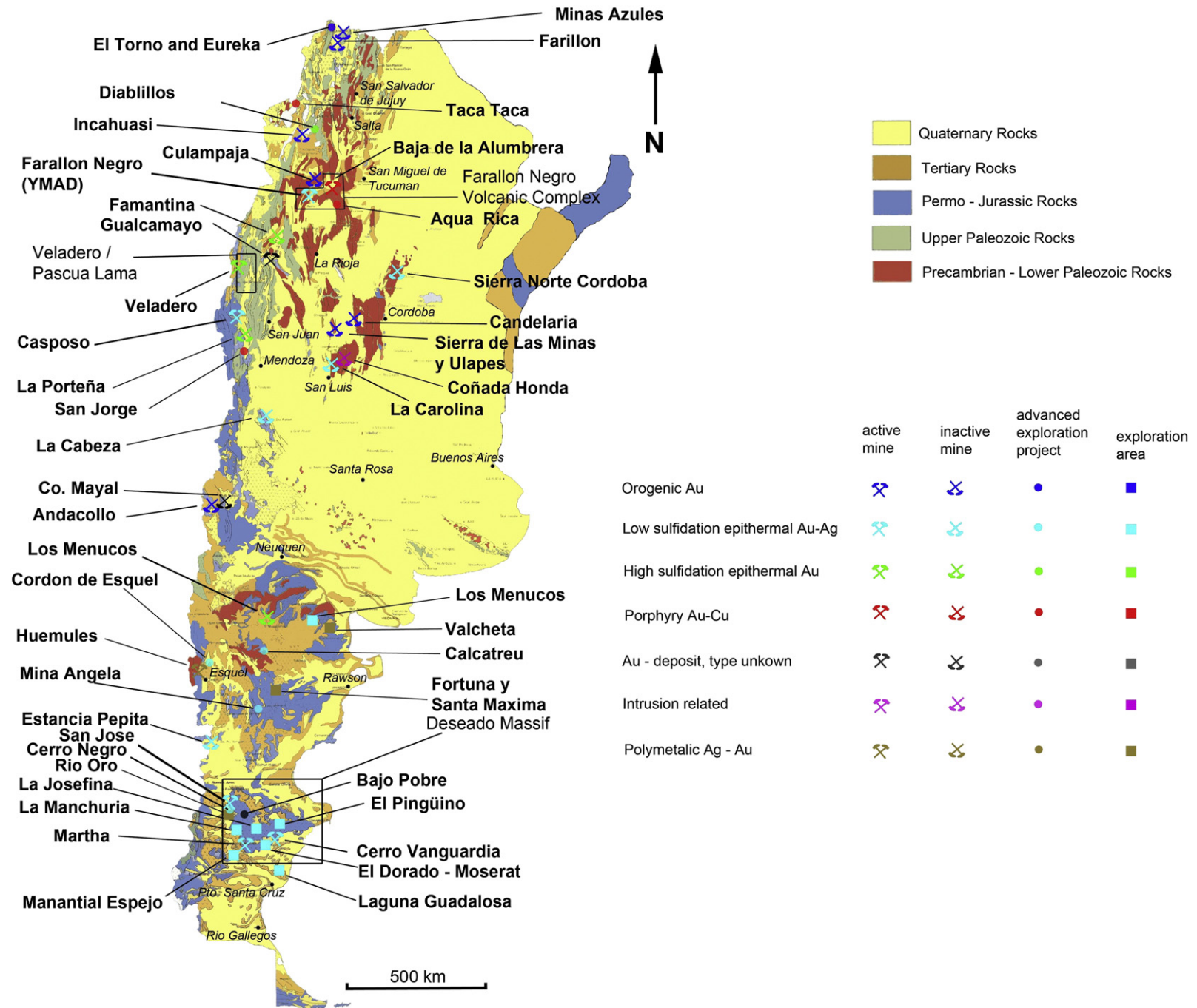


Fig. 1. Location of known gold deposits in Argentina (Fogliata and Hagemann, 2011a).

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