

THE ACHALA BATHOLITH (CORDOBA, ARGENTINA) A COMPOSITE INTRUSION MADE OF INDEPENDANT MAGMATIC SUITES

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ABSTRACT : In the Sierra de Cordoba (Argentina), the Achala batholith consists in four independent peraluminous magmatic suites which shows contrasted major and trace elements spectra and variable metallogenic specialisation.

KEY WORDS : Sierras pampeanas, S-type granites, differentiation , metallogenic specialisation

INTRODUCTION

The Achala batholith which outcrops over a surface of about 2500 km², is a major element of the Sierra Grande de Cordoba, the most oriental of the Pampean ranges. Several deposits and showings of W, Cu, U, F, Li, Be, Nb and Ta, are spacially associated with the batholith.

The recent papers dealing with its petrology and geochemistry consider only transversal cross-sections or limited sectors. The present study intends to take into account the whole batholith, since it is based on 84 reliable samples, carefully selected out of the 450 available analyses, in order to represent the different facies and the different sectors of the intrusion.

The Achala batholith is a post-tectonic intrusion emplaced in high grade metamorphic rocks of the pampean cycle (Upper Proterozoic). It is composite ; its main facies are synchronically emplaced in an environment of submeridian crustal shearing during a local extensional stage. An horizontal shortening induces the formation of NW to NNW trending magmatic shear zones which host synkinematic intrusions. After its emplacement, the batholith was affected by large dextral wrench faults associated with mylonites, which are anterior to the Upper Carboniferous, and by inverse faults related to the Andean cycle .

FOUR MAGMATIC SUITES

Structural, petrological and geochemical data allow one to divide the Achala batholith into homogeneus sectors and to recognise at least four magmatic suites ; the limits between the different domains, are not always obvious in the field, but are marked by strong geochemical discontinuities, particularly emphasized by the radiometric data.

Each suite regroups various petrographic facies : equigranular biotite granodiorites, porphyritic granodiorites and granites, coarse grained granites, equigranular muscovite granites, aplite and pegmatites.

All these different suites present a peraluminous character (S-type granites) but distinctions can be made using both trace and major elements : the Achala suite is richer in K, Rb, Sr, Zr, Th and U , the Champaqui suite richer in Na, Ba and Mg ; the Characato and Cumbrecita

suites are intermediate between the former. The Characato suite is particularly rich in REE ; Y and Nb present here a different behaviour.

Each suite seems to have its proper metallogenic specialization.: the uranium and fluorite deposits and showings appear related to the Achala suite , the W deposits and showings to the Characato suite and the pegmatites of metallogenic interest (Li, Be, Nb, Ta, P) to the Champaqui suite.

CONCLUSION

These difference that have been just mentionned, are observed even in the less differentiated members of the various suites ; the parental magmas must thus have been independent and these suites may be of very different ages. The published geochronological studies carried out without taking care of the composite character of the batholith, assing to the Achala batholith an age varying from Silurian to Carboniferous. : 399 ± 25 Ma for the Achala suite (probably errorchron) (Rapela & al. 1982); 337 ± 30 / 358 ± 9 Ma for the Characato suite (Rapela & al. 1991). As long as new data are not available, one must thus be very cautious about any geotectonical interpretation of the Achala batholith.

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