

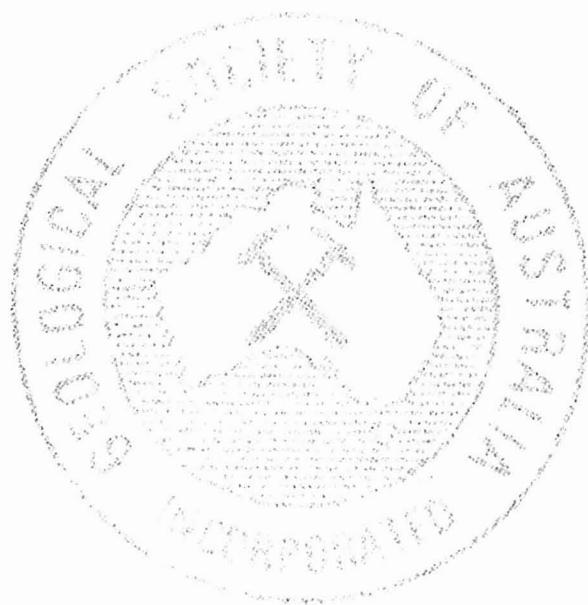
809440

DOC. 400

Geological Society of Australia

# ABSTRACTS

Number 27



SEVENTH INTERNATIONAL CONFERENCE ON

## **GEOCHRONOLOGY COSMOCHRONOLOGY AND ISOTOPE GEOLOGY**

Monday 24–Saturday 29 September, 1990

Canberra—Australia

**U-Pb ISOTOPE AND TRACE ELEMENT COMPOSITIONS OF BLACK AND KIMBERLEY REEFS PYRITE, SOUTH AFRICA: IMPLICATIONS FOR AGE AND ORIGIN**

BARTON, E.S., Bernard Price Institute of Geophysical Research, Univ. of the Witwatersrand, P O Wits 2050, South Africa, and HALLBAUER, D.K., Dept of Geology, Univ of Stellenbosch, Stellenbosch 7700, South Africa

In the Black Reef Quartzite Formation of the Transvaal Supergroup (East Rand Gold Field, South Africa) three types of pyrite occur in two gold-bearing conglomerate facies: 1) compact, rounded detrital, 2) rounded, porous and colitic synsedimentary, and 3) recrystallised authigenic grains.

Pb-isotope data for Type 1 pyrite from both facies suggest that all Type 1 pyrites crystallised about 3000 Ma ago from a common source that had a bulk earth composition. Pb-isotope and trace element data for Types 2 and 3 pyrite show very different patterns indicative of their sedimentary/authigenic origin. The Pb data for these pyrites define a steep linear trend on a Pb-Pb plot. If this trend represents an "anomalous Pb" line the maximum age of the source of the radiogenic contaminant is 3800 Ma and the time of formation of the radiogenic Pb component is 2500 Ma. The latter is a maximum age for Black Reef deposition. Such steep trends, common for many secondary minerals and some rock units in the Witwatersrand depositary, may reflect a widespread hydrothermal event.

The Pb-isotope compositions, U, Pb and trace element contents of Kimberley Reef detrital pyrites are distinct from that of all the Black Reef pyrites. While the 3000 Ma age for the Black Reef detrital pyrites does not exclude a Witwatersrand source, these data preclude the Kimberley Reef as a source for the pyrite.

**A K-Ar PROFILE THROUGH THE JOINVILLE MASSIF AND THE DOM FELICIANO BELT, SOUTHERN BRASIL - TECTONIC IMPLICATIONS.**

M.A.S. BASEI, O. SIGA JR. and K. KAWASHITA. IGc. Universidade de São Paulo, PO. BOX. 20899, CEP 01498. São Paulo, Brasil.

A K-Ar cooling age profile using biotite, amphibole, plagioclase, K-feldspar and whole rock data from metamorphic rocks of the Ribeira Belt, Joinville Massif and Dom Feliciano Belt is presented. The results are fairly coherent with crustal modeling previously obtained from geological and gravimetric data. Three main geochronological domains are distinguishable, from NW to SE: 1) Ribeira Belt (RB) and the northern part of the Joinville Massif (NJM); 2) southern part of the Joinville Massif (SJM); and 3) Dom Feliciano Belt (DFB). All domains are separated by major thrust faults probably related to lithospheric discontinuities. Geochronological domains 1 and 3 yielded K-Ar values of 750-500 Ma and 600-500 Ma, respectively, which show a clear influence of the Brasiliano Cycle. The granulite terrain comprising the SJM exhibits ages between 2200 and 1800 Ma, indicating that this area was cool during the Late Proterozoic Brasiliano Cycle. More detailed analysis of the profile reveals thermal differences at the tectonic contacts, interpreted here as a result of the geometrical characteristics of the nappes related to these boundaries. The SJM and NJM limit is marked by a rapid transition from Early Proterozoic ages (2000-1800 Ma) in the SJM, to Late Proterozoic ages (600 Ma) in banded gneisses of the NJM. This boundary is also delimited by a discontinuous belt of mafic bodies and an increase in regional metamorphism near the southern limit of the NJM. By contrast, the contact between the SJM and DFB is interpreted as a thrust at a high, relatively cool crustal level.

**GEOCHRONOLOGY AND GEOCHEMISTRY OF GROUP A ECLOGITES FROM THE MOLDAUBIAN ZONE OF THE BOHEMIAN MASSIF, CZECHOSLOVAKIA**

BEARD, Brian L., MEDARIS, L. Gordon, Jr., JOHNSON, Clark M., Dept. of Geol. and Geophys. University of Wisconsin, Madison, WI, 53706, USA, and BRUECKNER, Hannes K., Queens College, Palisades, NY 11367, USA

Eclogite and garnet pyroxenite that occur as lenses within garnet peridotite have been investigated from five localities in the Moldanubian zone of the Bohemian Massif, Czechoslovakia, to establish the age and equilibration conditions of eclogite formation and to evaluate the relative contributions of mantle and crust to their petrogenesis.

Garnet and omphacite are compositionally zoned with homogenous cores and retrograde rims. Depending on locality, cores of minerals yield minimum temperatures and pressures of 850-1050°C and 15-25 kb, based on Fe-Mg exchange between garnet and clinopyroxene and the jadeite content in clinopyroxene.

Eclogite samples range from ne- to hy- normative, are subalkaline, and define a tholeiitic AFM trend. REE patterns for eclogite are relatively flat to slightly LREE depleted. Elevated MgO and Cr contents indicate that these eclogites are not primary melts, and scatter in element variation diagrams suggests that they are cumulate in origin with up to 30% trapped melt.

Sm-Nd ages for garnet-clinopyroxene pairs are 374-327 Ma, reflecting events related to the Variscan Orogeny.  $\epsilon_{Nd}$  values and initial  $^{87}Sr/^{86}Sr$  ratios are anticorrelated and vary from -3 to +6 and 0.7025 to 0.7067, respectively. Field, compositional, and isotopic data indicate that the eclogites were derived from depleted to enriched mantle and were transported into the crust by enclosing mantle-derived peridotites during Variscan Orogenesis.

**Late Neogene  $^{87}Sr/^{86}Sr$  isotopic record in the western Arabian Sea; ODP Leg 117.**

C.J. Beets, Geomarine Center, Vrije Universiteit, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands.

This poster demonstrates the potential of strontium isotopes as a chronostratigraphical tool for late Neogene marine sediments. The sediments which were recovered during ODP Leg 117 in the western Arabian Sea provide a continuous early Miocene to Present record. This interval can be dated with strontium isotopes with a resolution varying from 0.2-1.5 My due to the "stepwise" increase of the  $^{87}Sr/^{86}Sr$  ratio in seawater. A comparison with earlier strontium evolution curves of DePaolo from the Tasman Sea and of McKenzie from the Mediterranean confirms the use of these curves as good chronostratigraphical tools for the late Neogene.