European Mineralogical Conference
Vol. 1, EMC2012-275-2, 2012
European Mineralogical Conference 2012

U-Pb detrital zircon age and Nd-Pb isotopic composition of sediments from the Phyllite–Quartzite Group, Iberian Pyrite Belt

R. C. G. S. Jorge (1), J. M. R. S. Relvas (1), S. Meffre (2), C.C.G. Tassinari (3), P. Fernandes (4), and Z. Pereira (5)

(1) CREMINER (LA-ISR), Universidade de Lisboa, Faculdade de Ciências, Departamento de Geologia, Edificio C6, Piso 4, Campo Grande, 1749-016 Lisboa, Portugal; rjorge@fc.ul.pt, (2) Australian Research Council Centre for Excellence in Ore Deposits, University of Tasmania, Hobart Campus, Private Bag 79 Hobart Tasmania 7001, Australia, (3) Centro Geocronologia (CPGeo), Universidade São Paulo, P.O. Box 11.340, São Paulo, Brasil, (4) CIMA, Centro de Investigação Marinha e Ambiental, Universidade do Algarve, Campus de Gambelas 8005-139 Faro, Portugal, (5) LNEG-LGM, Unidade de Geologia e Cartografia Geológica, Rua da Amieira, 4465-965 S. Mamede Infesta, Portugal

The Iberian Pyrite Belt is one of domains of the South Portuguese Zone, a SW branch of the European Hercynian Orogen. The Phyllite–Quartzite Group is the oldest unit of the Iberian Pyrite Belt (lower Givetian-Strunian age) and comprises a thick sequence of phyllites and (meta)sandstones deposited in a shallow water environment, likely a large marine siliciclastic platform affected by wave and storm events. To better understand palaeogeographic and palaeotectonic evolution of the Phyllite–Quartzite Group depositional basin, we have conducted a provenance study based on whole-rock Pb and Nd isotopic data of fine grained lithofacies, as well as U-Pb LA-ICP-MS detrital zircon analyses from coarse grained rocks. Samples were collected in Portuguese and Spanish sectors of the Iberian Pyrite Belt and palynomorph studies were used as detailed stratigraphic control. Fine grained lithofacies of the Phyllite–Quartzite Group have lead isotopic compositions characterized by $^{206}Pb/^{204}Pb$ = 18.639 - 19.466, $^{207}Pb/^{204}Pb$ = 15.639 - 15.697 and $^{208}Pb/^{204}Pb$ = 38.908- 39.965. These rocks display εNd (t) ranging from -7.14 to - 8.98 and T_{DM} model age of 1.55 – 1.85 Ga. Zircon geochronology reveals a wide spectrum of U-Pb ages, from the Paleoproterozoic to the Upper Devonian. The wide range of U-Pb ages in detrital zircons reflects the complex sedimentary heritage of the Phyllite–Quartzite Group. The occurrence of zircons of Mesoproterozoic age indicates the contribution of recycled sediments from the Amazon Craton, besides the possible input of other source areas to this unit. As a whole, the geochronological signatures of zircons from the sediments of the Phyllite–Quartzite Group indicate that this lithostratigraphic unit of the South Portuguese Zone correlates with the Avalonia-Meguma terrain. Integrated analysis of all the isotopic tracers suggests provenance dominated by erosion of old upper continental crust, extensively recycled and associated to a passive continental margin.

This study is a contribution to research projects ARCHYMEDES (FCT-SAPIENS 2001/41393) and ARCHYMEDES II (SAPIENS 2002/45873).