

SBPG - Sedimentary Basins and Paleontology Group

9.1.3 - Research Group Description and Achievements for 2008-2012

A- Members of the Group

Full members

Ausenda Albino
João Pais
José Carlos Kullberg
Lígia Castro
Maria Manuela Simões
Martim Chichorro
Miguel Telles Antunes
Octávio Mateus
Paulo Legoinha
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External Advisory Committee

Jacques Rey (Univ. Toulouse, France)
Louis Jacobs (Southern Methodist University, USA)

PhD Students

Ana Catarina Rodrigues Medeiros	(J5247782MNM6)
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Fernando Ferreira da Cruz	
Paula Cristina Loureiro Coelho	
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B- Organization of the Group

The SBP Group is lodged at the Dep. of Earth Sciences (DCT/FCT/UNL, Caparica *campus*) and articulates its activities with those of the other groups of GEOBIOTEC and of the DCT/FCT/UNL. All members were integrated in the former CICEGe Research Centre. Is involved in teaching of MSc on Paleontology, MEng of Engineering and water management, and PhD on Geology.

The Group promotes advanced multidisciplinary R&D in the areas of Geology of Sedimentary Basins and Palaeontology:

- Multidisciplinary study of the Portuguese basins:
 - Ediacaran to Paleozoic sedimentary units and tectono-sedimentary evolution of SW Iberia basins related with the assemblage and break-up of Gondwana and Pangea supercontinents
 - Jurassic and Cretaceous sedimentary units and tectono-sedimentary evolution of the Lusitanian and Algarve basins, comparison with other basins, in the Atlantic and Thetyan realms;
 - Late Cretaceous and Neogene sedimentary units and tectono-sedimentary evolution of the Cenozoic basins and their Atlantic and Mediterranean relationships.

- Palaeontology:
 - Palaeontologic heritage of vertebrates: dinosaurs, other reptiles, footprints and eggs, fishes, mammals, human;
 - Lower Jurassic invertebrate macrofaunas (ammonites, brachiopods, bivalvia);
 - Palaeobotany;
 - Micropalaeontology (Foraminifera, Dinoflagellata, pollen & spores)
- Cathodoluminescence imaging and Zircon dating by U-Th-Pb Isotope analysis;
- Transport and Flow Processes in Shear Zones and related hydrothermal epigenetic orogenic Au-Ag-As-W-Sb-Cu-Zn-Pb-Mo deposits
- Hydrogeology of the Tejo and Lis Rivers Basins: characterization of the hydrostratigraphical units, water quality, sustainable management;
- Geological mapping of Meso-Cenozoic units and of Ediacaran-Lower Paleozoic sequences (SW Iberia)
- Geological Heritage of geosites
- Anthropology and Archaeozoology
- History of Science and Museology.

The SBP Group has an experience of more than 40 years of scientific production mainly centered on Stratigraphy and Paleontology of the Portuguese sedimentary basins, as well as their tectonic and palaeogeographic evolution. This is the most experienced team working in the Meso-Cenozoic basins, which present an important potential for economic exploration of hydrocarbons and a particular position linking the Atlantic and the Tethyan and Mediterranean Seas, therefore allowing studies that are the key to unravel the evolution of past living organisms, climate changes and global changes. Recently the group has been also focused on the history of the Ediacaran-Lower Paleozoic basins of northern Gondwana that were later deformed-metamorphosed in the Upper Paleozoic Variscan orogeny and involved on the crustal growth and recycling processes associated to the formation of some ore deposits in Iberia. The SBP Group also incorporates some of the most productive authors of geological maps published by the Portuguese Geological Survey at different scales.

The scientific results have been published in international indexed journal. Important research has been carried out in collaboration with renowned international specialists. Most of the members of the SBP Group participate (President, Scientific and Organizing Committees, Editorial Board) in STRATI 2013, the 1st International Congress on Stratigraphy organized, under the auspices of the International Commission on Stratigraphy (IUGS) by the Dep. of Earth Sciences and CICEGe, held in Lisbon in July 2013.

The SBP Group is headed by a senior researcher that will be responsible for encouraging the members to widen their international contacts, will disseminate information pertaining the production of the other members (e.g. new publications, conferences, invited lectures from external collaborators), will inform the members about new calls for projects and will promote regular meetings to encourage synergies inside the Group. Since this is a very experienced team working together for a long time, some thematic sub-groups are already informally established and they will continue to develop their projects with some autonomy.

C- The main scientific research subjects that involve members of the SB group are:

The application of geochronology to A) Rodinia, Gondwana and Pangea Stratigraphy, Paleogeographic reconstructions and to dating zircon forming events representing thermal/magmatic pulses related with the assemblage and break-up of Gondwana and Pangea supercontinents, B) crustal growth processes, deformation and metallogeny of gold in shear zones and fracture systems.

M.A.CHICHORRO, J.A. Almeida. Collaboration with R.Solá (LNEG), M.F. Pereira (IDL-Évora University), J.B. Silva (IDL-FCUL), A. Neiva (GeoBioTec_Coimbra University), I. S. Williams, R. Armstrong (ANU, Canberra); U. Linnemann, (M. M. G Dresden, Germany),

Gutiérrez-Alonso, G. (U. Salamanca, Spain); S. T. Johnston (U. Victoria, Canada), T. Sánchez-García and Bellido, F. (IGME, Madrid, Spain, A. C. Dorado, C. Fernandez, (U. Huelva, Spain), A. Apraiz (EHU, Bilbao, Spain), Gerdes, A. (IGM, Frankfurt, Germany), K. Dorst (U. Tübingen, Germany)

Mesozoic tectono-stratigraphic evolution of the Lusitanian and Algarve Basins and comparison with other Atlantic and Thetyan basins, mainly in the Iberia plate. Construction of a biostratigraphical correlation scale based on ammonites, for a detailed definition of major sedimentary discontinuities and understanding of their geodynamic significances.

R. ROCHA, J. C. KULLBERG; collaboration with Jacques Rey (Toulouse University, France), António Ferreira Soares (Univ. Coimbra), Christian Meister, Jean-Louis Dommergues, Luís Vítor Duarte (Univ. Coimbra) e Ana Cristina Azeredo (Univ. Lisboa)

Mechanisms and age of emplacement of diapirs, magmatism and collisional structures that interfered with extensional structures formed in the Mesozoic sedimentary basins of the Western Iberian Margin.

J. C. KULLBERG, J. PAIS, P. LEGOINHA; collaboration with Antonio Casas-Sainz, Ruth Soto, Belén Oliva-Urcia, Juan J. Villalaín (Univ. Zaragoza, Spain)

The Triassic vertebrates, the Mesozoic and Cenozoic crocodylians, and the Neogene cetaceans from Portugal.

M. T. ANTUNES, O. MATEUS.

Palaeontological study (molluscs, brachiopods, bivalvia, belemnites, among others) of the Lower Jurassic of the Lusitanian and Algarve basins in order to specify biostratigraphic and chronostratigraphic scales, palaeobiogeographic and palaeoenvironmental evolution and regional correlations.

R. ROCHA; collaboration with Jean Louis Dommergues (Univ. Bourgogne, France), Christian Meister (Mus. Hist. Nat. Genève, Switzerland), Antonio Goy, M^a José Comas (Univ. Complutense Madrid, Spain).

The Late Jurassic dinosaurs of Lourinhã Formation and comparisons with other fauna in Portugal, Europe and North America, including the study of nests, eggs, and embryos of dinosaurs. The vertebrate fossils of the Mesozoic and Cenozoic of Angola (Project PaleoAngola). The Mesozoic and Cenozoic vertebrates from Boulemane Region in Morocco (Project *Atlas Mémoire*). Geology and Climate Changes in the Late Triassic Norian-Carnian of Greenland and associated vertebrate fauna.

O. MATEUS

Characterization of the major environmental changes of the Early Cretaceous from Portugal, taking advantage of the exceptional conditions of those portuguese deposits. Study of the palaeobotany and palynology of the climatic-ecological-adaptative evolution of angiosperms from the Portuguese Lower Cretaceous, mostly during the time interval when angiosperms have obtained ecological predominance.

J. PAIS, Mário Mendes; collaboration of Jorge Dinis (IMAR), Else Friis (Swedish Museum of Natural History, Stockholm, Sweden), Jacques Rey (Toulouse University, France), Bernard Gomez (Lyon University, France).

The ichthyological faunas, since the Cretaceous, from Portugal, Brasil and Angola.

M. T. ANTUNES, A. BALBINO; collaboration with Henri-Charles Cappetta (Univ. Montpellier) and Antonio Fernandes (Univ. Fed. Rio de Janeiro)

Global changes and Cenozoic stratigraphy of the European and African Atlantic basins, including sedimentological, palaeontological and palaeoclimatic changes. Geological mapping of Cenozoic portuguese units (collaboration with LNEG).

P. LEGOINHA, J. PAIS; collaboration with J. Angel Gonzalez, Idefonso Armenteros, Gaspar Gavillan, Jorge Civis (Salamanca University, Spain).

Micropalaeontological study (foraminifera, nannofossils, ostracoda, molluscs, fishes, small mammals, among others) of the Neogene of the Lower Tagus Basin and of the Algarve platform, in order to refine biostratigraphic scales and chronology, palaeoenvironmental and palaeoclimatic evolution and regional correlations.

P. LEGOINHA, M. T. ANTUNES, AUSENDA BALBINO, J. PAIS, LÍGIA CASTRO; collaboration with J. Angel Gonzalez, Jorge Civis, José Abel Flores from Salamanca University, Spain).

Geological mapping and 3D-4D geo-modeling.

M.A. CHICHORRO, J. PAIS, J.A. Almeida J. C. KULLBERG. Collaboration with M.F. Pereira (IDL-Évora University), J.B. Silva (IDL-FCUL) and R. Solá (National Laboratory of Energy and Geology - LNEG) in the scope of the project "Research of geological infrastructure and geological mineral resources in order to the publication of geological maps at scale 1:200000 (Map 5) and 1:50000 (Map 39b – Santiago do Escoural).

Modeling, stochastic and deterministic characterization of the hydrostratigraphical units of the Tejo-Sado Aquifer System at the Setúbal peninsula.

M. SIMÕES; collaboration with Luis Ribeiro (IST), Maria do Rosário Carvalho (FCUL).

Vulnerability and risk of groundwater contamination by nitrates in the hydrographical basin of the Lis River.

M. SIMÕES; collaboration with Luis Ribeiro (IST), Fernando Ferreira da Cruz (IPL).

Soil and water contamination due to intensive use of fertilizers in agricultural land at Caparica in the Tejo River Basin.

M. SIMÕES; collaboration with Celeste Jorge (LNEC), Malva Mancuso (UFSM, Brasil), Jorge Martinez (QUTB, Australia).

Evaluation of climate change effects on the coastal aquifers systems of Caparica in the Tejo River Basin.

M. SIMÕES; collaboration with Maria do Rosário Carvalho and Catarina Silva (FCUL)

Anthropological (*collaboration with Cristiana Pereira, Univ. Lisboa*) and archaeozoological studies of the Convento de Jesus Cloister (Lisbon, Academy of Sciences). Medieval islamic numismatics.

M. T. ANTUNES

Stages of the zoological knowledge since middle age until early 19th century. Development and restoration of the Maynense museum from the Academy of Sciences of Lisbon. *Miguel M. T. ANTUNES, A. BALBINO; collaboration with Philippe Taquet.*

The Geological Heritage sites of the Arrábida Chain and other areas of the central Portugal, related to the Alpine evolution of the Western Iberian Margin.

J. C. KULLBERG