



# REPORT

  

# FOR 2014

## — THE BRAZILIAN NATIONAL COMMITTEE —

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### PROJECTS WITH BRAZILIAN LEADERSHIP OR PARTICIPATION

Brazil participates on 4 IGCP Projects with Brazilian leader- or co-leadership (projects 598, 599, 604, and 628), and 1 with Brazilian Participation (project 632).

### Projects With Brazilian Leadership Or Co-Leadership

No. 598 – **ENVIRONMENTAL CHANGE AND SUSTAINABILITY IN KARST SYSTEMS** (2011-2014)

**Project co-leader:** Augusto Auler - CARSTE Consultores Associados - R. Brasópolis 139, Belo Horizonte, MG, 30150-170 - Brazil (aauler@gmail.com; Tel. 55 31 2552-9976, 55 31 2552-9974)

**Summary of Activities:** Organization of international course “Cave Restoration and Conservation” held in Cordisburgo (Brazil) between April 7-13, 2014.

**Meetings:** The following meetings have been attended:

- Participation on the IGCP 598 sponsored meeting “5<sup>th</sup> International Symposium on Karst”, held in Malaga, Spain between 13-16 October 2014.
- Participation on the WOKAM (World Karst Aquifer Mapping Project) project as a member of the Scientific Advisory Committee, in charge of South America. This project held a Scientific Advisory Committee meeting in Karlsruhe (Germany) in April 12-13, 2014.

**Main Publications:**

Auler, A.S; Piló, L.B. 2015. Caves and mining in Brazil: The dilemma of cave preservation within a mining context. In: Andreo, B. et al. Hydrogeological and Environmental Investigations in Karst Systems, Springer, Berlin, p. 487-496.

Parker, C.W; Wolf, J.A; Auler, A.S; Barton, H.A; Senko, J.M. 2013. Microbial reducibility of Fe (III) phases associates with the genesis of iron ore caves in the Iron Quadrangle, Minas Gerais, Brazil. Minerals 3: 395-411.

Pessoa, P.F.P.; Auler, A.S. 2015. Characterization and dynamics of two karst springs in a soil-covered karst area, Lagoa Santa, southeastern Brazil. In: Andreo, B. et al. Hydrogeological and Environmental Investigations in Karst Systems, Springer, Berlin, p. 207-218.

No. 599 – **THE CHANGING EARLY EARTH: CORRELATING AND MODELING SECULAR TRANSITIONS IN THE CRUST FORMATION AND LIFE ENVIRONMENTS** (2011-2014) - [IGCP/SIDA]

**Project continental leader for South America:** Roberto Dall'Agnol - Inst. de Geociências, Federal University of Pará - UFPa, Brazil (robdal@ufpa.br; Tel. (55 91) 3201-7477)

**Project's Web Site:** <https://sites.google.com/a/early-earth.org/early-earth/>

Brazilian project participants were committed to the publication of a special issue of the MUSEU PARAENSE EMILIO GOELDI BULLETIN dedicated to the Archean terranes of the Transition subdomain of the Carajás Province. The special issue was proposed by R. Dall'Agnol, C. N. Lamarão and D. C. Oliveira of the Geosciences Institute of the Federal University of Pará and published as planned at the end of 2013 (last number for 2013 of the Boletim do Museu Paraense Emilio Goeldi). The special issue contains one introductory paper and five research papers (see below).

**Published Papers:**

1. Special Issue of the BOLETIM DO MUSEU PARAENSE EMILIO GOELDI. Ciências Naturais – Volume 8, number 3, September-December 2013 (published beginning of 2014):

Dall'Agnol, R.; Oliveira, D. C. & Lamarão, C. N. Magmatismo granitoide arqueano e evolução geológica do Subdomínio de Transição da Província Carajás, sudeste do Cráton Amazônico, Brasil.

Santos, R. D.; Galarza, M. A. & Oliveira, D. C. Geologia, Geoquímica e Geocronologia do Diopsídio-Norito Pium, Província Carajás.

Ronaib, C. & Oliveira, D. C. Geologia, petrografia e geoquímica das associações TTGs e Leucogranodioritos do extremo norte do Domínio Rio Maria – Província Carajás.

Teixeira, M. F. B.; Dall'Agnol, R.; Silva, A. C. & Santos, P. A. Geologia, Petrografia e Geoquímica do Leucogranodiorito Pantanal e Leucogranitos arqueanos da área a Norte de Sapucaia, Província Carajás – Pará.

Santos, P. A.; Teixeira, M. F. B.; Dall'Agnol, R. & Guimarães, F. V. Geologia, Petrografia e Geoquímica da Associação Tonalito-Trondhjemito-Granodiorito (TTG) do Extremo Leste do Subdomínio de Transição, Província Carajás - Pará.

Santos, M. J. P.; Lamarão, C. N.; Lima, P. H. A.; Galarza, M. A. & Mesquita, J. C. L. Granitoides arqueanos da região de Água Azul do Norte, Província Carajás: petrografia,

geoquímica e geocronologia

## 2. Other Publications:

Silva, A. C.; Dall'Agnol, R.; Guimarães, F. V.; Oliveira, D. C. 2014. Geologia, petrografia e geoquímica de Associações Tonalíticas e Trondhjemíticas Arqueanas de Vila Jussara, Província Carajás, Pará. Bol. Mus. Para. Emílio Goeldi. Cienc. Nat., Belém, v. 9, n. 1, p. 13-45, jan.-abr. 2014.

Gabriel, E. O. & Oliveira, D. C. (in press) Geologia, petrografia e geoquímica dos granitoides arqueanos de alto magnésio da região de Água Azul do Norte – Província Carajás (PA). Bol. Mus. Para. Emílio Goeldi. Cienc. Nat., Belém, v. 9, n. 3, set-dez. 2014 (in press).

No. 604 – **GROUNDWATER AND WETLANDS IN IBERO-AMERICA** (2011-2015)

**Project co-leader:** Gerson Cardoso - Federal University of Rio de Janeiro - UFRJ - Brazil (gerson@acd.ufrj.br; Tel. (55 21) 2598-9464, (55 21) 2590-8091).

**Web Site:** <http://www.mdp.edu.ar/hidrogeologia/IGCP604>

**Some Reasoning:** The main objective of the project, under development since 2011 by researchers of several countries (Argentina, Spain, Colombia, Brazil) in collaboration with colleagues from various countries of Latin America and the Iberian Peninsula, was the analysis of interactions between groundwater and wetlands in Ibero-America (Latin America plus the Iberian Peninsula), allowing the description and systematization of this knowledge thus providing a profile of the current state of those important water bodies. As most wetlands depend strictly on their interactions with groundwater sources for their maintenance and existence, the understanding of hydrological, human and ecosystemic components involved are, therefore, crucial. Wetlands also provide support for a wide variety of ecosystems vital to biodiversity and human welfare.

**Summary of Activities:** During the year 2014 there were a number of events related to the project, namely participation in congress, team meetings and preparation of scientific articles. Presently, 52 cases from 12 countries were raised. Approaching the end of the project, we expect to achieve an advanced conceptual framework of wetlands' state in Ibero-America and the Iberian Peninsula, comparing interactions between wetlands and selected aquifers in the state of Rio de Janeiro and other areas of Brazil and other participating countries. Currently the project is near closure, with preparations for the Final Report and corresponding scientific articles in process.

**Brazilian WG:** Gerson Cardoso da Silva Junior, D. Sc. (UFRJ) (national co-leader), Aderson Marques, M.Sc. (DRM-RJ), Kátia Leite Mansur D.Sc. (UFRJ), Claudio Limeira Mello, Ph.D. (IGEO/UFRJ), Maria da Gloria Alves D.Sc. (UENF).

### Conferences and Scientific Meetings attended:

- V Congreso Colombiano de Hidrogeología in Medellín. Colombia, September 24-26, 2014. Participant countries: Argentina, Brazil, Colombia, Spain and Peru.
- 4<sup>th</sup> IGCP-604 General Meeting - Medellín, Colombia, 26 September 2014 - Chairwoman: Dr. Teresita Betancur, IGCP 604 co-Leader in Colombia.

Participants: members of the project: Dra. Emilia Bocanegra (Project Leader), Dr. Gerson Cardoso da Silva (Brazil), Dr. Teresita Betancur (Colombia) and Dr. Emilio Custodio (Spain). Dr. Gerson Cardoso from Brazil chaired a busy congress Special Workshop to address groundwater and wetlands interaction issue. IGCP 604 annual meeting followed this session.

The scope of the meeting consisted in:

- Discussion on the case studies inventoried, including the use of indicators to assess trends and definitions of the type of study areas.
- Proposed activities to assess the state of wetlands management.
- Publication of results in scientific conferences.
- Preparation of indexed articles.
- Summary for preparing the Final Report of IGCP-604

### Published Papers:

Cerqueira, F.C.; Alves, M.G.; Chrispim, Z.M.P.; Almeida, F.F.; Correia, L.C.; Cardoso da Silva Jr., G. PAP017698 - Análise preliminar da qualidade das águas do aquífero livre no município de São João da Barra, RJ. *In Cong. Bras. Hidrogeol XVIII Annals Belo Horizonte, Brazil.*

Chrispim, Z.; Alves, M.G.; Condesso de Melo, M.T. Cardoso da Silva, G. Jr. Origin of groundwater salinity and implications for groundwater management of the Emborê Aquifer, Rio de Janeiro State, Brazil. *IN SWIM, 23 Saltwater Intrusion Meeting. Husum, Germany.*

Bocanegra, E.; Manzano, M.; Custodio, E.; Betancur, T.; Cardoso da Silva Jr., G. Análisis de las acciones de gestión en humedales que brindan servicios altos al bienestar humano en Iberoamérica. *In* 5º Congreso Colombiano de Hidrogeología, Medellín, Colombia.

**Educational, Teaching or Human Resources:** There are two undergraduate students (funded by scholarships) working in the project, assisting in data collection of wetlands in Brazil and also a M.Sc. student (Mónica Fernandes). Both activities are underway, scheduled for completion by the end of 2015.

#### No. 628 – THE GONDWANA MAP PROJECT - THE GEOLOGICAL MAP AND THE TECTONIC EVOLUTION OF GONDWANA (2013-2017)

**Project Leader:** Renata da Silva Schmitt - Departamento de Geologia IGEO - CCMN - Federal University of Rio de Janeiro - UFRJ - Av. Athos da Silveira Ramos 274 sl. J2-020 - 21949-900 - Brazil (renatagondwana@uol.com.br / renata.schmitt@pesquisador.cnpq.br; Tel. (55 21) 2598-9482, (55 21) 99638- 8859).

**Summary of Activities of the Brazilian Working Group:** Ongoing activities are related to the building up of the GIS of Gondwana, as well as the geological database hosted on the Gondwana Digital Center of Geoprocessing (GSCG) at the Federal University of Rio de Janeiro (UFRJ).

These and other activities resulted on the release of the first draft of the Gondwana map, the highlight of the IGCP-628 second year. Two special workshops for IGCP-628 participants were organized by the Brazilians co-leaders, with the presentation of the draft. The scientific community endorsed the draft, but also made several comments and suggestions that are being incorporated by the research theme at the Gondwana Lab in Rio de Janeiro.

The research themes that started in 2013 proceeded with success and several publications were produced. Among these subjects the geology of southern South America strengthened the link between Brazilian and scientists from other South American countries. Another positive aspect was the engagement of more undergraduate and graduate students on the IGCP-628 research subjects supervised by both Brazilian and foreign professors that are cooperating in these Gondwanan areas. As pointed out in the report from 2013, the development of the SCIENCE WITHOUT BORDERS Program, from the Brazilian Science Funding Agency, CNPq, had a major impact on the acceleration of the IGCP-628 links and cooperation.

These new collaborations and ideas put the IGCP-628 participants among several geological problems to investigate on the tectonic evolution of Gondwana.

Regarding the Brazilian scientific community, IGCP Proj. 628 has an important role integrating the Brazilian universities and other research centers. Strong scientific groups of Brazilian geoscientists are fundamental to expand the geological knowledge from South America to the rest of the world. The Gondwana project is an opportunity to more closely confront the Brazilian scientists with the main scientific international issues, as well as to show the complexity and singularity of the South American geology to the scientific international community.

#### **Organized Scientific Meetings:**

- 21-26<sup>th</sup> of September 2014 – The symposium “GEODYNAMICS AND CRUSTAL EVOLUTION OF SOUTH AMERICA IN THE PALEOZOIC” on the Brazilian Geological Congress, coordinated by two IGCP-628 co-leaders Renata Schmitt (UFRJ) and Edison Milani (PETROBRAS) together with Prof. Leonardo Fadel Cury (UFPR).

Comprising four major themes (Tectonic consolidation of Gondwana: magmatic activity and deformation on the Cambrian-Silurian mobile belts; Orogenic collapse, thermal flux and erosion-sedimentation balance in the Gondwana lithospheric plate; Shear zones generated and/or reactivated during the Paleozoic; and Structural control of sedimentation of the Paleozoic basins in the South American platform), the one day session had oral and poster sessions. Selected papers from this symposium will be published next year on a Brazilian scientific journal.

- The IGCP-628 workshop on the Gondwana Map was held at the UNESCO headquarters (UNESCO-IUGS-IGCP - Paris, France) on 17<sup>th</sup> February 2014, during the CGMW GENERAL ASSEMBLY. The co-leaders of IGCP-628 coordinated the workshop: Renata Schmitt and Colin Reeves. Among the participants, Lêda Fraga, researcher from the Geological Survey of Brazil, presented the Tectonic Map of South America for discussion.
- The GONDWANA 15 was held in 13-18<sup>th</sup> of July in Madrid (Spain). It is a major meeting about the Gondwana evolution, attended by the specialists on Gondwana evolution. Our IGCP project 628 “The Gondwana Map Project– the geological map and the tectonic evolution of

Gondwana” proposed an oral session/workshop and a poster-exhibition of the first Gondwana Map draft on scale 1:10M during this meeting. The map was exposed on the exhibition hall during all week. In the workshop, scientists were able to discuss this first draft of the new Gondwana map was presented (1:10M). The main focus was the discussion of the legend of the map and the geology. The aim was to see the Gondwana evolution through the map. Therefore the main Gondwanan entities must be enhanced: Cratons, Mobile belts (pre and syn-Gondwana), Paleozoic-Mesozoic basins, and pre-break-up features. The co-leaders of IGCP-628, Umberto Cordani (Brazil), Alan Collins and Colin Reeves coordinated the session.

**Other Scientific Meetings attended:** Some other meetings have been attended by Brazilian project, with the presentation of talks on project related topics:

- Talk on the CGMW GENERAL ASSEMBLY between 18<sup>th</sup> and 20<sup>th</sup> of February 2014 at the UNESCO headquarters (UNESCO-IUGS-IGCP -Paris, France) by Renata Schmitt presenting IGCP-628 and giving the annual report for 2013.
- Talk on the IODP Workshop organized by the Geological Survey of Brazil. The meeting took place in Rio de Janeiro (Brazil) between 2-4<sup>th</sup> of April, 2014. The IGCP-628 project leader, Renata Schmitt (UFRJ), gave the talk: “*The Gondwana Map Project: linking offshore and onshore geology of the continental margins*”.  
The three day-workshop aimed the organization of Brazilian proposals for developing IODP projects for drilling the Brazilian continental margin in 2018-2019. Dr. Roberto Ventura Santos (Geological Survey of Brazil Director), Dr. Adriano Viana (PETROBRAS), Dr. Luciano Magnavita (PETROBRAS), Dr. Gianreto Manatschal (University of Strasbourg – France), Dr. Natasha Stanton (UFRJ-Brazil) and Dr. Elton Dantas (UnB-Brazil), all Proj. 628 participants, gathered with Renata Schmitt and other 50 scientists from Brazil, Germany and USA, in order to discuss the frontiers of the IODP on the Brazilian margin and the links with the Gondwana project. All scientists mentioned are participants of the IGCP-628. The project leader Renata Schmitt is co-author of the São Paulo Plateau proposal led by PETROBRAS.
- Talk by Renata Schmitt entitled *Unraveling the tectonic evolution of Brasiliano orogens from the actual South Atlantic margins – new U-Pb SHRIMP data* held at the 9<sup>th</sup> SOUTH AMERICAN SYMPOSIUM ON ISOTOPE GEOLOGY (SSAGI), São Paulo on April 6-9.
- Participation and talk by Rafael Fragoso (UFRJ) on the GEOLOGICAL MAP OF SOUTH AMERICA Workshop, 21 to 26.07.2014 at Villa de Leyva, Colombia.
- Dr. Evânia Alves (UFRJ) and Prof. Umberto Cordani (USP and project co-leader) presented a poster with the new draft of the Gondwana geological map on the GONDWANA15 Meeting, 13-18<sup>th</sup> July, in Madrid (Spain).
- Researcher Rafael Fragoso (UFRJ) presented the IGCP 628 Project on the GEODYNAMICS OF THE PALEOZOIC Symposium during the Brazilian Geological Congress on September 26<sup>th</sup>, in Salvador (Brazil).

**Technical Meetings and Field Campaigns:** Besides the Scientific Meetings and presentations, several technical meetings with smaller groups were organized in order to constrain the methodology of building up the new Gondwana Map. These meetings are presented below:

- Participation on the workshop TECTONIC MAPS, organized by CGMW in 21<sup>st</sup> of February, 2014 in the headquarters of CGMW in Paris (France), when the homogenization of the legends of the tectonic maps has been discussed.
- Talk on the Headquarters of PETROBRAS-CENPES. The project leader gave an hour talk on the Gondwana Project to the geologists of PETROBRAS on the 20<sup>th</sup> of August. The main objective is to give knowledge about the theme of the project to the group of specialists from the main financial supporter (PETROBRAS). The staff of geologists from PETROBRAS will help on the delimitation of the actual continental margins (specially the Atlantic) in order to make a better fit of the Gondwana fragments.
- Work-Meeting between the UFRJ Laboratory GIS staff and Prof. Umberto Cordani (São Paulo – USP) in the end of June 2014, when the Gondwana geological map draft to be presented in July in Madrid has been revised.
- Work-Meeting between the UFRJ Laboratory GIS staff and Prof. Victor Ramos (Universidad de Buenos Aires – UBA- Argentina) in the end of August 2014. Prof. Ramos stayed one week at the lab revising the Andean geological map within the Gondwana geological map.
- Work-Meeting between the UFRJ Laboratory GIS staff and Prof. Renata Tommezolli (Universidad de Buenos Aires – UBA- Argentina) in the end of March 2014. Prof. Tommezolli stayed one week at the lab revising the geology of the Gondwanides Orogen within the Gondwana geological map.
- Field Work in Madagascar. The student Raisa Lopes Costa (from the Gondwana Laboratory-UFRJ) stayed one month (September – 2014) in the eastern part of Madagascar doing

geological field work with IGCP-628 co-leader Prof. Alan Collins (University of Adelaide) and his group. She is studying the para-derived metamorphic rocks of the Neoproterozoic Madagascar belt and the influence of pre-Neoproterozoic basement as source to get the Bachelor degree in Geology next year and present also the results as a Master Thesis.

- The PhD student Debora Nascimento (UFRJ) together with the IGCP-628 researcher Prof. Rudolph Trouw developed a week of field work in the northwestern part of Namibia. The aim was to collect samples for geochronological analyses in Brazilian laboratories. The results will be compared with the geological evolution of the basement from the Brazilian margin.

**New Researches:** During this year new research themes and groups were created and themes that started in 2014 have continued.

- The student Raisa Lopes Costa (Gondwana Laboratory-UFRJ) has been doing geological field work with IGCP\_628 co-leader Prof. Alan Collins (University of Adelaide, Australia), studying the para-derived metamorphic rocks of the Neoproterozoic Madagascar belt and the influence of pre-Neoproterozoic basement as source. The Australian group and the Brazilian UFRJ group are integrating the data from the Brasileiro and Pan-african mobile belts.
- Rafael Fragoso de Araújo (UFRJ) started a research in the northern part of Patagonia (Argentina) with Prof. Renata Schmitt (UFRJ) and Prof. Victor Ramos (UBA – Argentina), as supervisors. The studied area will be the Serra de Lihué Calel region. The focus is the geological mapping of the volcanic rocks of Chadileuvú Massif, a major Permian ignimbritic succession that extruded and might be the source for the detrital zircons of the Paleozoic Paraná basin in Brazil.
- Building up the geological database of Gondwana with focus on Brazil. The area of the country was built according to the GIS 2003 from the Geological Survey of Brazil (CPRM – scale 1:2.5M). The simplification of the geological map of Brazil to the scale 1:5M is still an ongoing process, as well as the integration with the South American neighboring countries.
- Brazilian project participants Renata Schmitt (UFRJ), Reinhardt Fuck (UnB), Natasha Stanton (UFRJ), Cesar Rigoti (PETROBRAS) and Carlos Eduardo Ganade de Araújo (CPRM) are the co-authors of a chapter entitled "THE INHERITANCE OF THE GONDWANA LITHOSPHERE – INTERACTION BETWEEN THE SUPERCOLLAGE AND RIFTING TECTONIC FRAMEWORK" which will integrate a special volume to be published by the Geological Society of London in 2015, entitled "ONSHORE-OFFSHORE CONNECTIONS ALONG THE BRAZILIAN CONTINENTAL MARGIN".
- The study of the geology of the Gondwana margin in southern South America started last year with the study of Sierra de La Ventana (Argentina) and the Gondwanides. Two Master theses were concluded in 2014 on the restoration of the Paleozoic sedimentary rocks of the Sierra de La Ventana, in Argentina (see publications). The Master Brazilian students Felipe Nepomuceno and Rodolfo de Paula, both from UFRJ, were supervised by Renata Schmitt and Renata Nela Tommezoli (UBA) (*Figures 4 and 5*).
- Correlating geology onshore of southeast and south Brazil with geology onshore of southwest Africa. The PhD student Debora Nascimento (UFRJ, Brazil) is working on the evolution of the Congo Craton margin in Angola and the tectonic events that developed the Kaoko-Damara orogenic systems. The study included a one week field work in the northwestern part of Namibia. The results will be compared with the geological evolution of the basement from the Brazilian margin.
- C.E. Ganade de Araujo, supervised by Umberto Cordani (co-leader of IGCP-628), both from USP, concluded this year his PhD thesis on the correlation between Brazilian northeastern onshore geology (Ceará) and northwest Africa (Togo-Benin, Mali) with the Neoproterozoic evolution of the mobile belts. The most important results have been published in Nature: Communications, with major impact on the Brazilian and world scientific community, with the title "EDIACARAN 2,500-KM-LONG SYNCHRONOUS DEEP CONTINENTAL SUBDUCTION IN THE WEST GONDWANA OROGEN" and is an important IGCP Proj. 628 contribution.

#### **Published Papers:**

##### **Meetings:**

- Britto Pereira, B.S., Schmitt, R.S., Carmo, I.O., Vasconcelos, P.M., Thiede, D.S., Fortes, I.S.F.C. 2014. Termocronologia  $^{40}\text{Ar}/^{39}\text{Ar}$  e o resfriamento de um granito ordoviciano em um orógeno colisional, Faixa Ribeira, sudeste do Brasil. 47° Congresso Brasileiro de Geologia, 2014, Salvador. Anais do 47° Congresso Brasileiro de Geologia.
- Fragoso, R. A., Schmitt, R. S., Armstrong, R. 2014. Caracterização da Deformação Cambriana do Domínio Tectônico do Cabo Frio - Estudo de Diques Pegmatíticos Sin-Cinematismo. 47° Congresso Brasileiro de Geologia, 2014, Salvador. Anais do 47° Congresso Brasileiro de Geologia, 2014. p. 1866.
- Fragoso, R. A., Schmitt, R. S., Silva, E. A., Stanton, N. S. G. 2014. SOUTH AMERICA - A KEY

- CONTINENT ON THE GONDWANA EVOLUTION, Geological Map of South America Workshop, 2014, Villa de Leyva, Colômbia.
- Fragoso, R. A., Benedek, M.R. 2014. América do Sul - Um Continente Chave na Evolução do Gondwana. XXXVI Jornada Giulio Massarani de Iniciação Científica, Tecnológica, Artística e Cultural, 2014, Rio de Janeiro. Livro de Resumos, 2014. p. 470.
- Fragoso, R. A. 2014. Caracterização da Deformação Cambriana no Domínio Tectônico do Cabo Frio Estudo de Diques Pegmatíticos Sin-Cinematismo. In: XXXVI Jornada Giulio Massarani de Iniciação Científica, Tecnológica, Artística e Cultural, 2014, Rio de Janeiro. Livro de Resumos, 2014. p. 479.
- Nepomuceno, F.O., Reis de Paula, R., Araújo, M.N.C., Schmitt, R.S., Tomezzoli, R.N. 2014. Geologia estrutural da porção noroeste do cinturão de dobramento paleozoico Sierra de La Ventana: aplicação de balanceamento estrutural e validação cinemática de seções. 47° Congresso Brasileiro de Geologia, 2014, Salvador. Anais do 47 Congresso Brasileiro de Geologia, 2014.
- Reis de Paula, R., Nepomuceno, F.O., Schmitt, R.S., Tomezzoli, R.N.. 2014. Geologia estrutural das serras de Curamalal e Bravard, porção oeste do cinturão móvel paleozoico Sierra de La Ventana (Argentina). 47° Congresso Brasileiro de Geologia, 2014, Salvador. Anais do 47 Congresso Brasileiro de Geologia, 2014.
- Schmitt, R.S., Alves, E., Stanton, N., Fragoso, R. 2014. The new Gondwana Geological Map – first draft. Gondwana 15, North meets South: Abstracts book. In Gondwana Symposium 15. jul. 2014. Madrid, Spain. p. 161.

#### **Papers:**

- Cordani, U. G., Pimentel, M. M., Araujo C.E.G., Fuck, R.A. 2013. The significance of the - Transbrasiliano-Kandi tectonic corridor for the amalgamation of West Gondwana. Brazilian Journal of Geology, v. 43, p. 583-597.
- Cordani, U. G., Pimentel, M. M., Araujo, C.E.G., Basei, M.A.S.; Fuck, R.A., Girardi V.A.V. 2013. Was there an Ediacaran Clymene Ocean in central South America?. American Journal of Science (1880), v. 313, p. 517-539.
- Fernandes, G.L.F., Schmitt, R.S., Bongioiolo, E.M., Basei, M., Mendes. J.C. Unraveling the tectonic evolution of a Neoproterozoic active margin in SE Brazil: U/Pb and Lu/Hf provenance data. Gondwana Research (submitted).
- Ganade de Araujo, C. E., Weinberg, R.F., Cordani, U. G . Extruding the Borborema Province (NE-Brazil): a two-stage Neoproterozoic collision process. Terra Nova, 26(2), p. 157-168.
- Ganade de Araujo, C. E., Rubatto, D., Hermann, J., Cordani, U.C., Basei, M.A.S. 2014. Ediacaran 2,500-km-long synchronous deep continental subduction in the West Gondwana Orogen. Nature Communications, 5:5198 | DOI: 10.1038/ncomms6198.
- Ganade de Araujo, Carlos E., Cordani, U.G., Weinberg, R., Basei, M.A.S. Armstrong, R.A., Sato, K. 2014. Tracing Neoproterozoic subduction in the Borborema Province (NE- Brazil): clues from U-Pb geochronology and Sr-Nd-Hf-O isotopes on granitoids and migmatites. Lithos, v.202-203, p.167-189.

#### **Master Theses:**

- Fernandes, G.L.F. 2014. Geocronologia e significado tectônico dos paragneisses da porção sudeste do Orógeno Ribeira, Rio de Janeiro, Brasil: Análises U/Pb e Lu/Hf. Master Thesis, UFRJ, Brazil. 130 p.
- Oliveira, F.N. 2014. Geologia estrutural da porção oeste do cinturão Sierra de La Ventana: aplicação de balanceamento e validação cinemática de seções geológicas. Master Thesis, UFRJ, Brazil. 150 p.
- Reis de Paula, R. 2014. Geologia estrutural das serras Curamalal e Bravard, porção oeste do Cinturão móvel paleozoico Sierra de la Ventana (Argentina). Master Thesis, UFRJ, Brazil. 180 p.

**Educational or Scientific Training or Capacity Building Activities:** A very good result from the project is the development of human resources in Brazilian universities with many undergraduate and graduate Brazilian students being engaged with IGCP Proj. 628 activities. Five Brazilian undergraduate students continue to develop research related to the Gondwana project funded by the SCIENCE WITHOUT BORDERS from CNPq in Australia. Three UFRJ Master students completed their theses on themes related to the IGCP-628. Two UFRJ PhD students are allocated at the Gondwana Lab developing their theses on the Gondwana project. Also at the UFRJ Gondwana Laboratory, there are six undergraduate students working on building up the GIS of Gondwana

**Activities Planned for 2015:** besides the ongoing research work, very important workshops to discuss the fit of the Gondwana derived continents and to revise the geological map of

Gondwana are planned. These meetings would be of two types:

- Workshops with few people to work on the map and geological problems;
  - Second week of June – Workshop about the rotation and fit of the Gondwana fragments with invited specialists on the theme and the softwares. This is a very important meeting where the new Gondwana fit might come out. The workshop will be held on Rio de Janeiro city and coordinated by Renata Schmitt, Alan Colins and Colin Reeves, all IGCP-628 co-leaders. World class scientists on paleogeography will be especially invited: Trond Torsvik (Norway), Dietman Muller (Australia) and others. This field of research is not well developed in Brazil, so this will be an opportunity for Brazilians scientists to start this.
  - Mid-November- one-week workshop on the edition of the three volumes book about the Gondwana evolution. These books will be released in the end of the IGCP-628 in 2017. This workshop will be held in Brazil in order to integrate more Brazilians researchers on this legacy.
- Scientific sessions
  - During 2015, Brazilian meetings on geoscience are more restricted to regional smaller events. The IGCP-628 plan to integrate with the Brazilian Tectonic Symposium (SNET – ISTS – International Symposium of Tectonic Studies), that will be held in Vitória (ES), in the first semester of 2015. The IGCP-628 will propose a session on the correlation between geology of Africa and Brazil. Besides this, Brazilian researchers related to IGCP-628 will participate abroad on international meetings such as: AGU (San Francisco), EGU (Europe), Queensland Meeting of the Specialist Group in Tectonics and Structural Geology (SGTSG – Australia), and others.

### Projects With Active Brazilian WG's

The Brazilian National Committee does not have informations if there are some formal Brazilian WG's in any other IGCP Project.

### Projects With Brazilian Participation

No. 632 – **CONTINENTAL CRISIS OF THE JURASSIC: Major Extinction Events and Environmental Changes within Lacustrine Ecosystems** (2014-2018)

**National Participants:** João Villar de Queiroz Neto - CENPES/PDGeo/BPA - Brazil; joaovq@petrobras.com.br; Tel. (55 21) 2162-1716.

Paulo Roberto de Figueiredo Souto.

**Summary of Activities:** The project participant Dr. Queiroz Neto is carrying out some research on lacustrine ecosystems extending over the Late Jurassic-Early Cretaceous in southeastern Brazil. The ostracode assemblage correlates well with the African ostracode zone AS-2.

**Published Papers:**

Queiroz Neto, J. V., Sames, B. & Colin, J.-P. 2014. *Kegelina*: a new limnic ostracod (*Cypridoidea*, *Cypridoidea*) genus from the Lower Cretaceous of the Americas and Africa. *Journal of Paleontology*, Volume 88, Issue 4 (July 2014).

### ACTIVITIES OF THE NATIONAL COMMITTEE

The Brazilian National Committee submitted an endorsement to the Project Proposal “AQUIFER RECHARGE IN DIFFERENT CLIMATE AND HYDROGEOLOGICAL ENVIRONMENTS IN IBERO-AMERICA: EFFECTS OF CLIMATE AND GLOBAL CHANGES” to be submitted for approval at the next meeting of the



IGCP Scientific Board. The proposal has been signed by Dr. Gerson Cardoso (Rio de Janeiro, Brazil), Dr. Teresita Betancur (Medellín, Colombia), Dr. Emilia Bocanegra (Mar del Plata, Argentina), Dr. Christian Herrera (Antofagasta, Chile), Dr. Emilio Custodio (Barcelona, Spain), and Dr. Marisol Manzano (Cartagena, Spain).

On April 25, 2014, the Brazilian National Committee held a meeting where Dr. Campos commented on his trip to Portugal where he met Dr. Artur Abreu Sá (president of the Portuguese IGCP National Committee), and Dra. Elizabeth Silva (responsible for the Sector of Sciences of the UNESCO National Committee, member of the Portuguese National Committee, and Coordinator of the Portuguese Forum of Geoparks). Discussions, began in 2013, on how to implement the visibility of earth sciences to society continued. Some actions have been suggested:

- in order to benefit from a better infrastructure, the Brazilian National Committee could work within the framework of UNESCO's Geopark Program.
- the way to divulge Earth Sciences is still under discussion, but a possibility is to try support through the "ABC IN SCIENTIFIC EDUCATION" program of the Brazilian Academy of Sciences.

Nevertheless, none of these actions have been really initiated.

One of the major decisions has been the support for the creation of an award for female geoscientists in the Portuguese speaking countries.

A planned meeting on November 27, 2014, to continue the discussion about conjoint activities in Portuguese speaking countries with Dr. Artur Abreu Sá (president of the Portuguese IGCP National Committee), and Dra. Elizabeth Silva (responsible for the Sector of Sciences of the UNESCO National Committee, member of the Portuguese National Committee, and Coordinator of the Portuguese Forum of Geoparks) could not be held because of schedule problems. But it was possible to join with Dr. Martinis (Petrobras) and Dr. Schneider (CPRM) and some actions concerning the creation of the award for Portuguese speaking female geoscientists have been outlined.