



GONDWANA 14 – “East Meets West”

Field Trip PostGo1 - Ribeira and Brasília belts in the context of West Gondwana

The aim of the field trip is to discuss the tectonic episodes of West Gondwana amalgamation in southeastern Brazil and African counterparts. The major tectonic framework of West Gondwana in southeast Brazil comprises subduction all around the São-Francisco paleocontinent with generation of continental and intra-oceanic magmatic arcs and diachronic collisions with the Paranapanema paleocontinent to the southwest and with other minor blocks, during the Ediacaran. Major collisional events were recorded in the southern Brasília Belt (ca. 640-600 Ma), Central Ribeira Belt (ca. 590-565 Ma) and docking of the Cabo Frio Terrane (ca. 530-510 Ma). The collisional episodes were followed by a transtensional collapse episode with bimodal plutonic magmatism between ca. 510-480 Ma.

The southern Brasília Belt is composed of a flat lying east vergent nappe stack overlying the São Francisco Craton. The nappes are constituted of Neoproterozoic metasediments interleaved with basement slices. The metamorphism grades from greenschist facies at the base to high pressure granulite facies (kyanite K-feldspar assemblages) in the uppermost nappe. On top of this nappe stack is the suture, underlying the active margin of the Paranapanema paleocontinent. At the base it is composed of granulite facies orthogneisses interpreted to represent the deformed root of the magmatic arc. This active margin is called the Socorro-Guaxupé Nappe.

The Ribeira Belt is constituted essentially of Neoproterozoic metasediments interleaved with abundant intercalations of Paleoproterozoic basement, in upper amphibolite to medium pressure granulite facies. The belt records NW-SE shortening that resulted in a predominant foliation steeply dipping to the SE. It is subdivided into four tectono-stratigraphic terranes from NW to SE: (1) the Occidental terrane which corresponds to the reworked margin of the São Francisco Craton; (2) the Paraíba do Sul-Embu terrane; (3) the oriental terrane, that includes the Neoproterozoic magmatic arc of the belt and (4), the Cabo Frio Terrane.



During the first three days we intend to visit key outcrops to discuss the northwest vergent thrust sheets related to the northeast trending Ribeira Belt. In the last three days we are going to visit the east vergent nappes related to the evolution of the Brasília Belt and the interference zone between the two belts. Most of the visited geological units have detailed U-Pb geochronology and additional metamorphic and microtectonic data.

Leaders:

Ribeira belt: Monica Heilbron and Miguel Tupimambá (UERJ).

Brasília belt and Interference Zone: Rudolph Trouw and Andre Ribeiro (UFRJ).

Period of the field trip: October 1st- 6th, 2011.

Registration deadline: May 31st, 2011.

Registration fee: 950 USD (including transportation, accommodation in double rooms, breakfast, lunch and dinner during the field trip, and field trip guide).

SCHEDULE

Day 1: October 1st, Sat.

8:00 AM: Pre-field trip meeting and check-in at the *Atlântico Búzios Hotel*.

9:00 AM: departure to Itaperuna.

The day begins with the basal contact of the Cabo Frio Terrane docked at 530-510 Ma onto the central Ribeira Belt. After this we are going to see other tectonic units within the Ribeira belt: the *Italva* upper thrust sheet of the Oriental Terrane and orthogneisses of the Rio Negro Magmatic Arc.

Day 2: October 2nd, Sun.

8:00 AM: departure to Santo Antônio do Aventureiro.

During the morning we will visit the high-grade metasediments of the Cambuci thrust sheet. The rest of the day will be dedicated to visit outcrops of the Juiz de Fora domain of the Occidental Terrane in the lower part of the Ribeira Belt.



Day 3: October 3th, Mon.

8:00 AM: departure to Tiradentes.

The traverse will cross paleoproterozoic orthogneisses and paragneisses from the Juiz de Fora domain, part of the reworked margin of the São Francisco Craton.

Day 4: October 4th, Tue.

8:00 AM: departure to Carrancas.

On this day we'll see the lower flat lying east vergent nappes of the southern Brasília Belt with the lateral transition from greenschist facies chloritoid phyllites to amphibolite facies staurolite schists.

Day 5: October 5th, Wed.

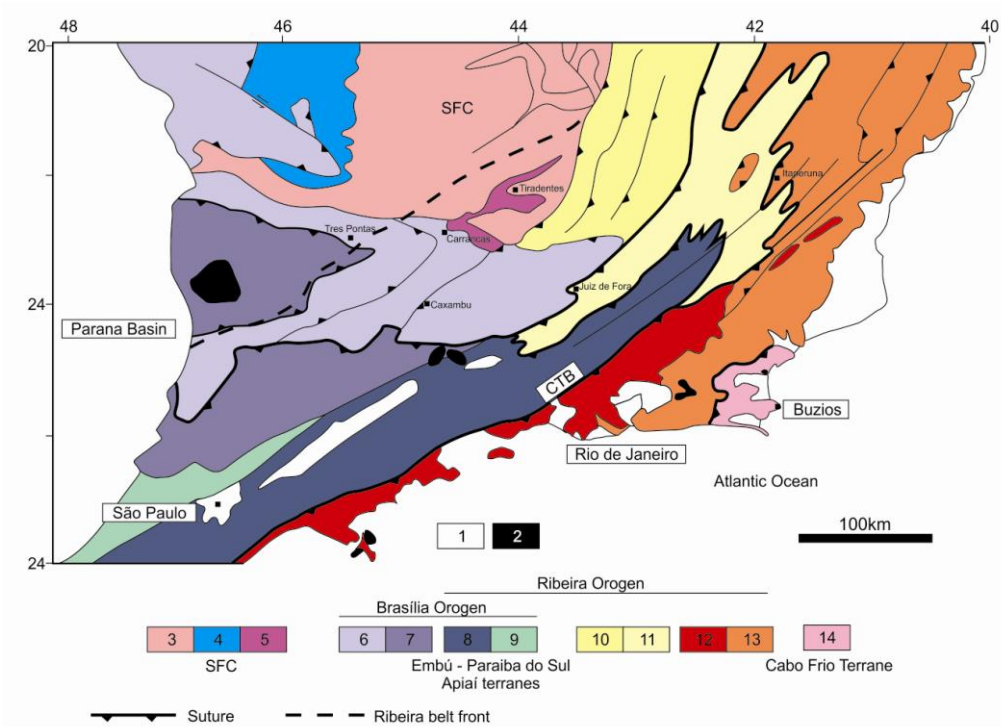
8:00 AM: departure to Caxambu.

The main outcrop of this day is a quarry in Três Pontas where the upper nappe of the Andrelândia Nappe System is exposed. It contains high pressure kyanite K-feldspar granulites. Another interesting outcrop is in the base of the Socorro-Guaxupé Nappe, with garnet orthopyroxene granulites.

Day 6: October 6th, Thu.

8:00 AM: departure to Rio de Janeiro.

On the last day we'll cross the interference zone where structures and metamorphism of the Ribeira belt are superposed on structures of the Brasília belt. First we'll see a "retroeclogite", then a klippe of the kyanite K-feldspar nappe and, along a section to the south the steep standing, southeast dipping attitude due to NW-SE compression of the Ribeira belt deformation.



Tectonic map of the transition zone between the southern Brasília Belt and the central Ribeira Belt: 1- Phanerozoic sedimentary basins; 2- K-T alkaline rocks. 3- Basement of São Francisco Craton; 4- Sedimentary cover of the São Francisco Craton; 5- Metasediments of autochthonous domain. Brasília Orogen: 6- Socorro-Guaxupé Nappe; 7- Lower Nappes. 8- Embú - Paraíba do Sul terranes; 9- Apiaí Terrane. Ribeira Orogen: 10- external domain and 11- Juiz de Fora Domain of the Occidental Terrane. Oriental Terrane: 12- Rio Negro Arc; 13- Neoproterozoic metasedimentary successions; 14- Cabo Frio Terrane.



Low angles dipping marbles from the Itálva Thrust sheet. U-Pb zircon age of the syn-sedimentary amphibolitic layers: 840 Ma (Heilbron & Machado 2003). Quarry near the Itálva city, NW of the Rio de Janeiro State.



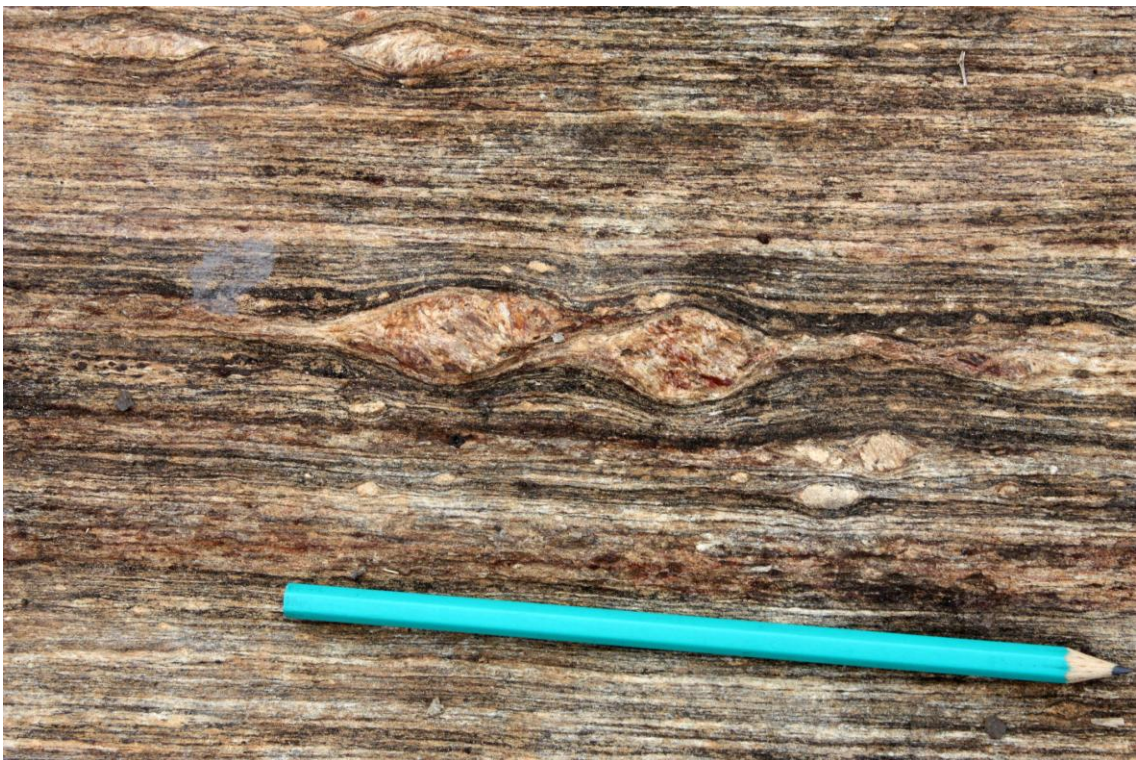
Landscape view of the Rio Negro thrust front. The mountainous area is the home of 630 Ma aging pre-collisional juvenile orthogneiss. RJ-230 road near Bom Jesus do Itabapoana.



Milonitic paragneiss of the Andrelândia Group. Extreme deformation along the suture between the Occidental and Oriental Terranes at the Central Tectonic Boundary. BR-116 road near Além Paraíba.



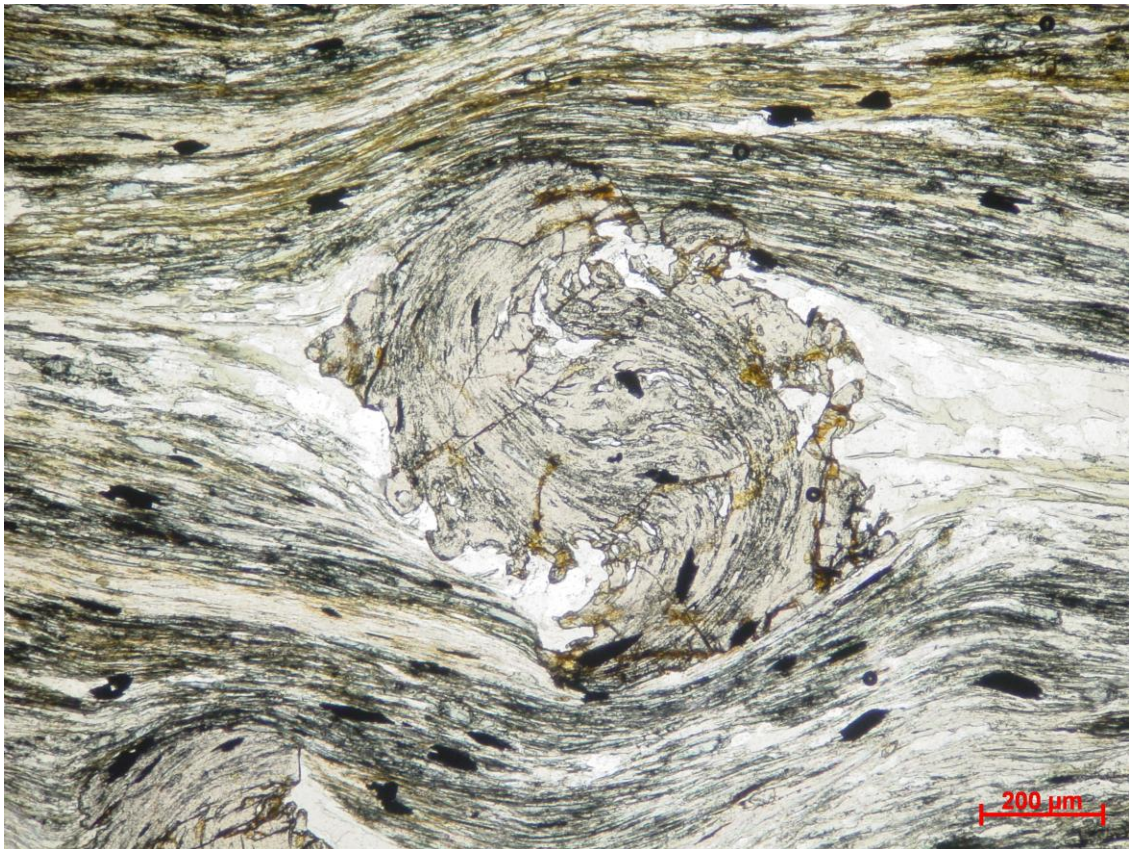
Hypersthene megacrysts in charnockitic leucosome. Syn-collisional neoproterozoic metamorphism affecting Paleoproterozoic orthogneiss of the Juiz de Fora Complex. Urban area of Itaperuna.



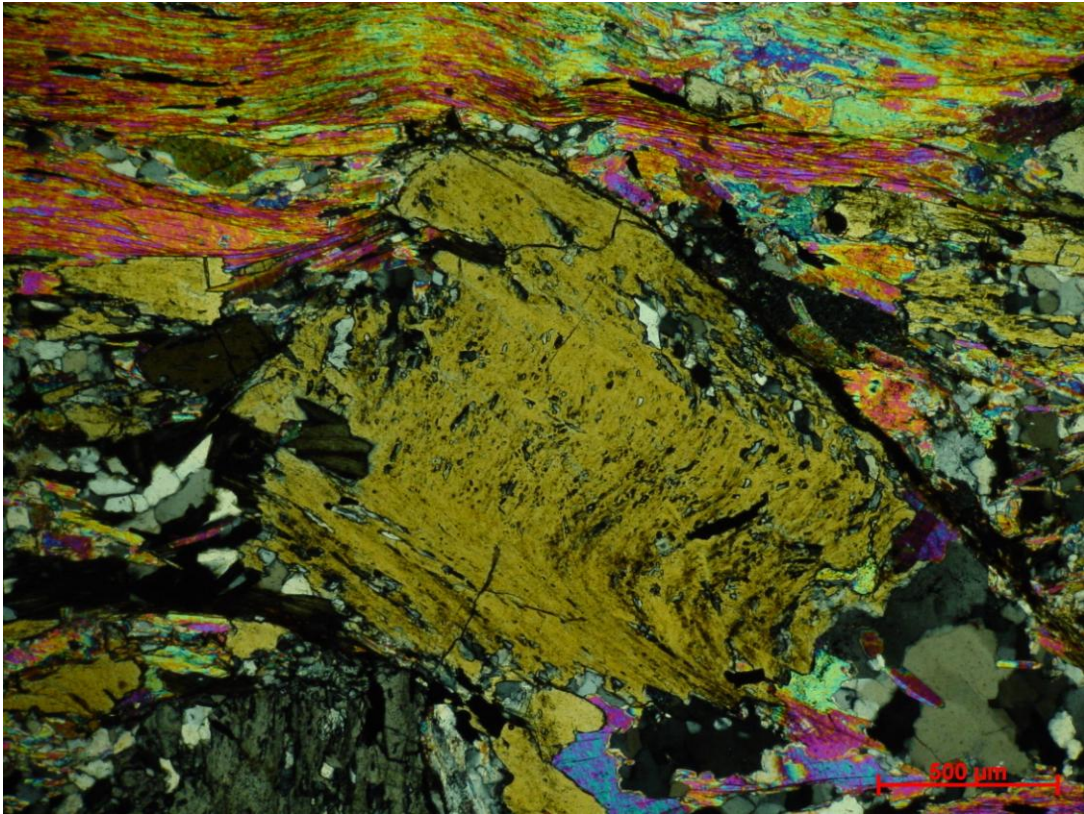
Microcline porphyroclasts in charnockitic mylonite gneiss of the Juiz de Fora Complex (Paleoproterozoic)



Foliation fish indicating top to the east tectonic movement in the Luminarias Nappe, lower nappe of the southern Brasília Belt in Minas Gerais State



Snowball garnet indicating 180 degrees sinistral rotation with respect to the foliation. This structure is interpreted to be related to eastward thrusting of the Carrancas Klippe



Staurolite with D2 crenulation cleavage included. The crystal grew during D2 and the surrounding schistosity is S2. Carrancas Klippe, southern Brasília Belt.



High pressure kyanite K-feldspar granulites, upper nappe of the Andrelândia Nappe System. Quarry near Três Pontas, southern Minas Gerais State.



Waterfall in quartzites of the Carrancas Klippe, the lowermost allochthon of the southern Brasília Belt nappe stack.