ROOM 01
GONDWANA AMALGAMATION

SESSION 1 – PRE-GONDWANA CRATONS AND PALEOENVIRONMENT

Conveners: D.Evans (USA), E. Dantas (Brazil) and M.Geraldes (Brazil)
dai.evans@yale.edu, elton@unb.br, geraldes@uerj.br

The Gondwana supercontinent was assembled by collisions among cratons with distinct geological histories. Understanding those histories has required careful mapping, stratigraphy, structural and metamorphic analysis, and geochronology. Our session welcomes contributions of new data that elucidate the pre-Gondwana geological evolution of the supercontinent's constituent cratons, as well as studies of Precambrian paleoenvironmental or paleobiological evolution as deduced from stratigraphic records within the Gondwana terranes. These fundamental contributions contain the direct evidence for inferences on Precambrian tectonic and environmental evolution, and set the stage for further discussion of pre-Gondwana paleogeography and tectonics in the companion sessions to follow.

SESSION 2 – PRE-GONDWANA PALEOGEOGRAPHIC EVOLUTION

Conveners: A.Rapalini (Argentina), R.Trindade (Brazil) and S.A. Pisarevsky (Australia)

rapalini@gl.fcen.uba.ar, ritrindad@gmail.com, spisarev@tsrc.uwa.edu.au

Following the proposal of a Late Proterozoic supercontinent known as Rodinia, almost twenty years ago, significant and continuous increase in interest on the global Proterozoic paleogeographic evolution has not ceased. This has promoted enthusiastic new research in areas that include more reliable paleomagnetic reconstructions, accurate geochronology and detailed stratigraphical and tectonic correlations among different crustal blocks or cratons. The existence of older supercontinents (Columbia, Nuna, Atlantica, etc) has been postulated since then with some support from scarce and partial evidence. This session welcomes new data and interpretations, from different techniques, with the common goal of solving regional to global Precambrian paleogeographic puzzles and their relationships to deep Earth processes. Special, but not exclusive, attention will be devoted to kinematic and dynamic processes that led from Rodinia fragmentation to Gondwana assembly.

SESSION 3 – OROCLINES DURING SUPERCONTINENT AMALGAMATION

Conveners: B. Murphy (Canada), Gabriel Gutierrez-Alonso (Spain), R. Trouw (Brazil) and F. Alkimim (Brazil)

bmurphy@stfx.ca, gabi@usal.es, rajtrow@hotmail.com, ffalkmim@gmail.com

A major, unresolved question in understanding the paleogeographic and tectonic evolution that led to the formation of the Gondwana and Pangea, is "what is the origin of bends in the orogenic belts that developed during the formation of supercontinents?" Answering this question is a necessary first step that has to be resolved before we can address the origins of supercontinent cyclicity and the geodynamics of supercontinent formation and breakup. When lithospheric plates are involved in supercontinent amalgamation, there are a number of features and conditions that result in formation of orogenic curvature. Some of the most frequently cited features are: rigid indentors, irregular coastlines, or lateral differences in sedimentary thickness, slope of basal detachment, and the value of critical taper. Thus, while a variety of possible controls play a paramount role in the development of curved orogens, the first step towards understanding these complex systems is documentation of the kinematics and timing of curvature with respect to their tectonic development. In other words, is the observed curvature of ancient orogenic systems seen today the result of primary non rotational deformation, or a secondary phenomenon that results in oroclinal bending?

Recent research into these questions has focused on the lithospheric-scale processes associated with oroclinal bending of crustal blocks about a vertical axis during supercontinent amalgamation. Importantly, are oroclines thin-skinned tectonic features, having mainly deformed sedimentary cover that overlies a basal detachment, or thick-skinned features, in which the entire lithosphere is involved with rotation? Formation of Gondwana and Pangea during Paleozoic orogeny required global-scale lithospheric collision of various sized crustal blocks, which are today separated by complex orogenic systems that are home to some of the more famous curved orogenic belts on Earth - e.g., Variscan Europe, the Appalachians, the Ibero-Armorican Arc, and the Kazakhstan orocline.

SESSION 4 – NEOPROTEROZOIC ACCRETIONARY AND COLLISIONAL OROGENESIS AND THE CAMBRIAN AMALGAMATION OF GONDWANA

Conveners: Alan Collins (Australia), John Foden (Australia), M. Santosh (Japan), Chris Clark (Australia), Peter Johnson (USA), Peter Cawood (UK), Monica Heilbron (Brazil) and Renata Schmitt (Brazil)

alan.collins@adelaide.edu.au, john.foden@adelaide.edu.au, santosh@kochi-u.ac.jp, C.Clark@curtin.edu.au, petergeo@earthlink.net, pac20@st-andrews.ac.uk, heilbron@uerj.br, renatagondwana@uol.com.br

The Neoproterozoic was a world of dispersed continents that broke away from Rodinia and amalgamated progressively throughout the Cryogenian and Ediacaran along a number of accretionary and collisional orogens. It wasn't until well into the Cambrian that a stable Gondwana formed. In this session, we welcome contributions of new data that help unravel the extensive Neoproterozoic-Cambrian orogenesis in the Gondwana-continents and help reconstruct the amalgamation history of Gondwana. Questions that we are particularly interested in addressing include: Are there phases of orogenesis that went into Gondwana formation, or did it progressively form over 200 million years? Where were the final collisions that formed Gondwana and how did this palaeogeography affect bio-provinciality in the Ediacaran-Cambrian? Can we recognize long-lived Neoproterozoic subduction systems and from these help constrain Neoproterozoic palaeogeography?"

SESSION 5 – GONDWANA SHEAR ZONES AND SUTURES: HISTORIES OF THE AMALGAMATION OF A SUPERCONTINENT AND INHERITANCE ON CONTINENTAL DEFORMATION

Conveners: R.D. Martino (Argentina), G. Vujovich (Argentina), Marcos Egydio Silva (Brasil)

rdmartino@com.uncor.edu, graciela@gl.fcen.uba.ar, megydios@usp.br

Large shear zones systems, from hundreds to thousands of kilometers, occur in all Mesoproterozoic, Neoproterozoic and Paleozoic orogens from Gondwana. Some good examples are: the Sobral-Kandi-Transbrasiliano lineament and the Trans-Africa, Central Africa, Nadj, Narmada-Son shear zones. These shear zones are products of the amalgamation of a group of continental blocks, with distinct histories and characteristics. Some are parallel to the orogenic belts and other define and contour the cratonic blocks, that vary from weak to strongly deformed. The displacement could have hundreds of kilometers, with fault rocks developing in even more than one kilometer of thickness, and presents either vertical or horizontal movement components. These shear zones are usually not well understood but are significant for the kinematic analysis of Gondwana assembly, inheritance and heterogeneities that are produced during reactivation of younger orogens or extension and dispersion of continents. In addition, the low preservation of ophiolitic lenses in these deeply eroded Proterozoic and Eo-Paleozoic orogens, difficult their recognition, and also the presence of upper mantle sheets associated with some shear zones, are very good motives for a discussion.