ABSTRACTS

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THE GONDWANA SUPERCONTINENT CYCLE AND THE SALVADOR-CONGO CRATON

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The Supercontinent Cycle in West Gondwana

The asemblage of the classical Gondwana supercontinent was the result of a **Supercontinent Dispersion-Amalgamation Cycle** finalized during the Late Proterozoic-Early Paleozoic Panafrican-Brasiliano-Delamerian--Ross-Katangan-Damaran events that we propose to call.

Gondwana Supercontinent Cycle. Another former supercontinent, called Rodinia by Hoffmann (1991), was amalgamated at the end of the Middle Proterozoic and then split off into cratons which were partially joined again while other portions were separating (ex. Laurentia from Amazonia) thus originating Gondwana. This Middle to early Upper Proterozoic continental amalgamation history might be related to a Rodinia Supercontinent Cycle involving Grenvillian, Elsonian, Uruacuano and Kibaran events.

Fig. 1 shows West Gondwana as a result of a Late Proterozoic accretion to East Gondwana. The latter apparently behaved as a more stable and rigid Megacraton. West Gondwana is primarily cut by a series of relatively extense Gondwanian (to oppose names like Panafrican, Brasiliano, etc.) thrust-fold belts whose average strike is close to North-South and, secondarily, by subtransversal smaller ones. The former are the Mozambique, the Pharusian-Araguaia-Paraguai belts and a more discontinuous Riberia-Dom Feliciano-Aracuai-Espinhaco assemblage of belts interrupted along small portions of terranes and/or fragmented cratons. The polarities of closure of these mobile zones was mainly westward while subduction was usually directed towards the East (exception may be eventually the Ribeira belt). These belts are cut by extense mylonite zones related to escape and oblique collision tectonics. The transversal belts are represented by the Damara-Zambeze, Sergipano-Oubanguides, Saldanha-Ross-Delamerides and Rokelides. They usually show two tectono-stratigraphic orogenetic pulses dated one as of Early Cambrian age and the other Late Precambrian (around 600-650 Ma) which correspond roughly to the Damaran and Katangan in SW Africa and the Pan African I and II of the French geologists in NW Africa.

The almost perpendicular intersections of these two systems of belts are synchronic triple junctions or diachronic overlapping junctions. Mainly the two Northern and Southern borders of the Sao Francisco-Cango Craton show evidences of strong transcurrent shearing: Cubatao-AlemParaiba, Campo do Meio, Lethakane-Muwembeshi and the Pernambuco-Paraiba-Ngourandere Shear Systems (Sadowski and Motidome, 1987).

The extreme West Gondwana was eventually joined to Laurentia (Dalziel, 1992) and the Lower Paleozoic Fammatinian belt is probably the remnant evidence of their separation.

It should be emphasized that during the evolution of these belts two main large cratonic

masses subsisted: Laurentia and East Gondwana.

Cratons and Rigid blocks

These old mobile zones of Gondwanian Amalgamation Age (Panafrican-Brasiliano "lato sensu" age) are usually the earmarks of subduction or of rift closure. One of the remaining problems is still the size of the seas or oceans they represent as also the distances which separated the cratonic masses before closure. This might also help to determine the velocity of continental convergence or even of past subduction processes. To solve it there is need of more paleomagnetic data and refined geochronology. (How large were the Rokelides, the Damaran or the Espinhaco seas?). The construction in Fig. 1 lacks Laurentia, brought recently into the frame by Dalziel (1992). It gives an approximate idea of the original form of the amalgamates as also a hypothetical lithospheric section based on presently available data, with the indication of a dominant eastward subduction.

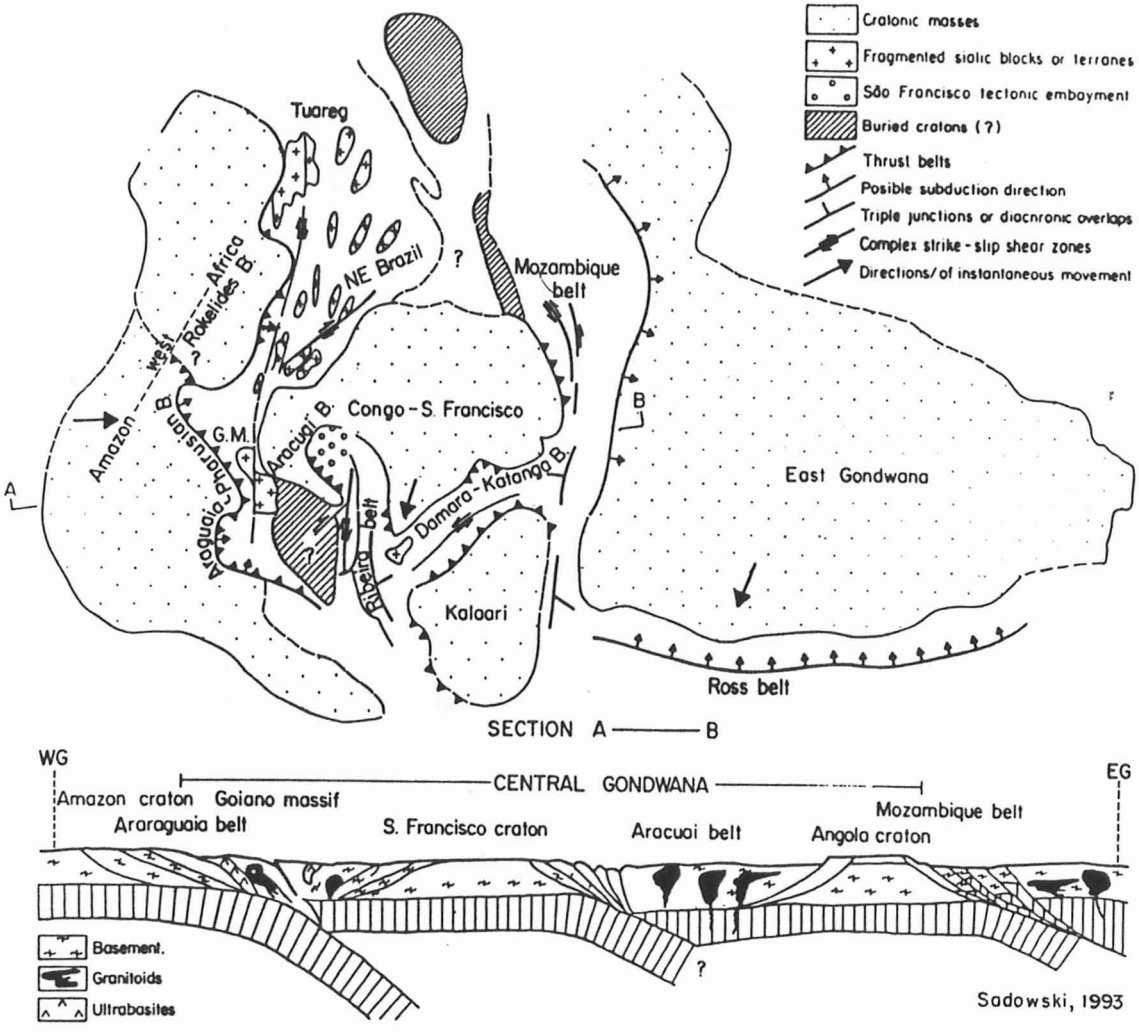
A significative difference between the sizes of the cratonic masses drives to the conclusion that these were more or less rigid blocks as there were large and small cratonic masses. Laurentia or Eastern Gondwana might have been first order cratons while the NW African and Amazon, the Kalahari and eventually the Sao Francisco-Congo (or Salvador-Congo of Cordani, 1977) could be designated as of second order. The smaller blocks viz Tuareg, Goiano, those of Northeastern Brasil (Cordani and Brito Neves, 1991) and others which show evidences of more or less tectonothermal overprinting during the Gondwanian Supercycle could be designated terranes, or continental or basement fragments.

Phanerozoic sedimentary covers also hide the real contours of some important cratonic limits. The western border of Gondwana is for this reason a major unknown. It is not clear how the Arequipa block and the Puncoviscana belt relate to the Amazon craton and what might the spatial distribution of the Fammatinian belt be as also the structure of the Unweinat-Nile craton below the sediments of the North African deserts.

The western and southern border of East Gondwana is underlined by the Mozambique-Lurio-Ross-Delamerides-Adelaide belts, assuming that the Dharwar, Australia, Arabia and East Antarctica cratons were parts of an East Gondwanian cratonic mass. The Salvador-Congo, Unweinat-Nile, and the Kalahari cratons were probably accreted first to East Gondwana; later followed by the closure of the Adamastor (Hartnady et al., 1985) Ocean and then the Pharusian-Araguaia-Paraguaia Ocean. In the Late Proterozoic and Early Paleozoic, Laurentia which was probably linked to Amazonia (Dalziel, 1992), departed during the opening of the Phammatinian Ocean and the Tucavaca rift.

From the distribution of all the tectonic scars which individualized rift and former subduction zones, it seems that West Gondwana was the region of major continental accretion and splitting during the Gondwanian Megacycle and that probably East Gondwana, and not the centrally located Salvador-Congo craton, was the starting point of continental amalgamation. Geochronological data indicate that the Gondwanian amalgamation probably began along the Mozambique belt and cratons were successively accreted to the western border of emerging Gondwanaland.

Probably the Congo-Salvador craton was pinched into the collision of East Gondwana and extreme West Gondwana and could be considered as a part of a Central Gondwana. It then was split and welded or continuously reactivated while subjected to later subduction-collision processes on its western border.



CARTOON OF POSSIBLE SUBDUCTION DIRECTIONS IN GONDWANA

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