Paper Number: 5060

Dividing South America into continental blocks and applying it to West Gondwana re-assemble.

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The paleogeographical reconstruction of West Gondwana may be a very obvious fit, but every time one tries to re-assemble South America and Africa continents some features don't adjust very well, leaving many gaps and/or overlaps. Since the first attempt to re-assemble South America and Africa, many different approaches were used to better reconstruct these two continents. One approach is to consider the non-rigidity of the tectonic plates by breaking them into smaller and rigid continental blocks. When localizing intracontinental deformation along these blocks boundaries it is possible to model pre-South Atlantic opening fit. Many proposals for internal blocks divisions, as a mean to reconstruct West Gondwana from Cretaceous, usually disconsider important tectonic features and the continental geology [1, 2]

We present here a proposal for a subdivision of the actual continental South American plate in blocks, considering its main tectonic features: pre-Neoproterozoic cratons, Neoproterozoic-Cambrian mobile belts, Phanerozoic sedimentary basins and the pre-Andean terrains. We consider that the crustal scale structures in between these domains accommodated part of the tectonic forces responsible for the Gondwana break-up in the Lower Cretaceous and the Atlantic drift phase. One of these structures is the Transbrasiliano mega scale shear zone that initiated at ca. 630 Ma and was reactivated several times through the geological time. The last record is Cretaceous related, during the South Atlantic rifting, and it is represented by extensional structures described in the northern Paraná Basin [3].

Our result is a South American map divided into continental blocks. This division is based upon a combination of the inherited continental main tectonic features and the record of intraplate deformation since the Cretaceous to present day. South American blocks were used to recreate a tighter fit for West Gondwana, connecting with with African blocks already established by Reeves et al. [4]. The reconstruction was created with the use of a plate tectonic reconstruction and interaction software, ATLAS (Cambridge Paleomap Services). We conclude that this method keeps intracontinental deformation more tied to the real possibilities of pre-South Atlantic fit correlating geological terrains of both Atlantic sides, especially in sectors of the margin where the continental platform is wider.

References:

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