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Gondwana tectonic evolution recounted through the Gondwana map – IGCP-628

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To build up a Gondwana Map with all geological information available at 1:5M scale is apparently only a technical labouring issue. But when this major task started at 2011, it demanded a vast scientific thinking to construct this methodology. The aim is the reconstruction of a paleocontinent that today is dispersed in the present continents of South America, Africa, Australia, India, Antarctica, Arabic Peninsula as well as smaller land masses as Madagascar, New Zealand, Papua New Guinea and others. The new Gondwana map should represent clearly its three foremost stages of evolution through time: the amalgamation (ca.800-450 Ma), development (ca.450-100 Ma), break-up (ca.180-80 Ma) [1]. Therefore it is a geological map that illustrates the main tectonic entities: the Pre-Neoproterozoic cratons, Neoproterozoic-Eo-Paleozoic orogens, Phanerozoic marginal orogens, Phanerozoic internal basins and the marginal terranes. We agreed that the Jurassic would be the best period to show the three Gondwana phases (ca.185Ma), although the break-up history continues towards the Cenozoic. The first step was the preparation of a new geological map of Gondwana in GIS platform by updating and integrating geological data of the present continents in scale 1:5M using software ArcGIS in the Gondwana Digital Center of Geoprocessing (GDCG) at UFRJ, Brazil. The database is being built through the homogenization of heterogeneous sources: digital and analog. The available digital maps (GIS of Australia, South America, New Zealand and Arabia) underwent through a process of adequacy of information known as cartographic generalization, as well as a compilation of the existent attribute tables. Several regions do not present available GIS data at continental scale (i.e. India, Antarctica, Africa, Madagascar, Papua New Guinea and Sri Lanka) so analog maps (in paper) went through a exerting process of drawing (to the appropriate scale), scanning, georeferencing, vectorization and creation of a new database. The major challenge was to agree on a common legend for these Gondwanan derived landmasses. The classification adopted five attributes for each polygon: (I) age of the rock (protolith age in metamorphic rocks), (II) type of the rock, (III) chemistry of the magmatic rock, (IV) metamorphic grade, (V) age of the main metamorphic event. The first item is represented by the filling color of the polygon, and all others are recorded as fill symbols. The color follows roughly the IUGS Geological Time Scale, some important changes were done. Only crustal-scale tectonic structures directly related to Gondwana are represented in a regular structural legend. The geological database is

also an outcome of this project and will be available. The next step is to test which reconstruction will best represent the new Gondwana fit [2]. We present here the Gondwana Map Draft version 2.0 in order to discuss with the geological scientific community whether it contemplates at its present form the main issues of the Gondwana evolution (www.gondwana.geologia.ufrj.br).

References:

[1] Bradshaw, J. and Schmitt, R. (this meeting)

[2] Richetti et al (this meeting)

