The Great Waterfalls of the Paraná River Basin and their Relation with Tectonic Alignments

BARTORELLI, A. Geoserv Consulting; São Paulo, Brazil.

The principal waterfalls of the Paraná Basin are associated with zones of neotectonic activity, manifested by the reactivation of megalineaments that represent deep crustal discontinuities. During the Early Quaternary the drainage system was reorganized, becoming endorreic in the Upper Paraná Basin, as a result of the global uplift processed in the last three million years. The arising of the Amambay-Maracaju Range constrained the former flow to the west, compelling the Protoparaná to run south-westward. In this process, the course of the river was intercepted by the Piquiri Tectonic Alignment, giving rise to the Sete Quedas waterfalls and the deep canyon downstream. The erosion was catastrophic, as suggested by the lack of vestiges of waterfalls regression, evidences of rapid tension release at Itaipu dam site and other indications. The Piquiri Alignment governed the waterfalls upstream and induced the embedding of many waterfalls downstream, in the tributaries with hanging valleys that flowed into the newly excavated canyon, as was the case of the famous Iguaçu Cataracts. The waterfalls were originated in the Early Pleistocene and the regression ratios were estimated of even two centimeter per year, in close relation to the rivers discharge. The waterfalls are related to megalineaments associated to the main gravimetric anomalies, as well as isogalic peaks, much of them representing second order discontinuities