

## **Inversion of Intraplate Stress Field in Brazil by Genetic Algorithm - Finite Element Method**

SHI Yaolin, Graduate School, University of Science and Technology of China, Academia Sinica, Beijing 100039, China; ASSUMPCAO Marcelo, Instituto Astronomico e Geofisico, Universidade de Sao Paulo, Brazil

Genetic Algorithm - Finite Element Method (GA-FEM) can be applied to solve inverse problem of partial differential equations. If stresses or displacements are observed, boundary conditions and material properties can be calculated. In this study, we apply GA-FEM to carry out inversion of boundary displacements and nodal forces from observed crustal stress field in Brazil and adjacent areas. Normal, thrust and strike slip types of faulting from earthquake mechanism and geologic observation are also used for additional constraints on the relative magnitude of vertical and horizontal stresses. Our inversion confirms previous studies showing that plate boundary actions are the main controlling factors of regional stress field, and spreading forces at the Andes Mountains and continent-ocean boundaries are important factors. Furthermore, we show that plate bending under vertical load of sedimentation or magma intrusion can affect significantly the local stress field. Our inversion also indicates that, in addition to the well recognized E-W compression in South America, North America plate may exerts southward compression on western Brazil and northward extension to eastern Brazil. This suggestion is in agreement with recent GPS analysis of relative motion between North and South American plates. This research also shows that GA-FEM is successful in stress field inversion.