Numerical modeling of lithospheric stress field and buckling in the Indian ocean

Alexander Koptev (1), Andrey Ershov (1), and Oleg Levchenko (2)

(1) Geological Faculty, Moscow State University Russia, (2) Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia

We present a 2D computer model of the lithospheric stress field and buckling in the Indian plate. Stress sources in our model are the topography/bathymetry, lithosphere density inhomogeneities (derived from the composition and the structure of the Earth crust and lithosphere, thermal regime and gravity anomalies) and plate-boundary forces derived from our global stress-field model. Thickness and density of the crustal layers were extracted from Crust2.0 odel and our own data. Depth of the lithosphere-asthenosphere boundary was determined from local iso-static constraint. Modelled stress field is in good agreement with available stress determinationsfrom earthquakes. Modelled stress field was utilized to calculate buckling. Several scenarios were considered: intact plate, plate with predefined fractures, plate with predefined weakened zones. Lithospheric buckles originate from flexures and steps in position of the effective middle surface of the lithosphere. We compare the modelled buckles with observed ones.