

Research of the features of seismicity and seismotectonic deformations of some areas of the Altai-Sayan mountain region

Nailia A. Sycheva¹, Yuriy L. Rebetsky

¹ Институт физики Земли им. О.Ю. Шмидта Российской академии наук

ivtran@mail.ru

The work presents the results of a STD study of two zones of the Altai-Sayan region: the Altai Mountains (the region of the Chuya earthquake) and the territory that includes the Academician Obruchev ridge, the southern part of the Eastern Sayan Mountains and the Southern Baikal region. The STD computation has been performed on the basis of the approaches proposed by well-known publications of Yu.V. Riznichenko and S.L. Yunga. The derivations on STD directions are based on focal mechanisms data (591 events) that occurred from 1963 to 2021). For the considered areas, a description of seismicity is given and STD maps are constructed. According to the STD maps, the directions of the axes of shortening and elongation are determined and the deformation modes is marked. The distributions of the Lode-Nadai coefficient, the angle of kind of the stressed state (the angle of the generalized plane deformation, the phase angle of STD tensor-deviator) and the vertical component (ZZ) have been constructed using the obtained averaged STD tensors for seismogenic layer of 0-35 km depths. The zone around Chuya earthquake source site is characterized by horizontal shear deformation, with a band of transpression (Chagan-Uzun block) passing through this zone. The territory, which includes Academician Obruchev ridge, the southern part of the Eastern Sayan Mountains and the Southern Baikal region is divided into two parts according to the deformation regime. The boundary runs along the Darkhat depression: the regimes of compression, transpression and horizontal shear occur in zones lying to the west of it; the regimes extensions, transtensions, and the transitional regime from vertical shear to extension occurs to the east. The Chagan-Uzun block and the Academician Obruchev ridge are uplifted, and the territory to the east of the Darkhat depression is lowered.

A comparison has been made with the results of a study of the current stress state of the earth's crust in the region under study, carried out using the STRESSseism software procedure, which is based on the algorithms of the Cataclastic Method of Yu.L. Rebetsky.