Critically stressed state of the earth's crust as an area for initiating trigger geodynamic events

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Features of manifestation of tectonic rockbursts (fault slip mechanism) in mines and earthquakes in industrial areas with a deep location of the hypocenter, the technogenic nature of which is the subject of discussion, are considered. A characteristic ratio of the size of the source zone R to the depth H of the hypocenter and the location of the hypocenter is deeper than the zone of anthropogenic impact or away from it were noted. To explain the phenomenon of the influence of engineering activities on the manifestation of strong (up to M=8) seismic events with a hypocenter at a great depth, the hypothesis of prof. Petukhov I.M. on the critically stressed state of the earth's crust. At R/H more than 1, the source zone of a seismic event occupies a certain volume from the earth's surface to a certain depth. Taking the source zone as an area of a destruction and a reaching the critically stressed state of the earth's crust, it is concluded that engineering activities on the surface in such places have a direct impact on a large zone of the critically stressed state of the rock mass. When the conditions of instability are met (discrepancy between the loading rate and the limiting rate of deformation of the massif), such an impact serves as a trigger for a strong rock burst or an earthquake with a large depth of the hypocenter. As a result of the technogenic impact on such zones, new sections of the earth's crust pass into an critically stressed state. This triggers a seismic process with the depths of the hypocenters of seismic phenomena much greater than the depth of the zone of technogenic impact, and the manifestation of the strongest events on the periphery of the seismically active zone. The nature of geodynamic events occurring outside the mine workings and at much greater depths than the zone of technogenic impact, as well as on the periphery of the seismically active zone, is understood as a reaction to the transition of rock masses to an critically stressed state as a result of the interaction of local geomechanical and regional geodynamical processes.