Observations of S wave splitting and anisotropy of the upper crust; Semi-controlled experiment in a gold mine in South Africa(23)

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At a gold mine in South Africa, mining has reached to depths of 3 to 4 km. Beacause of such a great depth, many earthquakes happen induced by mining.

Seismometers were installed in a horizontal tunnel to record the mining-induced events. In order to monitor stress changes due to mining by using S wave splitting, we try to determine the location of a splitting area, and to detect temporal changes in splitting.

S waves split very clearly. The splitting area is around a stope at a depth of 3.6 km. The arrival time difference between the two split waves (dT) decreased by 2 ms within five months. The decrease in stress concentration is likely to have decreased the crack density and dT. It can be concluded that the change in dT was related to changes in stress level affected by mining.