Relationship between b-value and stress parameter; Semi-controlled experiment in a gold mine in South Africa (21)

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We investigated the relationship between b-value and stress by analyzing induced earthquake at 2650m depth in a South African gold mine. High stress ($10^6$[Pa]) and low b-value (0.75) was estimated in the small rectangle remnant of reef, while low stress ($10^4$[Pa]) and high b-value (1.42) was estimated near the long mining face. In low b-area clear sequence of forshocks, mainshock (M2.0) and aftershocks were observed; high stress drop ($10^6$[Pa]) with low b-value (0.8) before mainshock was observed, while low stress drop($10^5$[Pa]) with high b-value(1.3) after mainshock. Consequently, we confirmed negative correlation between b-value and stress in much larger scale than laboratory rock fracture.