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How does the impact magnitude affect the relaxation process in rock?

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The data from numerous laboratory and field experiments demonstrate that the material recovery processes in these two cases have much in common. In particular, they may take much longer than the impact (slow time), and the recovery is mostly (not exclusively) logarithmic. The main difference is in the duration of this time. A typical recovery time in laboratory experiments is of the order of minutes to hours, whereas for earthquakes it can take months and even years. Based on the thermodynamic (Arrhenius-type) model discussed earlier, this presentation considers the dependence of the effect on impact strength. It is shown that the dependence of structural changes on the impact strength can naturally explain a radical difference in recovery time, even at a moderate (a few times) variation of the effective contact volume. The statistical distribution of detached (metastable) contacts is accounted for.

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