Field explosion experiment and volcanic explosion: Scaling law for relations among energy, depth, crater size and ballistics

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To investigate the scaling low that governs the relations among explosion energy, depth of explosion, crater size and distribution of ballistic fragment, we have performed field explosion experiments using Kiri-dynamites. The experimental results lead to the conclusions that the cube-root scaling law governs the relations among the explosion energy, explosion depth, crater size and the distribution of ballistic fragments. Based on these relations we can estimate the explosion energy if explosion depth and crater size are known, and we can predict the maximum flight distance and the maximum weight of ballistic fragments if the explosion energy is known.