

论文

统一应力场中基底断裂对盖层复杂断块变形的影响——来自砂箱实验的启示

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摘要:

基底先存断裂的活动会对其盖层岩层的变形起到较大的影响,尤其当应力直接作用于基底时更是对变形起到了控制作用。通过一系列的砂箱实验模拟分析了在统一的构造应力场中,当深部的基底断裂作平移滑动时盖层断块的被动变形情况:当其具有伸展分量时,会形成一个近对称的走滑-伸展裂谷形态,当具有挤压分量时,会形成以逆冲走滑断裂为边界的对称的局部挠曲隆起;同时在剖面上会形成典型的走滑构造特征,变形区域的大小与伸展或挤压分量的大小有关。先存的盖层断块受到基底作用力时,除内部变形本身还会发生旋转,形成局部的拉伸和挤压区;当一个地区的基底断裂多次活动甚至发生反转时,就会使地表形成特别复杂的构造现象;郯庐断裂带中段的埭岛-垦东潜山构造带的变形是一个典型的走滑基底控制的情况,实验结果证明基底的走滑反转变形造成这些断块的旋扭,盖层的非完全反转形成了剖面上的“复式花状构造”。

关键词: 关键词: 基底断裂;走滑断层;物理模拟;砂箱实验;被动变形;郯庐断裂带

The influence of basement fault on the deformation of complex cover blocks in a uniform stress field—Enlightenment from sandbox experiment.

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Abstract:

The activity of previous basement fault has great impact on the deformation of the cover, especially when the stress immediately acts on the basement. The sandbox experiments were employed to simulate the passive deformation of cover fault block in case the deep basement was deformed through strike-slip fault in a uniform stress field. The experiments indicated that a nearly symmetrical strike-slip extension rift formed when extension component exists, whereas a symmetrical bending fold, which is bounded by strike-slip thrusts, was formed when compression component exists. The deformation is characterized by a typical strike-slip structure on the section, and the dimension of deformation region was related to the intensity of extension or compression component. When the stress from basement imposed on cover block, there would be rotation and internal deformation in the previous cover consisting of fault blocks, forming alternative extension and compression. When the basement faults show multiple activations or even reverse movement, some complex structures could be formed on the surface. The Chengdao-Kendong buried hill belt in the middle section of the Tancheng-Lujiang Fault is a typical example of the structure controlled by strike-sliding basement. The experiments proved that the reversal and strike-sliding of the basement resulted in the rotation and torsion of the fault block, and the incomplete reversal of the cover blocks formed composite flower structure.

Keywords:

Key words: basement fault; strike-slip fault; mechanical simulation; sandbox experiment; passive deformation; Tancheng-Lujiang Fault

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