

## 山西盆地现今地应力状态与地震危险性分析

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引用本文: 陈群策,安其美,孙东生,杜建军,毛吉震,丰成君.2010.山西盆地现今地应力状态与地震危险性分析[J].地球学报,31(4):541-548.

DOI: 10.3975/cagsb.2010.04.06

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基金项目:深部探测技术与实验研究专项项目(编号: SinoProbe-06); 公益性行业科研费专项项目(编号: 200811070)

中文摘要:在山西盆地南北两端4个地区共计13个深钻孔中进行了水压致裂地应力测量,获得了现今地应力的大小、方向和分布规律。在盆地北端五台山、雁门关地区400~600 m深实测最大水平主应力值为8~12 MPa。而南端临汾、运城地区则具有较高的构造应力,在400~500 m深度内实测最大水平主应力值为20~28 Mpa。地应力“南高北低”比较明显。这些实测的地应力资料,根据库仑摩擦滑动准则,对研究区内断裂的稳定性进行了力学分析。分析结果表明,总体来看,目前五台山、雁门关和临汾地区的水平主应力都未达到断层活临界值;运城地区已接近断层活动临界值的下限,若计入孔隙压力的影响因素,运城地区最大水平主应力已达到逆断层活动的临界值。从地应力的角度分析认为该区发生地震的潜在性较大,这一现象值得关注和研究。

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## Current In-situ Stress State of Shanxi Basin and Analysis of Earthquake Risk

**Abstract:**Hydraulic fracturing in-situ stress measurements were carried out in 13 boreholes in the southern and northern parts of Shanxi Basin, and the magnitude and direction as well as the distribution regularity of the stress values were obtained. In Wutaishan and Yanmenguan areas within the northern part of Shanxi basin, the magnitude of the measured maximum horizontal principal stress is 8~12 MPa in the depth range of 400~600 m. In Linfen and Yuncheng areas within the southern part of Shanxi basin, the tectonic stress is much higher, with the measured maximum horizontal principal stress being 20~28 Mpa in the depth range of 400~500 m. Obviously, the magnitude of the stress in the southern part is much higher than that in the northern part. According to Coulomb faulting criterion and by using the above in-situ stress data, the authors studied the characteristics and activities of the faults in the study area. The results show that in Wutai, Yanmenguan and Linfen, the stress values have not reached the critical value, whereas in Yuncheng area, the values have reached the lower limit of the fault activity; moreover, if the pore pressure is taken into account, the maximum horizontal principal stress has reached the critical value for reverse fault activity, and the strain accumulation is even much higher. It is suggested that much more attention should be paid to this area.