

2001年昆崙地震断層のセグメンテーションと破壊プロセス

Rupture segmentation and process of the 2001 Mw 7.8 Central Kunlun Earthquake, China

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<http://www.shizuoka.ac.jp/~geo/temp-g.html>

2001年11月14日中国北西部青海省と新疆自治区との境界付近の昆崙(Kunlun)山中部の山岳地帯において発生したMw8.1の地震に伴い地表に長さ425km, 最大横ずれ変位量16mに及ぶ地表地震断層帯が既存の昆崙断層に沿って現れた(Lin et al., 2002; 2003). この地表地震断層帯は, その長さ最大変位量ともにこれまでに世界で報告された内陸地震の中では最大のものである.

昆崙地震断層の概要はLin et al.(2002, 2003)により報告されている. 本報告では, 野外調査と大縮尺のIKUNOSやSPOTなどの衛星写真解析および地震波形インバージョンの結果に基づいて, 地表地震断層の変形特性及びそれと既存の地質構造との関係・断層セグメンテーションと断層破壊プロセスを考察する.

The purpose of this study is to understand the relationship between the displacement distributions, rupture structures and pre-existing geological structures, and to assess the kinematics of rupturing process during the Central Kunlun earthquake by using the field observations, Landsat and SPOT images and inversions from teleseismic data.

The 425-km-long rupture zone may be divided into four segments based on the geological structures, tectonic landform features, spatial displacement distributions obtained from field observation, and analysis of teleseismic waveform. The deformational characteristics of the surface ruptures and focal mechanism solutions reveal that the earthquake had a nearly pure strike-slip mechanism. The inversion results from seismic data show that the rupture started from the west near the epicentral area bilaterally and rapidly extended to the east in an unilateral manner for 380 km, and that the large slip region was limited in the segment 150-280 km east of the epicenter, consistent with field observations. The average stress drop is estimated to be 7 MPa in the area where the large displacements occurred, a value typical of intraplate earthquakes.

The geologic and topographic evidence and the inversion results from seismic data clearly show that temporal and spatial displacement distributions and the rupture process are controlled by the pre-existing geological structures of the Kunlun fault.

References:

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2. Lin A. Kikuchi M., and Fu B. (2003). Rupture segmentation and process of the 2001 Mw 7.8 Central Kunlun Earthquake, China. *Bulletin of Seismological Society of American*, in press.