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Basement structure of Junggar Basin, Southwest China from potential field data

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Basement structure is a key point to study the regional evolution of sedimentary basin and its relationship with the deep crustal structure. For the large density contrast, gravity anomaly has been an effective way to study the basement structure, which is an important supplement for seismic exploration. To get a proper basement relief, the gravity effects of the shallow sedimentary layer is reduced by forward calculation. The spectral analysis is applied to the residual gravity anomaly to get the average depth of different structure layers and their corresponding spectral bands. The application in Junggar basin gives the basement relief corresponding to the top of Carboniferous. The basement roughly reflects the sedimentary cover from Upper Carboniferous to Mesozoic and Cenozoic. The average depth of the basement is 7.6km from the spectral analysis of the residual gravity anomaly after sedimentary layer effects reduced. The basement varies from 5 to 10 km in Junggar basin. It is about 2km deeper on average in the western than that in the eastern Junggar basin. The deepest basement is located along the south margin of Junggar basin. In the surrounding orogenic belts, the basement depth is shallower than 7km in most area.