Redefinition of age for the volcanic rocks from Xiaocaohu, Beishan, Gansu Province China

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The volcanic rocks from Xiaocaohu of Beishan, Gansu Province, previously considered as 'Xiaocaohu rock', are bimodal volcanic rocks assemblage experienced ductile deformation. It is extent in NWW-direction and bounded by Dunhuan Group to the south as ductile fault. Geochemiclly, the basic rocks and acid are the calc- alkaline series, with $\sigma <$ 4 (1.42-3.05), and showing 47.13-59.5%, 70.81-76.53% SiO_2 respectively. All the rocks characterized by distinct enrichment in LREE and have the pattern similarity to the tholeiite from continent rift. LA-ICP-MS dating on the zircons from dacite yielded 286±3Ma. The age represents the formation age of the volcanic rock and indicates Xiaocaohu volcanic rocks is the part of the Carboniferous Tianshan igneous megaprovince. This new data has important information to study the Late Paleozoic tectonic structure of Beishan-China.

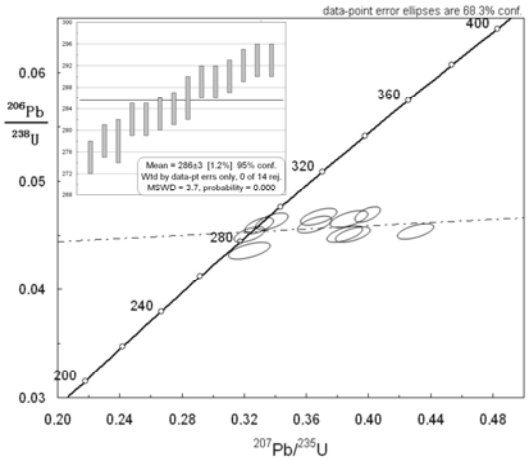

Figure 1: LA-ICP-MS U-Pb zircon of mylonited dacite Concordia diagram.

Thermal stability and gas generation of petroleum in the earth's subsurface based on kinetics modelling and field observations

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A typical marine origin crude oil from the Tarim Basin, NW China was pyrolysed in sealed gold tubes under constant pressure (50Mpa) and programmed heating (250-600°C) conditions, and chemical and carbon isotopic compositions of its generated gases were analyzed. A kinetics model for oil cracking was established and extrapolated to geological conditions. This model predicts that for a geological heating rate of 2°C/Ma a crude oil begins cracking to form gas at about 165°C (EasyRo=1.25%), attains 50% cracking at about 188°C (EasyRo=1.75%), is completely converted to gas about 215°C (EasyRo=2.5%), and is cracked to a dry gas (C_1/ $C_{1\text{-}5}$>0.95) at around 263°C (EasyRo=3.9%). This oil cracking model is supported by field observations. A residual oil from the Cambrian carbonate reservoir in the eastern Tarim Basin is characterized by high density (1.02g/cm^3) and a high content of polyaromatic compounds, indicating a strong thermal alteration. The fluid inclusion data from this reservoir and the geothermal evolution model for the area indicate the oil has experienced a maximum temperature of about 180-190°C. A further example is the Puguang gas reservoir in early Triassic rocks of the northeastern Sichuan Basin which has developed from a destroyed oil pool. The oil pool formed during the Jurassic based on kinetics modeling of the possible source rocks, and it is inferred from fluid inclusion and pyrobitumen reflectance data that it experienced a maximum temperature of around 250°C during the late Cretaceous. Thermal stress together with TSR (thermochemical sulphate reduction) resulted in the reservoired oil being completely altered to the H_2S-rich dry gas now forming the giant gas pool.

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