The Application on Aeromagnetic Delineation of Jiangling Depression in Potassium-rich Brine Prospect Area

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Abstract. Jiangling depression found in oil exploration in its deep Tertiary volcanic rocks containing potassium-rich brine, unusually high grade potassium, potash is an important resource. Potassium-rich volcanic important reservoir brine, and depression has a wide distribution in the volcanic area of great thickness, distribution layer bit more than features. Volcanic show dramatic changes in the magnetic field, the larger the intensity, no rule of positive and negative jump features. In this paper, the use of high-precision aeromagnetic for distribution within the volcanic depressions were delineated, and achieved good results.

Introduction

1967, 1980 in Jiangling Depression, Jianghan Oilfield oil exploration drilling in both the high-temperature, high pressure, potassium-rich brine (Pan Et., 2011). In 2010, the company invested in Jiangling Depression Jinhui implemented the first port of deep drilling brine potash (potassium Gang 1 well) project, found a high temperature, high pressure, high salinity potassium-rich (grade 1.64%) brine, its potassium content and individual well production reached industrial exploitation standards.

Jiangling Depression east rift basins in south-central China, is a secondary depression west Jianghan basin, an area of 6500 km2. (Liu ET, 2013) Jiangling depression in most areas covered by Quaternary strata measured in the region rely mainly on drilling revealed Overall: volcanic rocks in this area is very developed, wide distribution area, the distribution layer bit more than a third multi-formation volcanic Department has distributed; metamorphic rocks and metamorphic rocks in shallow clastic series based; sedimentary rocks are a variety of shale, limestone, dolomite and a small amount of sandstone and siltstone.

Run Chun Tak (1996) demonstrated the relationship between the Jiangling Depression and volcanic reservoir within the pores, through the Tertiary volcanic rocks within the depression results of the analysis showed that volcanic Jiangling Depression has good reservoir space. Shashi, a new ditch true group, Jinsha group and Qianjiang Group porosity and permeability sandstones are present brine deposits (Jian get, 1996). Jiangling Depression is one of volcanic origin of potassium-rich brine, provide good reservoir space for potassium-rich brine, and therefore to identify the distribution of volcanic depression is carried out within the potassium-rich brine prospects delineation important basis. Volcanic show dramatic changes in the magnetic field, the larger the intensity, no rule of positive and negative jump features. The use of high-precision aeromagnetic can effectively delineate the distribution of volcanic rocks.

Geology

Through the study of the magnetic susceptibility measurement area and its surrounding rocks show that: sedimentary rocks are weaker magnetic susceptibility in (30 to 195) between × 10-5SI, can be regarded as non-magnetic; magnetic susceptibility mainly metamorphic in the (500 ~ 1560) × 10-5SI range. Volcanic basalt dominated the region, with a strong magnetic susceptibility varies at (300 ~ 7000) × 10-5SI. Through the above petro physical analysis, regional aeromagnetic anomaly is mainly

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caused by the volcanic, which is delineated using aeromagnetic data provides a physical basis volcanic rock.

Jiangling depression volcanic very developed, widely distributed volcanic area, large thickness, distribution layer bit more, from Shashi - Qianjiang Group volcanic rocks are distributed (Peng ET, 2006.). Formation of magmatic activity and volcanic rocks in the area are mainly concentrated in Himalayan to mafic magma eruption as the main feature. Himalayan mainly mafic volcanic rocks in the eruption activity in depression tend to form large basalt flows, caught in the Cenozoic strata.

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Potassium-rich brine predict volcanic reservoir aeromagnetic

Typically, in the volcanic field, the anomalous peak basalt often of several hundred to several thousand math, but there are relatively weak places, depending on the thickness and specific burial depth and content of basalt in the formation of a relationship; acidic volcanic rocks due to its dark minerals contained less, so the magnetic relatively weak. Volcanic field having common characteristics are: in the direction of the field values along the section line jump change, difficult to compare measured in the adjacent line, with increasing depth of volcanic rocks, jumping variation of volcanic gradually weakened or disappeared. Meanwhile in sedimentary basins, volcanic formations can cause abnormal jump messy and complex changes, because the residual magnetization of volcanic rocks induced magnetization is much larger than several times sake

Jiangling Depression in the region is mainly Cenozoic volcanic basalt rock magnetic characteristics based on basalt in the region with a strong magnetic when it is thick buried depth on the performance of dramatic changes in the magnetic field, the larger the intensity, the positive and negative jump exceptions, cannot compare the characteristics of the survey line adjacent; magnetized pole on the contour flight plan, regional distribution of volcanic rocks, presented as calm slow wide field superimposed background clutter exception.

Distribution of igneous rocks

Jump-like magnetic features based on volcanic strata have combined comprehensive geological data, drilling of Jiangling Depression in the study area were inferred volcanic distribution area, as is the use of high-precision aeromagnetic data directly, so its distribution range inferred accuracy higher. According to the interpretation of the results of aeromagnetic data, volcanic mainly in the central area of Gangneung study area is mainly basalt rock oriented.

Another important factor in controlling the distribution of the region is volcanic faults. The edge of the depression is deep faults place, these areas are mafic crustal magma towards the surface of the favorable channel and volcanic rocks have some direct relationship with these zones in the plane direction, thus located above inferred tectonic environment for the distribution of volcanic provide a favorable basis. In Figure 1, you can see the distribution of volcanic Jiangling Depression by EW trending faults control obvious: the whole, to the north west of Songzi - Police break (F1) and far-Ann - Jingzhou fracture (F2) control-oriented, Man City fracture (F3) and Masan fracture (F10), Jingmen fracture (F4), latent North fracture (F7) respectively control the distribution of volcanic rocks from the overall different directions.

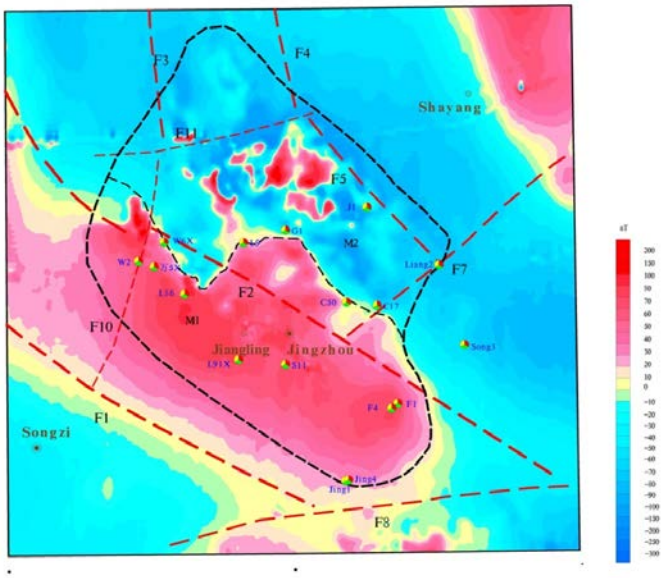

Figure 1 Jiangling Depression Air magnetized pole contour plan

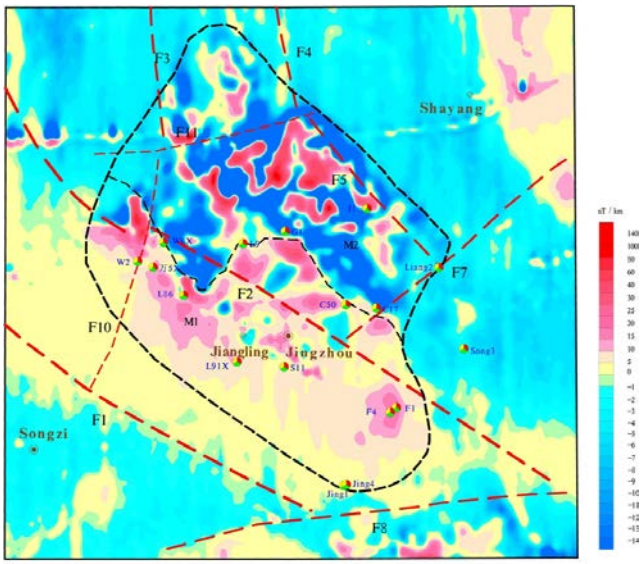

Figure 2 Jiangling Depression aeromagnetic first derivative of the vertical contour plan

Aeromagnetic volcanic features

Air magnetized pole in contour maps and navigation first derivative of the magnetization pole vertical contour diagram, from the shape of aeromagnetic anomalies, the basalt Area was divided into two components:

Little more range Jinzhou fracture (F2) fracture control, the overall shape is superimposed on the regional elevated background clutter irregular shape abnormalities in the Air magnetized pole extension 1km etc. - M1 region Basalt strictly subject to much security the value of the line plan, abnormal irregular lumps disappear, indicating that the regional distribution of basalt buried shallow, and small size; Magnetic characteristics of the region as a whole M2 superimposed on the background of a local increase in negative magnetic anomalies, alternating positive and negative, and a number of positive and negative anomaly centers, these characteristics shows that the region has a strong eminence basalts from the region magnetic anomalies combined with the characteristics of the formation mechanism of residual magnetism can be inferred basalt region is a multi-phase eruptions.

Formation of magmatic activity and volcanic rocks in the area are mainly concentrated in Himalayan to mafic magma eruption as the main feature. Himalayan mainly mafic volcanic rocks in the eruption activity in depression tend to form large basalt flows, caught in the Cenozoic strata.

Summary

The study showed that within the volcanic rocks on Jiangling Depression-relief calm background magnetic field superimposed multiple clutter aeromagnetic anomaly characteristics and distribution of volcanic reservoirs controlled by faults obvious effect of these volcanic rocks are delineated undoubtedly carry potash in Jiangling Depression evaluation of resources provide more important geophysical information, the method can be extended to potassium-rich brine reservoir prediction and evaluation with similar geological conditions in the region.

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