The Integration Geophysical Description Technique and Application of Volcanic Reservoir - A Case from Fengcheng Group Volcanic Reservoir of Permian in Xia-72 Well Field, Northwestern Margin of Junggar Basin

Yongbo Chen, Jianguo Pan, and Duonian Xu
Research Institute of Petroleum Exploration and Development - Northwest(NWGI), PetroChina, Lanzhou, China.

Ever since the later 19th and the beginning of 20th, there have been plenty of volcanic reservoirs discovered both at home and abroad. The lithology of these reservoirs are primarily basalt, andesite, rhyolite and the like. Also, the reservoir spaces are marked by fissure. Yet, the lithology of Fengcheng group volcanic reservoir, which is located in Xia-72 well field, Northwestern Margin of Junggar Basin, is mainly lava tuff breccia. The reservoir space is featured by air pole. The drilling practices prove that this pattern of volcanic reservoir is of obvious lateral heterogeneity. As a consequence, the investigation and predication of its distribution scale is complicated and time-consuming. Based on the fine description that aims at main controlling factor of Fengcheng group volcanic reservoir of Permian in Xia-72 well field, Northwestern Margin of Junggar Basin, this paperhas proposed the mode of fissure volcanic eruption, namely the reservoir distribution itself is mainly determined by the crater and paleo-geomorphology. According to this geological view, masses of geophysical technologies, such as frequency-division and coherence technique, paleo-geomorphology restoration, forward and inversion technique, 3-D sculpture as well as multitude attributes fusion technique are made to predict the distribution of high quality volcanic reservoir with a high accuracy; Also, the further exploration strategy of allocating exploratory along the face area which is adjacent to the crater in Yanxia-Honglan fault zone. By putting the result of the research into practice, the Fengnan-4 well are deployed which has obtained commercial oil and gas flow.