

地质与勘探

模糊数学在长庆气田碳酸盐岩储层评价中的应用

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摘要:

为了综合反映孔隙度、渗透率、准残余溶率、有效储能指数、有效连通指数、次生灰化指数等六个参数对残余岩溶强度的贡献程度, 研究残余岩溶强度与储层富集区域的关系, 文章借鉴前人对古岩溶的研究成果, 运用模糊数学评判法对以上各参数进行综合处理, 得到一个反映残余岩溶强度的综合指标——残余岩溶强度模糊指数, 并用此参数对储层进行评价。在长庆气田靖边区选取了93口开发井和探井, 在单因素评价的基础上, 运用模糊综合评判方法对储层进行综合评判, 把储层分为四类: I、II类可靠; III类能达到工业气流产量; IV类不能达到工业气流产量。评判结果显示, 在渗透率和有效连通指数权重选取较大的情况下, 所选取的3个权重集评价结果相差不大, 故别的参数对评判结果影响相对较小; 同时评价结果与实际情况具有很强的一致性, 可见该方法可使储层的优劣定量化。这表明模糊综合评判方法对碳酸盐岩储层评价具有一定的实用价值。

关键词: [模糊数学](#) [碳酸盐岩](#) [储集层](#) [岩溶作用](#) [综合评价](#)

APPLICATION OF FUZZY MATHEMATICS TO EVALUATING THE CARBONATE RESERVOIRS IN CHANGQING ASG FIELD

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Abstract:

In order to reflect comprehensively the contributions of the six parameters, such as porosity, permeability, quasi residual solution ratio, effective storage capacity index, effective connectivity index and secondary limestone index, to the remaining karstification strength, the relation between the remaining karstification strength and the reservoir concentrating area was investigated by the authors. On the basis of the paleokarst research achievements finished by our predecessors, a fuzzy remaining karstification strength index of comprehensively reflecting the remaining karstification strength was obtained through synthetically processing the above mentioned parameters by fuzzy mathematical judgement method, and the reservoir evaluation was carried out by use of the fuzzy index. According to 93 development wells and exploration wells selected from the Jingbian region of Changqing Gas Field, a comprehensive reservoir evaluation was finished by applying the synthetical fuzzy judgement method on the basis of one factor evaluation. The reservoirs were divided into four types: Types I and II are reliable; Type III is of commercial value; and Type IV is of non commercial value. It is pointed out in the paper that there are a little differences among the results evaluated by the three weight sets selected under the condition of the relatively great weight values of permeability and effective connectivity index, so that the influence of the other parameters on the evaluation results is relatively weak; and, meanwhile, the evaluation results are quite consistent with the actual situation, therefore the reservoir evaluation can be quantified by use of such a method, which indicates that the synthetical fuzzy evaluation method is of a certain practical value to carbonat reservoir evaluation.

Keywords: [Fuzzy mathematics](#) [carbonate rock](#) [Reservoir](#) [Karstification](#) [Comprehensive evaluation](#)

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