

Characterization of Fractured Carbonate Reservoir: Triple-Porosity System

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In many carbonate reservoirs, the hydrocarbon bearing formations are not only naturally fractured, but also highly vuggy. Some of the vugs are connected through diagenetic channel remnants or fracture network, while others are isolated and trapped in the matrix medium. Dolomitizing solutions often convert the limestones to crystals of dolomite rhombs along fracture paths and produce mixed vuggy-fractured porosity. Such interconnected vugs and fractures can form extensive networks, significantly enhancing the producibility of the lower porosity rock and make viable economically marginal resources.

Evaluation and characterization of fractured carbonate reservoirs have been important topics in petroleum geology over past decades. However, conventional wireline logs often fail to produce results consistent with production data due to their limited vertical resolution and complicated nature of vuggy-fractured carbonate. Recent development of advanced borehole logging tools (such as FMI, CMR) has given a new opportunity to adequately characterize the fractured carbonate reservoirs. This presentation will demonstrate the use of these advanced logging tools to quantitatively assess the fractured carbonate reservoirs.