EFFECT OF THE FLOW RATE ON AN IMBIBITION CAPILLARY PRESSURE CURVE: THEORY VERSUS EXPERIMENT

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Abstract Dynamic capillary pressure measurements have been performed during waterfloods, at various flow rates. The capillary pressure is shown to be flow rate dependent: it increases with the flow rate and its derivative with respect to saturation mostly decreases when the flow rate is increased. These dynamic capillary pressure measurements have been used to interpret the flow experiments and calculate the relative permeabilities. Relative permeabilites were found to increase with the flow rate. These results cannot be interpreted in the standard framework of modelling two-phase flow in porous media. A new model, based on an averaging technique is presented.