13.08: Mudrock creep behavior and implications for predicting field porosity

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ABSTRACT

In GoM, older rocks are commonly more compressed (lower porosity) than younger rocks of the same lithology and at the same effective stress. This observation may be explained by the contribution of creep (or secondary compression) to total compression (Fig.1). We studied creep behavior of Resedimented Gulf of Mexico Clay (RGoM-EI) over a wide range of stress levels by means of incremental oedometer tests. Results show that: (1) the secondary compression index decreases with increasing stress and approaches a limiting value (Fig.2); (2) the ratio of the secondary compression index (C_α) to the slope of normal compression curve (C_c) is constant; (3) C_α decreases with time for Resedimented Boston Blue Clay but stays constant for RGoM-EI.

CLICK ON IMAGE FOR LARGER VIEW

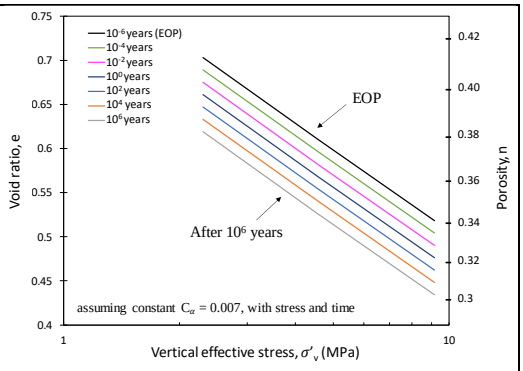

Fig 1: Effects of creep on compression behavior at different times up to 1 million years. End of primary curve (black line) is obtained from a laboratory test. Secondary compression index is assumed to be constant with stress and time.

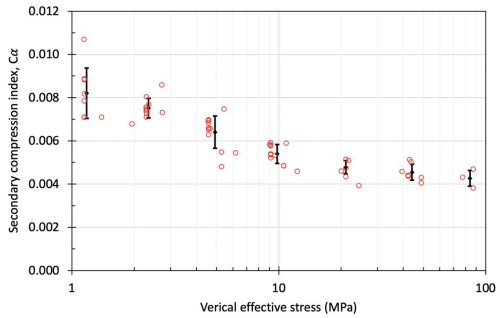

Fig 2: Effects of effective stress on creep rate of RGoM-EI

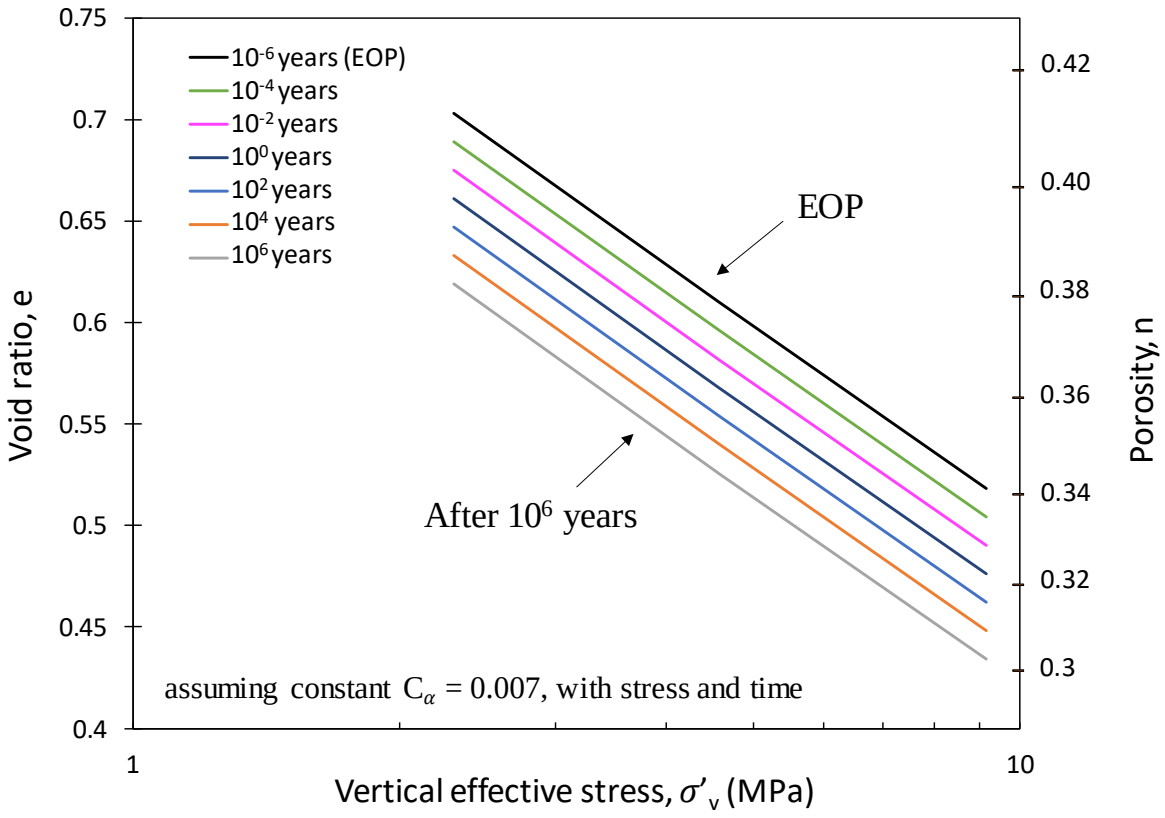

Fig. 1: Effects of creep on compression behavior at different times up to 1 million years. End of primary curve (black line) is obtained from laboratory test. Secondary compression index is assumed to be constant with stress and time.

Back

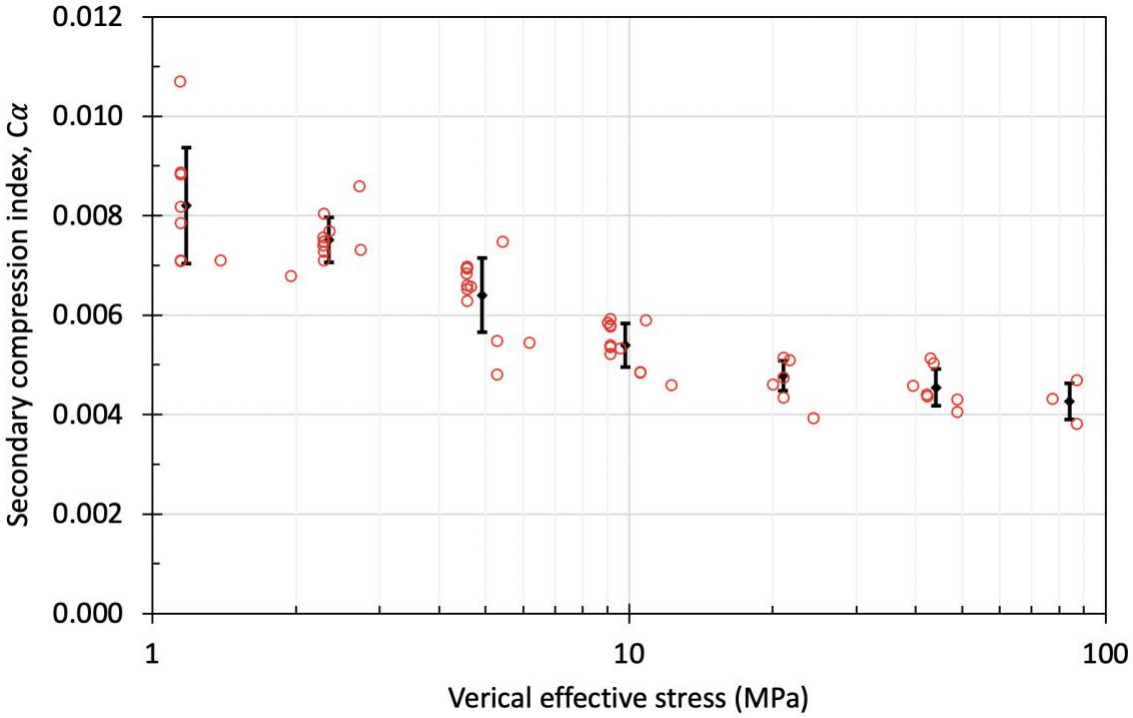

Fig. 2: Effects of effective stress on creep rate of RGoM-EI

Back