



Determining the maximum consolidation stress of sedimentary rocks using the porosity-effective confining pressure curves

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Stress history plays an important role on the mechanical behaviors of rocks. Therefore, how to determine the stress history subjected on rocks is crucial. Adopting the same concept for determining the maximum consolidation stress of soils from a consolidation curve, we utilized the curves of porosity versus effective confining pressure to estimate the maximum consolidation stress of sedimentary rocks. Core samples from the scientific Taiwan Chelungpu fault Drilling Project (TCDP), Hole-A, were used. The maximum buried depths of these samples were determined from the estimated maximum consolidation stress and rock density. Consequently, the proposed method can be validated using the maximum buried depth of the tested rocks from geologic profiles. The results show that the proposed method can efficiently estimate the maximum consolidation stress of the sedimentary rocks. Accordingly, the influence of stress history, such as tectonic uplifting and erosion, on the mechanical behaviors of sedimentary rocks can be evaluated.