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# Compressibility of biogenic and clastic fine-grained sediments in response to pore water salinity changes

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## ABSTRACT

Marine sediments mainly consist of silt- and clay-sized grains. Coastal and offshore structures such as ports, offshore wind farms and gas platforms will often need to be built on fine-grained sediments. Geotechnical properties associated with sediment compressibility are key parameters for marine construction designs especially on soft grounds, which involve clay-mineral dominated fines that can consolidate and settle significantly in response to engineered and environmental loads. We conduct one-dimensional consolidation tests with clastic sediments (silica silt, kaolinite and bentonite) and biogenic sediment (diatoms). To explore compressibility in various marine conditions, the pore fluids for the consolidation tests include deionized water and a series of brines with NaCl molalities of 0.1 m, 1.0 m and 2.0 m. Of particular interest offshore Korea, where diatom-rich sediments are common, diatoms are more likely to be broken than clastic sediments during to loading, and diatom-rich sediment is therefore generally more compressible than clastic-rich sediment. The crushing of diatoms can gradually evolve and affect the shape of the consolidation curve, contributing to the secondary consolidation or creep, which is a plastic (non-recoverable) strain. The parameter assessment methods for consolidation curves are reviewed for plastic strain associated with diatoms. Lastly, we suggest appropriate interpretations based on sediment types.

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