Title:
The Determination of Aqueous Concentration Profiles within Intact Sediment Cores During Transport Experiments.

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A multiport permeameter was utilized to assess the rate of and the factors controlling sorption and desorption during bacterial transport experiments conducted using intact sediment cores (7.3 x 50 cm) from Oyster, Virginia. The multiport permeameter consists of a needle inserted into the shelby tube and attached to either a manometer or a sampling port. The unimpeded hydraulic connection to the core was obtained using either pneumatic inflation or 16 gauge syringe needles with nine side holes (<0.5 mm diameter) drilled within the first 2 cm of the needle. Six needles were inserted halfway into the core at 7 cm intervals. The relatively small diameter needles did not disturb the intact sediments. The needles are initially attached to manometers to determine the permeability of the sediments. The needles are subsequently utilized to extract aqueous samples during the injection of a small pulse (<1 pore volume) of non-reactive tracers or bacteria. The aqueous samples are used to produce concentration profiles at discrete time intervals along the length of the core. A small sample volume is extracted through the sampling ports at a rate that does not reverse the direction of flow nor alter the observed break through curve. Bromide and tritium were injected simultaneously to determine if bromide reacted with the iron rich sediments. The collection of multiple samples from the side ports throughout the bacteria transport experiment showed the change in the aqueous bacteria concentration through time. A high resolution cat-scan of one core shows the distribution of porosity and grain size in the core. The permeability, grain size, porosity, side-port concentrations, breakthrough curve, and final sorbed profile were used to assess the factors controlling transport.

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