

Phosphorus sorption and precipitation characterization at a wastewater infiltration site; Mines Park, CO

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Abstract. Phosphorus is a contaminant that occurs in wastewater systems and is of concern in mountain watersheds because it contributes to eutrophic conditions in surface-water. In these watersheds, soil-based wastewater infiltration and septic systems are common, yet the transport mechanisms for phosphorus compounds are poorly understood. The goal of this study is to characterize phosphorus sorption and precipitation at the Mines Park wastewater infiltration experimental site on the Colorado School of Mines campus. At this site, soil samples were taken from a two-depth 30ft long trench. These samples were analyzed by batch equilibrium tests to determine the equilibrium linear or nonlinear sorption distribution coefficients and sorption rates for the Mines Park soil. The statistical analyses of the batch tests show the spatial heterogeneity of phosphorus sorption parameters at a scale relevant for domestic wastewater infiltration. To assess the precipitation of phosphate compounds below the infiltration trench, PHREEQC modeling was used to speciate the septic tank effluent. Based on saturation indices calculated by PHREEQC, and the sorption parameters from the batch tests, better estimates for phosphorus transport can be made.