

Agent-based simulation of biocomplexity: Effects of adsorption on natural organic mobility through soils

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Natural organic matter (NOM) is a heterogeneous mixture of organic molecules that is ubiquitous in terrestrial and aquatic ecosystems, and that plays a vital role in many biogeochemical processes. NOM interactions form a complex system with emergent properties; i.e., system properties not present in the individual components, but present in the whole. To better understand the complex NOM system, we have developed a Web-based stochastic simulation of NOM interactions. Here, we focus on NOM molecular weight effects on adsorption and NOM mobility. Previous experiments have shown that relatively small NOM components adsorb quickly to soil minerals, and are gradually replaced by intermediate- to high-molecular weight components that form more stable adsorption complexes. Thus, different probabilities can be assigned for adsorption and desorption of different molecular-weight components. The simulation uses the SWARM agent-based modeling tool from the Santa Fe Institute, and is configured, started, and viewed from Web browser pages.