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Biocolloid particles transport in geochemically heterogeneous porous media

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The effect of spatially variable attachment coefficient on biocolloid transport in geochemically heterogeneous porous formations was investigated numerically with a newly developed three–dimensional mathematical model. The biocolloid transport model accounts for horizontal uniform flow in water saturated porous media, and assumes that the biocolloid attachment varies spatially with a constant mean and random fluctuations. Biocolloid particles can either be suspended in the aqueous phase or attached (reversibly or irreversibly) onto the solid matrix. Multiple random realizations of geochemically heterogeneous porous media were employed in order to obtain appropriate ensemble mean concentration distributions, which subsequently were used for classical moment analysis. The results showed that the existence of spatially variable biocolloid attachment strongly contributes to a substantial increase in biocolloid spreading, an effect that dissipates when the migrating biocolloid plume has sampled all of the geochemical heterogeneity within the porous formation.