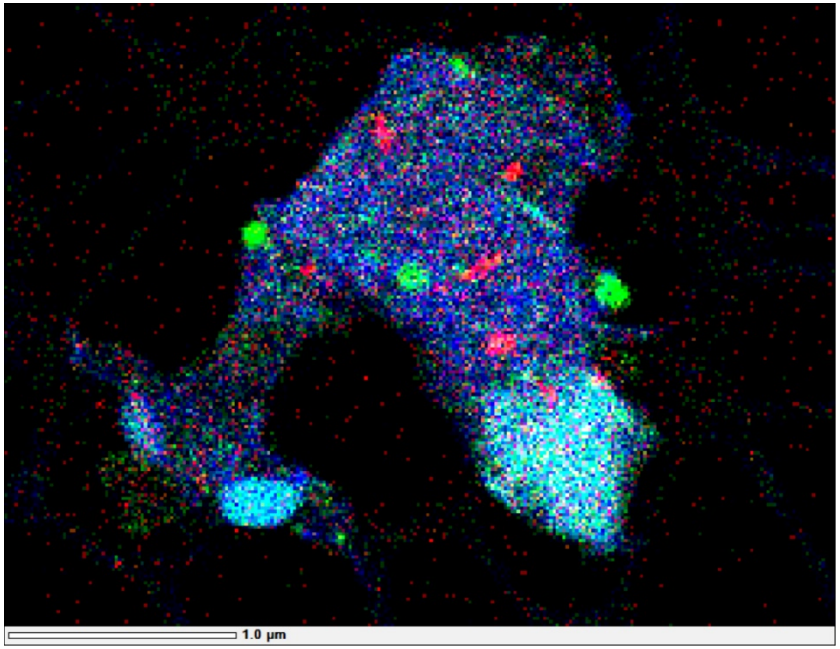
Nano-colloid Facilitated Transport of Organic Carbon Release from Riparian Sediment

In aqueous systems, nano-colloids (1-100 nm diameter) and small colloids (<450 nm diameter) provide a vast store of surfaces to which organic carbon (OC) can sorb, precluding normal bioavailability. As such, mineral nano-colloids (MNC) and small colloids, are both an unaccounted-for reservoir and unquantified vector for transport of OC and nutrients and contaminants within watersheds. Colloids extracted from two contrasting riparian sediments analyzed using STEM/EDS displayed aggregations with high concentrations of Si, Al, and O, suggesting that these are primarily silicate minerals. μ-XRD patterns were crystalline with sharp peaks for kaolinite. Mössbauer spectra revealed ~80% of the sample's Fe was nano-particulate goethite (<10 nm) and confirmed the presence of hematite, with <3% Fe being hematite.



STEM / EDS mapping of aerobic water extracted colloids from Tims Branch within the Savannah River watershed, near Aiken South Carolina, Si (blue), Al (green), Fe (red).

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