ASLO

Association for the Sciences of Limnology and Oceanography

Suspended minerogenic particles in a reservoir: Light-scattering features from individual particle analysis

Peng, Feng, Steven W. Effler

Limnol. Oceanogr., 52(1), 2007, 204-216 | DOI: 10.4319/lo.2007.52.1.0204

ABSTRACT: Light-scattering attributes of minerogenic particles in a reservoir, where these particles dominate over a wide range of light-scattering levels, were characterized by an individu particle analysis technique, scanning electron microscopy interfaced with automated X-ray microanalysis and image analysis (SAX). SAX provided characterizations of the elemental X-ray composition, shape, number concentration (N), particle size distribution (PSD), and projected area per unit volume (PAV_m) of these particles. Clay mineral particles represented ~84% of the PAV_m, and they deviated from sphericity more than the other components of the minerogenic assemblage. Scattering coefficients for minerogenic particles at 660 nm (b_m(660)) were estimatec directly from SAX results based on Mie theory. Both PAV_m and b_m(660) were strong predictors of the observed wide variations in light scattering. Most of the light scattering in the reservoir was attributable to particles in the size range 2-8 μm. Reasonably good closure is reported for estimates of b_m(660), based on comparisons to in situ measurements of the beam attenuation coefficient at 660 nm. The widely used hyperbolic (or Junge) model (to describe PSDs) failed to accurately represent the total value and the particle size dependency of b_m(660) as calculated from SAX observations, whereas the two-component PSD model (using both components or the 8-component only) succeeded for these two features. SAX offers the opportunity to advance partitioning of scattering between minerogenic and organic particle contributions as well as among constituents of the minerogenic component.

Article Links

Download Full-text PDF

Return to Table of Contents

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for $10 per