

A Water Luncheon Seminar



► Presented by:
The Water Management Association of Ohio
and
The Ohio Water Resources Center

October 17, 2018; 11:30 a.m. - 1:00 p.m.

Wilma H. Schiermeier Olentangy River Wetland Research Park,
The Heffner Building, 352 Dodridge St., Columbus, OH 43202



From St. Rt. 315, exit east onto Ackerman Rd, continue past Olentangy River Rd onto W. Dodridge St, then left into Park driveway.

Insights into the composition of the 2018 CyanoHAB on Lake Erie based on spectral decomposition of visible remote sensing images

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Lake Erie has recently been listed as an impaired water body due to the perennial cyanobacterial and harmful algal bloom (CyanoHAB) that develops from spring until fall in its Western Basin. Research developed at Kent State in conjunction with NASA Glenn provides an effective means of identifying the optically-active constituents present in water bodies, and differentiates the composition of complex CyanoHABs. The spectral decomposition method partitions cyanobacterial constituents from algal, pigment degradation products and identifies suspended sediment as minerals and oxides. The approach, which is a form of unsupervised classification, uses an eigenvector-eigenvalue decomposition of the correlation matrix obtained from derivative-transformed reflectance values to determine spectral signatures that represent independent components that can be extracted from the image data cube. When combined, these components explain the majority of the coherent variance present within the scene. Visible derivative spectroscopy is then used to identify the spectral signals by comparing them against a library of known spectral signatures using multiple linear least-squares regression. In addition to a spectral signature, the method also provides a spatial pattern associated with each spectral signal. As a result, it can also be validated using field samples that provide pigment measurements, cell counts or other field instrumentation. This technique can be used as part of a water quality monitoring program to assess CyanoHAB composition and extent. The method is extremely versatile and has been used with handheld spectroradiometers, as well as aerial and orbital sensors. It is effective with both multispectral and hyperspectral data sets, although more information can be extracted from hyperspectral instruments. Results from collaborative field campaigns lead by NASA Glenn and participated in by academic, government, and commercial partners in Lake Erie are presented to document its utility. In addition Lake Erie, to has been applied successfully in various water bodies in Ohio, as well as lakes and coastal waters of Florida and in the coastal waters around the US Virgin Islands.

Please register by October 12, 2018. Late or on-site registrations cost \$5 extra and are not guaranteed a meal. For registered engineers who need Professional Development Hours (PDHs), this presentation offers 1 PDH.

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Please send form and check to: WMAO-Luncheon, 8584 E. Washington St. #206, Chagrin Falls OH 44023.

OR, register online with a credit card at: www.wmao.org.