

## Remote Sensing of Sediment Concentration in the Hudson River using 250-m MODIS/Aqua Land Bands

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With daily, near-global coverage dating back to 2002, medium-resolution (250m) images from the Moderate Resolution Imaging Spectroradiometer (MODIS) Aqua satellite have the potential to become a useful tool in studying long-term trends in the sediment load of rivers around the world. Satellite imagery's ability to capture synoptic information over a large area every day makes it a spatially- and temporally-comprehensive, low-cost compliment to field data. However, atmospheric interference from clouds and aerosols, land adjacency effects, and oblique sun and view angles often reduce the quality of water-leaving reflectance signal reaching the satellite sensor, resulting in very noisy data. The goal of this project is to develop and test universally applicable numerical criteria to filter out flawed satellite pixels in order to construct a time series to study long-term trends in river sediment concentration. We ultimately developed five filtering criteria and applied them to reflectance data from a pixel corresponding to a sampling location near Poughkeepsie, NY from January 2007 to July 2010. A moderate correlation was found between band 1 (620-670 nm) reflectance and daily mean *in situ* measurements of suspended sediment concentration ( $R^2 = 0.5873$ ,  $n = 217$ ), and the filtered reflectance data was used to construct a time series with an average of 5 data points per month. When the five filtering criteria were applied to 4 months of *in situ* sediment measurements taken within 8 minutes of satellite overpass, a strong correlation emerged between band 1 reflectance and concurrent *in situ* measurement ( $R^2 = 0.9296$ ,  $n = 8$ ). Future work will focus on testing these criteria on other locations in the Hudson River and on other rivers around the world.