Remote Sensing Analysis of Temperature and Suspended Sediment Concentration in Ayeyarwady River in Myanmar

Nyein Thanda Ko and Martine Rutten
Delft University of Technology, Delft, the Netherlands (N.T.Ko@tudelft.nl)

Detailed spatial coverage of water quality parameters are crucial to better manage rivers. However, collection of water quality parameters is both time consuming and costly for large rivers. This study demonstrates that Operational Land Image (OLI) Sensor on board of Landsat 8 can be successfully applied for the detection of spatial patterns of water temperature as well as suspended sediment concentration (SSC) using the Ayeyarwady river, Myanmar as a case study. Water temperature estimation was obtained from the brightness thermal Band 10 by using the Split-Window algorithm. The study finds that there is a close agreement between the remote sensing temperature and in-situ temperature with relative error in the range from 4.5% to 8.2%. The sediment load of Ayeyarwady river is ranked as the third-largest sediment load among the world's rivers but there is very little known about this important parameter, due to a lack of adequate gauge data. The single band reflectance of Landsat image (Band 5) seems a good indicator for the estimation of SSC with relative error in the range of less than 10% but the developed empirical formula by the power relation with the only seven ground reference points is uncertain to apply for the entire river basin. It is to note that an important constraint for the sediment analysis is the availability of spatial and temporal ground reference data. Future studies should also focus on the improvement of ground reference data points to become more reliable, because most of the river in Asia, especially in Myanmar, don't have readily available continuous ground sediment data points due to lack of measurement gauge stations through the river.