

RETRIEVAL OF SUSPENDED SEDIMENT CONCENTRATION IN THE PEARL RIVER ESTUARY FROM MERIS USING SUPPORT VECTOR MACHINES

Shilin TANG^{a*}, Qing Dong^a, Chuqun CHEN^b, Fenfen LIU^b,

^aLaboratory of Digital Earth Sciences, Center for Earth Observation and Digital Earth, Chinese Academy of Sciences, Beijing, 100190, China

^bLED, South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, 510301, China

Corresponding author, E-mail address: sltang@ceode.ac.cn

Abstract: With the rapid industrialization and urbanization, more and more solid have been emitted into the Pearl River Estuary. The suspended sediment concentration is one of the most important water quality parameters. With in-situ optical data and suspended sediment data collected on four cruises from 2004 to 2006 in the Pearl River Estuary, analysis shows that with the increasing of the suspended sediment concentration, the intensive bands which have the best correlation relationship with the suspended sediment concentration shift from Rrs(620) to Rrs(778). When the mean suspended concentration is 11.89 g.m^{-3} , the remote sensing reflectance at 620nm has best correlation with the suspended concentration. However, when the mean suspended concentration becomes more than 40 g.m^{-3} , the most correlated band shifts to 778nm. It seems that all of the Rrs(620), Rrs(665), Rrs(681), Rrs(708), Rrs(753), Rrs(760), Rrs(778) may be the most sensitive band for the different suspended sediment concentration. This work investigates the possibility of using a new universal approximator-support vector machines (SVMs)-as the nonlinear transfer function between suspended sediment concentration and remote sensing reflectance in the Pearl River Estuary. Experimental results show that the SVM performs better result than general empirical algorithms or the piecewise algorithm. The correlation coefficient between the in-situ and modeled suspended sediment of the test data set is 0.91 and the root mean squared error (RMSE) is 0.145. The algorithm based on the SVM is applied to MERIS satellite data in January 31, 2007. The distribution of suspended sediment concentration was obtained and it shows that the algorithm could be a useful tool for the study of suspended sediment distribution in Pearl River estuary.