

# Ocean Color Algorithms for Estimating Water Clarity (Secchi Depth) from SeaWiFS

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## Abstract

Relationships between water-leaving radiances ( $L_{wn}$ ) in the blue:Green region of electromagnetic spectrum, Secchi disk depth and the diffuse attenuation coefficient at 490 nm ( $K_{490}$ ) were examined using data from several CalCOFI cruises (1993-1997). We were able to explain approximately 90% of the variance in Secchi depth and  $K_{490}$  using band ratios of  $L_{wn490}/L_{wn555}$ . We present results that support the view that a ratio of  $L_{wn}$ s at 490:555 perform better than the 443:550 in explaining the variance of  $K_{490}$  and Secchi depth. We also performed a neural net (NN) analyses to predict Secchi depth using a combination of  $L_{wn}$  ratios and information from a series of channels corresponding to SeaWiFS ( $L_{wn}$ s at 412, 443, 490, 512, 555 and  $L_{wn}$  ratios at 443/510, 443/555, 490/555). The best training set from the NN analyses resulted in an  $r^2$  of 0.91. A sensitivity analysis using the neural network methodology allowed us to specify the variables that are most useful in predicting Secchi depth. We present results of predicted Secchi depth and  $K_{490}$  using SeaWiFS data from Southern California and other locations where water turbidity is of great interest to recreational and commercial fishing and diving.