

A semi-physical method is proposed to evaluate turbidity from broadband irradiance measurements and other atmospheric parameters. An error analysis and various tests against measured data show that this method can predict accurate turbidities provided that the sky is perfectly cloudless and the diffuse irradiance data are very accurate. Yet, this method is insensitive to errors in input data such as precipitable water and ozone amount. Applications of this method to the quality control of radiation data are discussed. Tests with actual data from Florida and Oregon show good agreement with other methods. Evaluation of the model required a detailed discussion of the accuracy and cosine error of pyranometers, and the uncertainty in precipitable water estimates.