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Wednesday, October 10
Oral Session 8
14:00–16:00

14:20–14:40

THE EFFECT OF OPTICAL PROPERTIES ON SECCHI DEPTH AND IMPLICATIONS FOR EUTROPHICATION MANAGEMENT

Successful coastal management requires reliable monitoring methods and indicators. Besides Chlorophyll-a concentration (Chl-a), Secchi Depth (ZSD) is widely used for water-quality assessment and as eutrophication indicator. In Case2 waters dissolved organic matter (CDOM) and inorganic suspended particulate matter (SPIM) also influence the under-water light field, and ZSD. In situ data from Swedish coastal gradients in three optically different regions were collected in 2010-2014. Regional empirical linear multiple regressions based on optical variables explained the ZSD well (R^2_{adj} = 0.53 to 0.84). The effects of the predicting variables to the variance in R^2_{adj} for ZSD models were analyzed by commonality analysis and showed large differences between regions. CDOM explained most of the variance in the Bothnian Sea (46%), together with SPIM (42%) and 70% alone in the Skagerrak; a combination of all three parameters contributed most in the Baltic proper (53%); Chl-a generally contributed only modest to variations in ZSD. The link between Chl-a and ZSD was weaker in areas with high CDOM and SPIM. These results impact the goals for achieving good water quality status of ZSD, based on reductions of Chl-a. Analysing the threshold for good Chl-a status, showed that ZSD is neither a sufficient indicator for eutrophication, nor for changes in Chl-a. Terrestrial run-off, physical and hydrological conditions indirectly effect the optical components determining ZSD. Natural coastal gradients in ZSD influence the reference conditions for other eutrophication indicators, e.g. underwater vegetation. Hence, setting targets for ZSD based on reducing Chl-a might in some cases be inappropriate and misleading.

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