Some insights of spectral optimization in ocean color inversion
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In the past decades various algorithms have been developed for the retrieval of
water constituents from the measurement of ocean color radiometry, and one of the approaches is spectral optimization. This approach defines an error target (or error function) between the input remote sensing reflectance and the output
remote sensing reflectance, with the latter modeled with a few variables that represent the optically active properties (such as the absorption coefficient of
phytoplankton and the backscattering coefficient of particles). The values of the variables when the error reach a minimum (optimization is achieved) are considered the properties that form the input remote sensing reflectance; or in
other words, the equations are solved numerically. The applications of this approach implicitly assume that the error is a monotonic function of the various
variables. Here, with data from numerical simulation and field measurements, we
show the shape of the error surface, in a way to justify the possibility of finding a solution of the various variables. In addition, because the spectral properties could be modeled differently, impacts of such differences on the error surface as well as on the retrievals are also presented.