



## **Atmospheric correction for ocean colour images using a classification and a neuro-variational algorithm**

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Radiometers on board satellite measure the solar radiation reflected by both ocean and atmosphere at several wavelengths. One difficulty is that the signal is strongly polluted by the contribution of the atmosphere. An important step in the processing of ocean colour images is the so-called “atmospheric correction” that consists in removing the contribution of the atmospheric signal to solely retrieve the ocean contribution.

Due to the presence of aerosols in the atmosphere, this contribution cannot be predicted a priori. Thus, standard algorithms use a part of the signal, generally the near-infrared bands, to deduce the contribution of aerosols to the signal. It is necessary to make some assumptions on the contribution of the ocean for these bands. Most of the time this contribution is determined a priori.

In some situations, this approach is not relevant. Two main problems can occur: (1) The ocean contribution can not be determined a priori in the near-infrared bands; it is the case of most of the coastal waters where the content of the water is complex and not be predicted. (2) The near-infrared part of the signal is not enough to entirely deduce the aerosol contribution; it is the case of absorbing aerosol.

To solve this problem, a methodology was proposed: NeuroVaria. It was based on the spectral matching principle: instead of making strong hypothesis on the oceanic contribution, a multispectral optimization is made on both oceanic and atmospheric signal. NeuroVaria alone was already validated in several cases.

To improve the accuracy of the results and to process more situations, NeuroVaria was combined with a classification procedure in order to constrain the inversion. The classification was done with neuronal classifier (SOM map). The method was applied to the daily MODIS images off the Senegal coast. The resulting oceanic products were validated and a data archive of the daily MODIS data of the region is under construction. This database comprises the Chla-a concentration, the water leaving reflectance spectrum, the aerosol parameters.