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Atmospheric correction and chlorohylle-a restitution in presence of Saharan dusts.

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Ocean Color remote sensing of the region of the Senegalo-Mauritanian upwelling is essential for the study of marine ecosystems as well as to quantify the effect of the desertification.
Upwelling regions are very productive. They have a strong impact on the halieutic resources and on the global climate. The region of Senegalo-Mauritanian upwelling has the specificity to present some frequent aerosol plumes from Sahara desert. A first effect of these dusts is to deteriorate the restitutions of the chlorophyll-a estimations of the standard algorithm. For the SeaWiFS standard treatment, during some periods, there are very few valid pixels for which chlorophyll-a is available. It reduces drastically the quantity of useable data in this region for accurate studies.
We propose a new methodology that classifies SeaWiFS pixels following the aerosol type and then inverse the pixels identified as dust using the NeuroVaria algorithm. The classification step is made using self-organizing maps following a methodology similar to the one proposed by Niang et al. 2006. Reflectance measurements of the SeaWiFS sensors were classified into five different aerosol types (oceanic, maritime, continental, coastal and dust). The inversion step is then realized using the NeuroVaria algorithm. NeuroVaria was first developed to address the problem of absorbing aerosol with standard optical properties (Brajard et al. 2006). The methodology was adapted to the specific case of Saharan dust. The complete methodology (classification + inversion) was applied to SeaWiFS images of the ocean off the Senegalese coast from 1997 to 2009 to produce the type of aerosol, the aerosol optical thickness and the chlorophyll-a concentration. A inter-comparison with the SeaWiFS standard treatment showed that this methodology increased the number of pixels treated of a factor until 10 for the days for which there was a dust event. A validation of the atmospheric products (type of aerosol and optical thickness) was made using the AERONET stations in Dakar and Cabo-Verde.

References :
Niang, A., Badran, F., Moulin, C., Crépon, M. & Thiria, S. (2006). Retrivial of aérosol type and optical thickness over the Mediterranean from SeaWiFS images using an automatic neural classification method. Remote Sensing of Environment, 100, 82-94.
Brajard, J., Jamet, C., Moulin, C. and Thiria, S. (2006). Use of a neuro-variational inversion for retrieving oceanic and atmospheric constituents from satellite ocean colour sensor: Application to absorbing aerosols. Neural Networks 19, 178-185.