

THE ESTIMATION OF MARINE BIO-GEO-PHYSICAL QUANTITIES FROM HYPERSPECTRAL IMAGES

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The Compact High Resolution Imaging Spectrometer CHRIS sensor was launched on board of PROBA (PROject for on Board Autonomy) the 22nd of October 2001. CHRIS will acquire sets of images over the Belgian coastal zone near Oostende. Within this context the German Aerospace Center DLR operated its Digital Airborne Imaging Spectrometers (DAIS7915 and ROSIS), under the HySens 2001 project over a sub region of the future CHRIS coverage in the summer of 2001. These images were used as prototype of CHRIS data. Radiometric and physical in-situ measurements were carried out simultaneously in the Belgian waters (Oostende and IJzer). An atmospheric correction algorithm was developed to retrieve the water leaving reflectance from the total recorded reflectance. The algorithm is based on the Gordon and Wang (1994) method. However the water leaving reflectance at the NIR was not rounded to zero (Gao *et al.*, 2000), neither was the back scattering coefficient assumed spectrally flat at the NIR (Ruddick *et al.*, 2000 and Hue *et al.*, 2000). This was followed by a spectral fitting procedure with a pre-generated table of aerosol reflectances. The main results are water leaving reflectance and a by-product (aerosol optical thickness). The validation of this model is in process. A simplified version of the algorithm was tested on CASI images (Salama and Monbaliu, 2002). The inherent optical properties of the surface water in each pixel of DAIS and ROSIS were estimated through a non-linear inversion technique (optimization). A statistical method (Monte Carlo) was employed to perform a sensitivity analysis on the parameters and to evaluate error budgeting /propagation in each step of the process. The final result is a confidence interval of the IOPs with probability distributions of the errors. A simple model of SPM was developed and tested against the inversion method. Good agreement was found between SPM concentrations in both methods. These models (inversion technique and SPM) are still to be validated with in-situ measurements.

Keywords: Inversion; Atmospheric correction, Suspended sediments, CHRIS/PROBA, DAIS/ROSI.