

ATMOSPHERIC CORRECTION OF CHRIS DATA – A FIRST STEP TOWARDS SUSPENDED SEDIMENT QUANTIFICATION

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The Compact High Resolution Imaging Spectrometer (CHRIS) sensor was launched on board of PROBA (PROject for on Board Anatomy) on October 22, 2001. The CHRIS sensor will acquire sets of images over an area of 18km by 18km within the Belgian coastal zone near Oostende. This area exhibits a permanent high load of suspended sediments. Values are of the order of 40mg/l off the coast and may increase (especially in the winter) to more than 100 mg/l. This high load of suspended sediment arises from transport and re-suspension of sediment materials through hydrodynamic processes, river discharge and from the nearly continuous dredging activities in the area. Estimating suspended sediment transport and concentration is necessary to assess its environmental impact. This task requires synoptic information at a regular frequency, which is very difficult to obtain from the routine in-situ monitoring. Integrating remote sensing data, in situ measurements and model-results provides a better understanding of the spatial and temporal variability of suspended sediments.

The main objective is to use CHRIS images to quantify the concentrations of suspended sediments in the Belgian coastal waters. This is achieved by relating the optical properties of water constituents to their physical characteristics. The high spectral resolution of CHRIS may identify diagnostic optical-properties of water constituents. This will improve the understanding of other phenomena that were not accessible via the current multi spectral sensors.

However, the sensor-recorded signal is strongly affected by the presence of the atmosphere. Up to 90% of the measured radiance may originate from atmospheric perturbation, i.e. aerosol and air molecules scattering. Therefore, the accuracy of the retrieved water constituents depends on the applied atmospheric correction algorithms. Within this context an atmospheric correction approach is proposed for the CHRIS data. Since the CHRIS images are not yet available, the proposed approach is illustrated with data from the Compact Airborne Spectrographic Imager (CASI).