THE MERIS WATER PRODUCTS: PERFORMANCE, CURRENT ISSUES AND POTENTIAL FUTURE IMPROVEMENTS

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The MEdium Resolution Imaging Spectrometer, onboard the ESA satellite ENVISAT, has been delivering global ocean colour products since April 2002. Level 1b and Level 2 processing algorithms have been continuously improved and updated in the ENVISAT ground segment.

New issues and improvements have been identified and are addressed in the next reprocessing. The radiometric and spectral calibrations will be updated. Modifications have been carried out to improve the atmospheric correction in both case 1 and case 2 waters. A vicarious adjustment strategy to remove residual biases in the Level 2 marine signals is put in place. The MERIS Matchup In-situ Database (MERMAID), currently populated with AAOT, BOUSSOLE, MOBY, NOMAD and SIMBADA water leaving reflectance matchups, has been developed to assess the Level 2 product performance.

In parallel, future algorithmic improvements are being pursued and covered by three separate exploratory studies.

The first study addresses the limitation of the current MERIS atmospheric correction scheme in sun glint conditions. A forward radiative transfer model of the ocean-atmosphere has been developed and served as a basis for the development of a neuronet approach making use of the full MERIS spectral range. It appears to perform consistently in a range of observational geometries and glint reflectance

levels. In addition, a synergetic approach, using the thermal IR channels of AATSR, is under development to directly retrieve the glint reflectance in the SWIR where the aerosol and water leaving contributions to the top-of-atmosphere signal are low.

A second issue faced by atmospheric correction schemes in coastal environments is the adjacency effect. When observing water surfaces, in the vicinity of land masses, the modelling of scattering processes in the atmosphere needs to take into account the spectral and geometrical properties of the surrounding land surface in order to accurately retrieve water leaving signals. A prototype corrective algorithm accounting for both molecular and aerosol effects has been developed and is currently available to users. Preliminary validation shows encouraging results and might serve as a basis for future operational implementation.

The third study makes use of the ability of MERIS to measure transmission in the O_2-A oxygen band, at about 760 nm. Forward modelling capabilities have been developed to simulate MERIS observations at high spectral resolution in cloudy and clear sky observational conditions both in an exact manner and through an analytical modelling. Over ocean, retrieval algorithms for cloud top pressure and the effective height of scatterers are being developed. Their products are expected to increase the MERIS Level 2 data quality by enhancing the cloud and aerosol identification and characterization capabilities.