 <p>GKSS Research Centre Geesthacht Institute for Coastal Research</p>	<p>MERIS</p> <p>Regional Case II Water Algorithm</p> <p>Flags ATBD</p>	<p>DOC: GKSS-KOF-MERIS-ATBD01</p> <p>Name: MERIS Case II ATBD-ATMO</p> <p>Issue: 1.1 Rev: 1.0</p> <p>Date: 16. Nov. 2006</p> <p>Page: 1</p>
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Algorithm Theoretical Basis Document (ATBD)

MERIS Regional Case 2 Water BEAM Extension Flags ATBD

Version 1.1 16. Nov. 2006


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MERIS Case 2 Water Algorithms Development

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Distribution


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Change Record

Issue	Revision	Date	Description
Draft 0.1	0	24.10.2005	Initial draft
Draft 0.8	1	23.8.2006	Draft
Final Version 1.0	tbc	tbc	Final Version

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Abstract

This document describes the level 2 flags as implemented in version 1.1 of the MERIS Case 2 Water Beam processor.

1 Introduction

Any algorithm in remote sensing has its own scope, i.e. the range of conditions under which the procedure should provide reasonable results. Thus, one important step in a procedure is to detect conditions, which are out of scope. These data/pixels are then flagged.

Flagged pixels can be easily visualized by using VISAT. With the flag operator you can switch on/off flags and change the colour and transparency. For the MERIS C2R algorithm we have defined the following flags beside the level 1 flags, which are also included in the C2R product:

2 Description of flags

2.1.1 rad_err

This flag is switched on under hazy conditions, when the aerosol optical thickness surmounts a certain degree for which the present version of the atmospheric neural network has not been trained. It is simply checked by the TOA radiance reflectance in MERIS band 1. This band is only little influenced by the reflectance of suspended matter. The threshold for the TOA radiance reflectance is presently set to 0.07 sr⁻¹. Under these hazy conditions the separation between reflectance caused by the atmosphere or by turbid water can fail.

2.1.2 l2_land

Although the land is flagged already by the level 1 land and the coastline flags, conditions occur such as dry fallen tidal flats, which are not included in the L1 flag. With the l2_land flag we test if the radiance reflectance in MERIS band 13 (865 nm) is above a threshold, which is provided in the parameter file of the C2R processor (s. #13, 0.02 sr⁻¹). Also the rim of clouds maybe flagged.


2.1.3 cloud_ice

This flag indicates very high radiance reflectance indicating clouds, ice or snow. Normally it should not appear, because these pixels should have been excluded from water processing by the L1 bright flag. Algorithm works as for l2_land, the threshold is provided in the parameter file (s. #13, 0.2 sr⁻¹).

2.1.4 sunlint

This flag is presently not implemented. Sun glint is corrected as far as possible by the atmospheric correction procedure.

2.1.5 ancil

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This flag indicates unreasonable data for ozone or pressure, which are used in the atmospheric correction procedure. In the present version it tests if surface pressure is within the range 500 - 1100 hPa, and the atmospheric ozone content is within the range 200 - 500 Dobson units (DU).

2.1.6 toa_oor

This flag is on when the input radiance reflectances (top of standard atmosphere, tosa) are out of the atmosphere neural network training range. The limits are included in the NN and are used for this test. Flag goes on if any of the bands is outside the limits.

2.1.7 wlr_oor

This flag is on when the input water leaving radiance reflectances (as result of the atmospheric correction) are out of the water neural network training range. The limits are included in the NN and are used for this test. Flag goes on if any of the bands is outside the limits.

2.1.8 solzen

Flag is on if the solar zenith angle is out of the neural network training range. The limits are included in the NN and are used for this test. Flag goes on if any of the angles is outside the limits.

2.1.9 satzen

Flag is on if the viewing zenith angle is out of the neural network training range. The limits are included in the NN and are used for this test. Flag goes on if any of the angles is outside the limits.

2.1.10 atc_oor


Flag is on if the output of the atmospheric correction neural network (path radiance reflectances and transmittances) are not within the expected range. The limits are included in the NN and are used for this test. Flag goes on if any of the bands is outside the limits.

2.1.11 conc_oor

Flag is on if the output of the water neural network, i.e. the inherent optical properties *a_{pig}*, *b_{tsm}*, *a_{yellow}*, are not within the expected range. The limits are included in the NN and are used for this test. Flag goes on if any of the IOPs is outside the limits.

2.1.12 ootr

This flag indicates that the water leaving radiance reflectance as submitted to the water NN is outside the range of the spectra used for training of the NN. Flag is on if the sum of the squared deviations between the water leaving radiance reflectances (i. e. after atmospheric correction) and the water leaving radiance reflectances as simulated with the forward NN surmounts a certain threshold, which is given in the parameter file *s. spectrumOutOfScopeThreshold*. The degree of the deviation is also provided as the output product *chi_square* (set *outputOutOfScopeChiSquare* = true in parameter file). Details are described in the ATBD water.

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2.1.13 whitecaps

This flag is triggered if the windspeed as provided with the MERIS product surmounts 12 m/s, which is about Beaufort 6. Note that whitecapping starts at wind speeds around 7 m/s (Beaufort 4). Large white patches, which may have a significant influence on the reflectance of the ocean, occur at wind speeds above 11 m/s (Beaufort 6). In coastal waters, the foam coverage can be influenced also by the concentration of organic material and thus may be formed even at lower windspeeds.

2.1.14 l2_invalid

This is the master flag, which goes on if any of the flags OOTR, wlr_oor, toa_oor, l2_land, cloud_ice, rad_err, WHITECAPS has been triggered.

2.1.15 inputValidMask

This flag is provided in the parameter file (s. #2). It is used to mask out all those pixel from further processing, which have one of the following L1 flags switched on:

not l1_flags.INVALID and not l1_flags.SUSPECT and not l1_flags.LAND_OCEAN and not l1_flags.BRIGHT and not l1_flags.COASTLINE