SCIAMACHY	Operation Change Request	OCR No: 035 Issue: A

Title: Changing Integration Time for cluster 16 an 18 (channel 3) for 20 April 2008 to 17 May 2008 to 0.25 or shorter for nadir

Description of Request:

We wish a higher spatial resolution for clusters 16 and 18 (channel 3) with the same short integration time as for cluster 17 (0.25 or better) as it has been successfully applied for OCR32 last year. First results from analysing SCIA data from Nov 2007 indicate that the former operation change OCR 032 was successful (see annexed figures): we can, with using the entire data set from ~530 to 595 nm for DOAS analysis, resolve the absorption of the phycoerythrin-containing Synechococcus (a dominating phytoplankton species in tropical areas) and distinguish the global abundance of this species with a much better coverage and higher spatial resolution. With resolving Synechococcus distributions from SCIAMACHY data, this enables to distinguish this species from other cyanobacteria species and helps to improve phytoplankton biomass estimates and marine nutrient flux studies.

In normal operation the integration time in clusters 16 and 18 of around 1 sec is not enough to get highly spatially resolved results for further phytoplankton modelling approaches. In addition also the integration times for cluster 9 (channel 2) and 15 (channel 3) should also not be larger than 0.25 because we need this information for calculating phytoplankton group concentrations from the DOAS-fits of phytoplankton and also for distinguishing other phytoplankton groups. We choose the time of April 20, 2008 to May 17, 2008, because then we are measuring online in the Atlantic Ocean between 20°N and 25°S in situ phytoplankton characteristics during a ship cruise (on Research Vessel Polarstern, Ant XXIV-4) which are necessary data for validation of these specific phytoplankton retrieval. It is sufficient to fullfil the above requirements only for solar zenith angles smaller 60°.

Originator: Astrid Bracher, IFE	Date of Issue: 2008-02-20	Signature: A. Bracher by email 2008-02-20

Assessment of SSAG (necessary for requests by scientists):

The proposed change, as long as not conflicting with the nominal measurement sequence and not affecting the quality of the data products, is an unique (there is no other sensor in space to do it) opportunity to test phytoplankton retrieval using high spectrally resolved reflectance data. Therefore it is recommended to investigate the implementation of the proposed temporary change.

SSAG: H. Bovensmann	Date: 28.2.2008	Signature: e-mail 28.2.2008

Classification of OCR: D

OCR Analysis (incl. Implementation Option):

The following analysis is derived from OCR_032 executed in November 2007. A reduction of the integration times below 0.25 s would have a major impact on the data products and is not considered to be feasible. Therefore the implementation concentrates on achieving an integration time of 0.25 s for clusters 9, 15,16,17 and 18.

The OCR can be implemented by modification of the co-adding tables for the nadir states N6 (state ID 6) and N7 (state ID 7). Reduction of the integration time for clusters 16 & 18 can be achieved by reducing the co-adding factors for these clusters from 16 to 4, resulting in an integration time of 0.25 s. There is no need to modify co-addings for clusters 9, 15 & 17 for states N6 and N7 as these already have 0.25 s integration time.

A reduction of the co-adding factors results in an increase of the data rate above the allowed limit of about 390000 bits/s. To compensate for this it is necessary to increase the co-adding factors (and thus reducing spatial resolution) in other clusters.
(Note: an integration time of 0.25 s corresponds to a spatial resolution of about 30km x 60 km, 1 s to about 30km x 240 km.)

Since OCR_032 was implemented using the then proposed option 2, also OCR_035 shall follow the same approach.

Increase integration times of “non-special” clusters in channel 7 (48,49,51,53) and blinded pixels in channel 6 (36,47) to 5s. Coadding tables 26 and 27 will be modified accordingly (see annex 2). The co-addings for clusters 16 & 18 are set to 4 as described above

Since the implementation involves CTI-tables only and no MPS-activities the proposed timeslot April 20, 2008 to May 17, 2008 can be met. We will upload the modified CTI parameter tables in orbit 32092 (April 20, 2008) and switch back to the final flight configuration in orbit 32493 (May 18, 2008).

SOST: E. Krieg, DLR-IMF (ESA, Industry if necessary)	Date: 27.02.2008	Signature: email 27.02.2008 Update: email 07.03.2008

Approval of Proposed Implementation:

Originator Approval: A. Bracher	Date: 07/03/08	Signature: via e-mail 07/03/08
SSAG Approval: H. Bovensmann	Date: 28.2.2008	Signature: e-mail, 28.2.2008

Decision / Approval:

It is recommended to implement this OCR in the same way as already successfully tested to work for OCR32. Data users needs to be informed in advance on this temporary change of integration times (Action ESA).

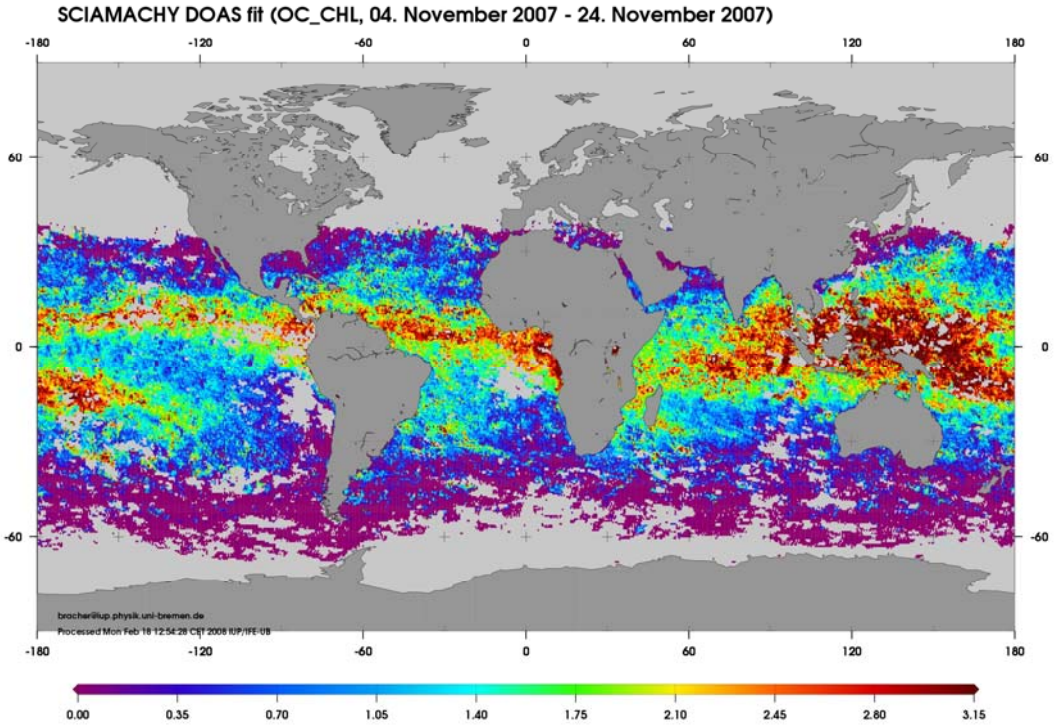
DLR Approval: Ch. Chlebek	Date: 4.3.2008	Signature: e-mail, 4.3.2008

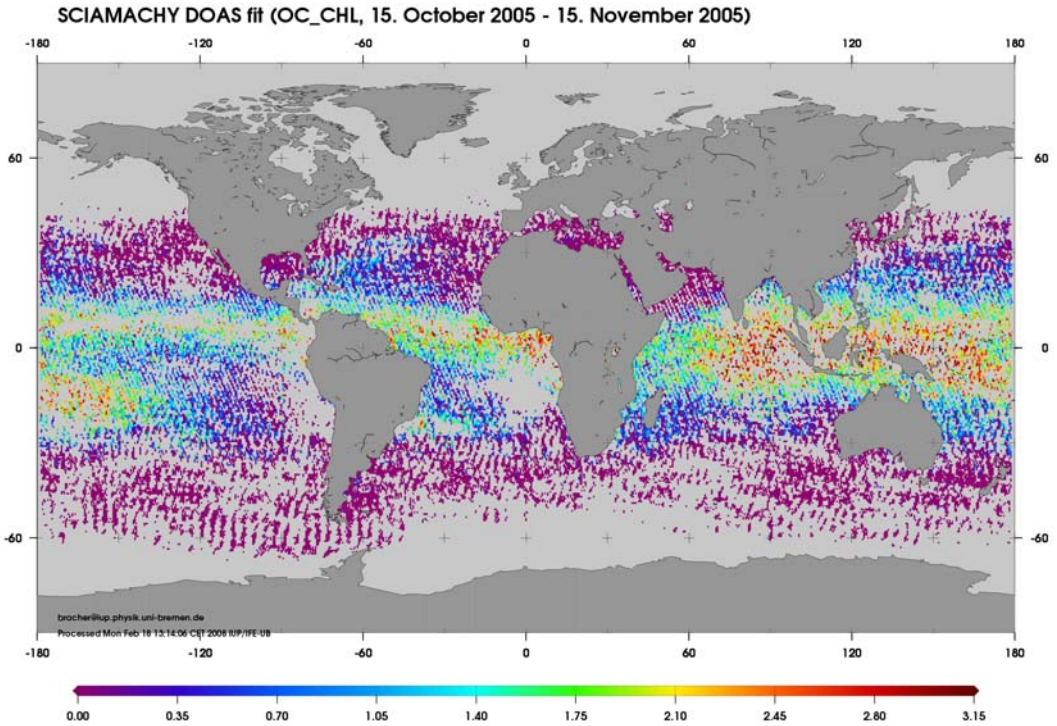
Implementation by SOST:

According to option 2 in OCR_032 coadding tables 26 and 27 will be modified as specified in tables N6 and N7 of annex 2.
Start orbit for the execution of OCR_35 is 32092 (April 20, 00:48 UTC), Stop orbit is 32493 (May 18, 01:06 UTC).

SOST E.Krieg	Date: 12.03.2008	Signature: e-mail, 12.3.2008

Annex 1:


SCIAMACHY DOAS fit (OC_CHL, 04. November 2007 - 24. November 2007)
-180
-120
-60
0
60
120
180
60
0
-60
brocher@iup.physik.uni-bremen.de
Processed Mon Feb 18 12:54:28 CET 2008 IUP/IFE-UB
0.00
0.35
0.70
1.05
1.40
1.75
2.10
2.45
2.80
3.15


SCIAMACHY DOAS fit (OC_CHL, 15. October 2005 - 15. November 2005)
-180
-120
-60
0
60
120
180
60
0
-60
brocher@iup.physik.uni-bremen.de
Processed Mon Feb 18 13:14:06 CET 2008 IUP/IFE-UB
0.00
0.35
0.70
1.05
1.40
1.75
2.10
2.45
2.80
3.15

Annex 2:

Summary of results **N6**

State						N6	
Cluster Ind.	Description	min/max wavelength , nm		Channel	Coadding	PET (s)	Int. Time(s)
1	Blinded Pixel	212,53	213,14	1a	1	1	1
2	straylight	213,29	239,88	1a	1	1	1
3	virtual channel 1a	240,00	281,90	1a	1	1	1
4	virtual channel 1b	282,01	303,54	1b	1	0,25	0,25
5	overlap region, PMD 1	303,65	313,92	1b	1	0,25	0,25
6	Blinded Pixel	333,92	334,37	1b	4	0,25	1
7	Blinded Pixel	412,18	411,74	2b	4	0,25	1
8	overlap region 2b	403,96	391,87	2b	4	0,25	1
9	UV DOAS, PMD 1	391,76	320,14	2b	1	0,25	0,25
10	overlap region 2a, UV DOAS, PMD 1	320,02	309,43	2a	1	0,25	0,25
11	Blinded Pixel	301,06	300,59	2a	4	0,25	1
12	Blinded Pixel	383,56	385,84	3	16	0,0625	1
13	overlap region	391,88	404,10	3	16	0,0625	1
14		404,34	423,73	3	16	0,0625	1
15	VIS DOAS, PMD 2	423,97	526,96	3	4	0,0625	0,25
16		527,20	544,56	3	4	0,0625	0,25
17	AE	544,80	565,08	3	4	0,0625	0,25
18		565,31	597,28	3	4	0,0625	0,25
19	overlap region	597,52	605,48	3	16	0,0625	1
20	Blinded Pixel	627,41	628,40	3	16	0,0625	1
21	Blinded Pixel	595,36	596,26	4	16	0,0625	1
22	overlap region	597,60	605,43	4	16	0,0625	1
23		605,65	612,53	4	16	0,0625	1
24	PMD 3, AE	612,75	725,99	4	4	0,0625	0,25
25		726,19	753,77	4	16	0,0625	1
26	O2(A)	753,98	775,92	4	4	0,0625	0,25
27	overlap region	776,13	789,85	4	16	0,0625	1
28	Blinded Pixel	811,47	812,33	4	16	0,0625	1
29	Blinded Pixel	773,21	774,43	5	4	0,25	1
30	overlap region	776,24	789,74	5	4	0,25	1
31		790,04	798,06	5	4	0,25	1
32	PMD 4/7, AE	798,35	946,62	5	1	0,25	0,25
33		946,90	990,40	5	4	0,25	1
34	overlap region, (AE)	990,68	1056,25	5	2	0,25	0,5
35	Blinded Pixel	1061,68	1062,83	5	4	0,25	1
36	Blinded Pixel	971,46	978,74	6	8	0,125	1
37	overlap region	990,84	1056,23	6	4	0,125	0,5
38		1057,02	1233,24	6	8	0,125	1
39	AE	1234,01	1253,14	6	2	0,125	0,25
40		1253,90	1388,96	6	8	0,125	1
41	Water Vapour	1389,72	1410,36	6	2	0,125	0,25
42		1411,12	1548,51	6	8	0,125	1
43	Water/Ice cloud & PMD 5	1549,30	1670,70	6	2	0,125	0,25
44		1671,51	1695,84	6	8	0,125	1
45	add. Water/Ice cloud	1696,65	1707,26	6	2	0,125	0,25
46		1708,08	1750,09	6	8	0,125	1
47	Blinded Pixel	1765,07	1772,59	6	8	0,125	1
48	Blinded Pixel	1934,38	1935,44	7	10	0,5	5
49		1939,99	1967,79	7	10	0,5	5
50	CO2	1967,90	1984,05	7	1	0,5	0,5
51		1984,15	2029,89	7	10	0,5	5
52	CO2, H2O	2029,99	2040,19	7	1	0,5	0,5
53	Blinded Pixel	2042,80	2043,67	7	10	0,5	5
54	Blinded Pixel	2259,26	2260,47	8	2	0,5	1
55	PMD 6, Ch. 8, unused pixel	2260,61	2384,49	8	1	0,5	0,5
56	Blinded Pixel	2384,60	2385,61	8	2	0,5	1
57							
58							
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62							
63							
64							
Total Data Rate (bit/s, including Headers, PMD /Auxiliary Data)							**386333**

Summary of results N7

State						N7	
Cluster Ind.	Description	min/max wavelength , nm		Channel	Coadding	PET (s)	Int. Time(s)
1	Blinded Pixel	212,53	213,14	1a	5	1	5
2	straylight	213,29	239,88	1a	1	1	1
3	virtual channel 1a	240,00	281,90	1a	1	1	1
4	virtual channel 1b	282,01	303,54	1b	2	0,25	0,5
5	overlap region, PMD 1	303,65	313,92	1b	1	0,25	0,25
6	Blinded Pixel	333,92	334,37	1b	20	0,25	5
7	Blinded Pixel	412,18	411,74	2b	4	0,25	1
8	overlap region 2b	403,96	391,87	2b	4	0,25	1
9	UV DOAS, PMD 1	391,76	320,14	2b	1	0,25	0,25
10	overlap region 2a, UV DOAS, PMD 1	320,02	309,43	2a	1	0,25	0,25
11	Blinded Pixel	301,06	300,59	2a	4	0,25	1
12	Blinded Pixel	383,56	385,84	3	16	0,0625	1
13	overlap region	391,88	404,10	3	16	0,0625	1
14		404,34	423,73	3	16	0,0625	1
15	VIS DOAS, PMD 2	423,97	526,96	3	4	0,0625	0,25
16		527,20	544,56	3	4	0,0625	0,25
17	AE	544,80	565,08	3	4	0,0625	0,25
18		565,31	597,28	3	4	0,0625	0,25
19	overlap region	597,52	605,48	3	16	0,0625	1
20	Blinded Pixel	627,41	628,40	3	16	0,0625	1
21	Blinded Pixel	595,36	596,26	4	16	0,0625	1
22	overlap region	597,60	605,43	4	16	0,0625	1
23		605,65	612,53	4	16	0,0625	1
24	PMD 3, AE	612,75	725,99	4	4	0,0625	0,25
25		726,19	753,77	4	16	0,0625	1
26	O2(A)	753,98	775,92	4	4	0,0625	0,25
27	overlap region	776,13	789,85	4	16	0,0625	1
28	Blinded Pixel	811,47	812,33	4	16	0,0625	1
29	Blinded Pixel	773,21	774,43	5	8	0,125	1
30	overlap region	776,24	789,74	5	8	0,125	1
31		790,04	798,06	5	8	0,125	1
32	PMD 4/7, AE	798,35	946,62	5	2	0,125	0,25
33		946,90	990,40	5	8	0,125	1
34	overlap region, (AE)	990,68	1056,25	5	8	0,125	1
35	Blinded Pixel	1061,68	1062,83	5	8	0,125	1
36	Blinded Pixel	971,46	978,74	6	40	0,125	5
37	overlap region	990,84	1056,23	6	8	0,125	1
38		1057,02	1233,24	6	8	0,125	1
39	AE	1234,01	1253,14	6	2	0,125	0,25
40		1253,90	1388,96	6	8	0,125	1
41	Water Vapour	1389,72	1410,36	6	2	0,125	0,25
42		1411,12	1548,51	6	8	0,125	1
43	Water/Ice cloud & PMD 5	1549,30	1670,70	6	2	0,125	0,25
44		1671,51	1695,84	6	8	0,125	1
45	add. Water/Ice cloud	1696,65	1707,26	6	2	0,125	0,25
46		1708,08	1750,09	6	8	0,125	1
47	Blinded Pixel	1765,07	1772,59	6	40	0,125	5
48	Blinded Pixel	1934,38	1935,44	7	10	0,5	5
49		1939,99	1967,79	7	10	0,5	5
50	CO2	1967,90	1984,05	7	1	0,5	0,5
51		1984,15	2029,89	7	10	0,5	5
52	CO2, H2O	2029,99	2040,19	7	1	0,5	0,5
53	Blinded Pixel	2042,80	2043,67	7	10	0,5	5
54	Blinded Pixel	2259,26	2260,47	8	10	0,5	5
55	PMD 6, Ch. 8, unused pixel	2260,61	2384,49	8	1	0,5	0,5
56	Blinded Pixel	2384,60	2385,61	8	10	0,5	5
57							
58							
59							
60							
61							
62							
63							
64							
Total Data Rate (bit/s, including Headers, PMD /Auxiliary Data)							**390784**

The maximum data rate of 390000 bits/s is slightly exceeded. This is considered to be uncritical since nadir states with data rates up to 391034 bits/s have already been run successfully.