

 SCIAMACHY	<h2>Operation Change Request</h2>	OCR No: 032
		Issue: A
Title: Change Integration Time for cluster 16 and 18 (channel 3) for 4-24 Nov 2007 to 0.25 or shorter		
<u>Description of Request:</u> 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) because tests found out that with the entire data set from ~530 to 595 nm we can resolve Synechococcus (a dominating phytoplankton species in tropical areas) absorption within this wavelength range. So far the integration time in clusters 16 and 18 is around 1 not enough to get meaningful results for further phytoplankton modelling approaches. 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 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 Nov 4-24 2007, 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-1). It is sufficient to fulfill the above requirements for solar zenith angles smaller 60°.		
Originator: Astrid Bracher, IFE	Date of Issue: 2007-06-27	Signature: A. Bracher by email 2007-06-27
<u>Assessment of SSAG (necessary for requests by scientists):</u> The proposed change, as long as not conflicting with the nominal measurement sequence and not affecting the quality of the data products, is a 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: 29.6.2007	Signature: e-mail 29.6.2007
Classification of OCR: D		

OCR Analysis (incl. Implementation Option):

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.)

The following options are proposed (see Annex for details; note that for all options co-addings for clusters 16 & 18 are set to 4 as described above):

Option 1:

Increase integration time in cluster 32 (channel 5, PMD 4/7, AE) to 0.5 s and in overlap channel 6/7 to 1s.

Option 2:

Increase integration times of "non-special" clusters in channel 7 (48,49,51,53) and blinded pixels in channel 6 (36,47) to 5s.

We consider option 1 to be our baseline, since it has none of the – although uncritical – settings of option 2 (see annex). If not requested otherwise this option will be implemented.

SOST: S. Noël, IFE; E. Krieg,
DLR-IMF
(ESA, Industry if necessary)

Date: 13/07/07

Signature: via e-mail, 13/07/07

Approval of Proposed Implementation:

Originator Approval:
A. Bracher

Date:19.7.2007

Signature: e-mail 19.7.2007

SSAG Approval:
H. Bovensmann

Date: 2.10.2007

Signature: e-mail 2.10.2007

Decision / Approval:

In the light of the discussion on option 1 and 2 end of July 2007 (see e-mail A. von Bargen – H. Bovensmann 26.7.2007) and as the used co-adding factors are within the specified range it is recommended to implement option 2.

Data users needs to be informed in advance on this temporary change of integration times (Action ESA).

DLR Approval:
Ch. Chlebek

Date:
18.10.2007

Signature: e-mail 18.10.2007

Implementation by SOST:

Decision has been taken to implement option 2. Co-adding tables 26 and 27 will be modified according to the definitions for option 2 (see corresponding N6 and N7 in the annex).

Start orbit for the execution OCR_032 is 29687 (November 4th at about 00:35 UTC). Return to final flight settings occurs in orbit 29988 (November 25th at about 01:17 UTC).

SOST M.Gottwald
E.Krieg

Date: 18.11.2007

Signature: e-mail 18.10.2007

Annex:

The following pages give a summary of the new state settings for all options. Changed integration times are marked yellow.

Notes:

- For option 2 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.
- Option 2 requires co-adding factors of 10 and 40 which have up to now not been used. This is also considered to be uncritical as co-addings up to 64 are allowed and co-adding factors which are not powers of 2 (like 5 and 20) are already in use.

Option 1:

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	2	0,25	0,5
33		946,90	990,40	5	4	0,25	1
34	overlap region, (AE)	990,68	1056,25	5	4	0,25	1
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	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	8	0,125	1
48	Blinded Pixel	1934,38	1935,44	7	2	0,5	1
49		1939,99	1967,79	7	2	0,5	1
50	CO2	1967,90	1984,05	7	1	0,5	0,5
51		1984,15	2029,89	7	2	0,5	1
52	CO2, H2O	2029,99	2040,19	7	1	0,5	0,5
53	Blinded Pixel	2042,80	2043,67	7	2	0,5	1
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
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Total Data Rate (bit/s, including Headers, PMD /Auxiliary Data)							383594

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	4	0,125	0,5
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	8	0,125	1
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	8	0,125	1
48	Blinded Pixel	1934,38	1935,44	7	2	0,5	1
49		1939,99	1967,79	7	2	0,5	1
50	CO2	1967,90	1984,05	7	1	0,5	0,5
51		1984,15	2029,89	7	2	0,5	1
52	CO2, H2O	2029,99	2040,19	7	1	0,5	0,5
53	Blinded Pixel	2042,80	2043,67	7	2	0,5	1
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
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Total Data Rate (bit/s, including Headers, PMD /Auxiliary Data)							380013

Option 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
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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
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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							
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Total Data Rate (bit/s, including Headers, PMD /Auxiliary Data)							390784