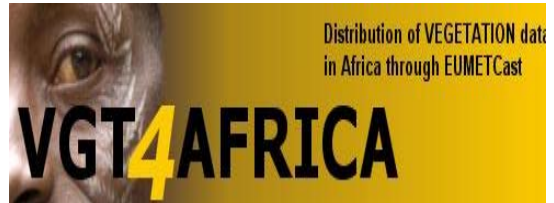




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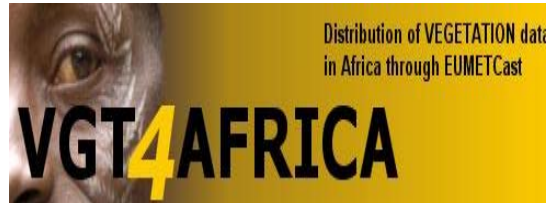
VGT4AFRICA Technical Note: ROI boundary check



Table of Contents

1. General.....	3
1.1. Scope.....	3
1.2. Terms and abbreviations.....	3
1.3. Impact of the tests	3
1.4. Revisions.....	3
1.5. Intended readers.....	3
2. ROI boundary check	5
2.1. Test description	5
2.2. Test results	5
2.3. Conclusions from the test	7
2.4. Further testing.....	7
3. Corrective actions	8

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1. General

1.1. *Scope*

After some complaints from potential users at the 7th EUMETSAT User Forum in Maputo, it was decided to review all defined regions of interest, to see if the ROIs do actually cover the area that they're supposed to cover. For instance, the Mauritius ROI was said to intersect the boundaries of Mauritius and thus only covered part of the island. This review can thus be seen as a kind of quality check on the pre-defined ROIs, that were originally derived from a list from FAO.

During this check, the definition of the regional ROIs will also be adjusted so that they better match the CILSS, IGAD or Greater Horn of Africa (GHA) and SADC communities.

In this document, the results of this ROI boundary check and the performed ROI corrections are presented.

1.2. *Terms and abbreviations*

Terms	Description
CILSS	Permanent, inter-state committee on the fight against drought in the Sahel. Member states include Burkina Faso, Cape Verde, Chad, Gambia, Guinea-Bissau, Mali, Mauritania, Niger and Senegal.
EAF	East African Federation.
GHA	Greater Horn of Africa, a region in eastern Africa that includes the current IGAD member states (Djibouti, Ethiopia, Kenya, Somalia, Sudan and Uganda), EAF member states (Burundi, Rwanda and Tanzania) and Eritrea.
IGAD	Intergovernmental Authority on Development
ROI	Short for Region Of Interest. An ROI is a rectangular area on a map. For instance, a VGT image over Africa is said to have Africa as ROI.
SADC	Southern African Development Community in southern Africa. Member states include Angola, Botswana, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South



	Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe.
VGT	SPOT-VEGETATION instruments.

1.3. Impact of the tests

If the tests show that the ROIs are incorrect, for instance that they intersect the boundary of the country or region that they try to cover, then the ROI definitions will be altered accordingly. Definitions of regional ROIs will also be revised and made more consistent with the CILSS, IGAD and SADC regions (thus covering as much as possible the Member States of the different regional communities).

For instance, if the conclusions from the boundary check indicate that the region of interest is too small (i.e. it intersects the country borders and hence does not cover entirely the country or region it's supposed to cover), then the ROI will be expanded.

The performed ROI changes not only affect the products offered via the VGT4AFRICA website, which will be reprocessed and updated, but also the pre-defined ROI settings in VGTEExtract. These new ROI settings for VGTEExtract will be included in the next released version of VGTEExtract.

In other words, the following actions will be carried out:

- change the ROI settings in VITO's VGT4AFRICA processing system for future products;
- reprocess/update the already created products accordingly for website downloads;
- adapt the VGTEExtract pre-defined ROI settings and release the new VGTEExtract.

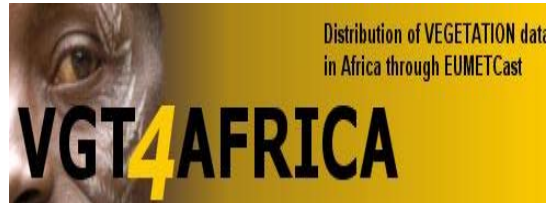
Details of the performed ROI changes are given in Chapter 3.

1.4. Revisions

Version	Revisions by	Description
1.0	VITO Tim Jacobs	Original document
1.1	VITO Tim Jacobs	Added chapter 3 that describes the performed ROI changes

1.5. Intended readers

This document is only intended for the VGT4AFRICA partners (VITO, JRC-IES and MEDIAS-France) and the VGT4AFRICA users.



2. ROI boundary check

2.1. *Test description*

In IDL-Envi, the African country borders were displayed on top of a randomly selected NDVI image.

On top of this, each of the defined regions of interest were displayed, one by one, and it was checked visually to see if the ROI boundaries intersected with the borders of the country or region it is supposed to cover.

Based on this visual inspection, it was then concluded if the ROI had to be enlarged and in what direction(s) (North/East/South/West). The exact amount of enlargement needed (in degrees) is to be established as part of the corrective actions (see Chapter 3).

If the current ROI is considered too large, no corrective actions are foreseen, as the VGTEExtract tool can then easily be used by the users to derive their desired ROI, without undesirable effects.

The ROIs that copied from the MARS-FOOD and GMFS projects were not checked, because no corrections are needed.

2.2. *Test results*

In the overview table below, the first column indicates the name of ROI. The N, E, S and W columns indicate if the ROI should be enlarged in the respective direction (North, East, South, West) and the final column contains some comments. When the N, E, S and W columns are all empty, then the ROI boundaries are fine and do not need to be corrected.

ROI name	N	E	S	W	Comment
Algeria					
Angola					
Benin					
Botswana				X	
Burkina Faso					
Burundi					
Cameroun					
Cape Verde					
Central African Republic					
Chad					
Comoros			X		Should include Mayotte island
Congo					
Democratic Republic Congo					



ROI name	N	E	S	W	Comment
Djibouti					
Eastern Africa	X	X		X	Should include Greater Horn of Africa region
Egypt					
Equatorial Guinea					
Eritrea					
Ethiopia				X	
Gabon					
Gambia					
Ghana					
Guinea					
Guinea Bissau					
Ivory Coast					
Kenya					
Lesotho					
Liberia					
Libya					
Madagascar					
Malawi					
Mali					
Mauritania					
Mauritius	X				Island should be covered completely
Morocco					
Mozambique					
Namibia					
Niger					
Nigeria					
Principe			X		
Reunion					
Rwanda					
Senegal					
Seychelles	X				Include 2 additional small islands to the North
Sierra Leone					
Somalia					
South-Africa					
Southern Africa		X		X	Madagascar and Mauritius should be included to cover all SADC countries.
Sudan					
Swaziland					
Tanzania					
Togo					
Tunisia					
Uganda					
West Africa	X			X	Should probably extended to the North to cover the complete Mediterranean coastline.
Zambia					
Zimbabwe					
CILSS				X	Should include Cape Verde as CILSS member



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2.3. Conclusions from the test

1. 10 ROIs out of 58 need to be corrected.
2. The definition of the regional ROIs should definitely be reviewed thoroughly, as none of them seem to be correct at this time.

2.4. Further testing

No further testing is required.



3. Corrective actions

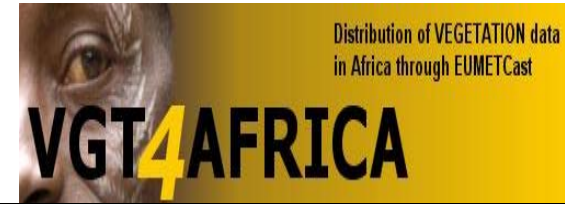
After carefully investigating the test results, the following ROI changes have been implemented from 2007-08-22 onwards:

- The ROIs for Botswana, Comoros, Ethiopia, Mauritius, Sao Tome and Principe and the Seychelles have all been expanded by 1° in the proposed directions. This should suffice to cover the entire countries.
- The Eastern Africa ROI was changed to cover the same countries as the GMFS EAF ROI and then extended by 1° to the North to cover Sudan completely. This results in an ROI that covers all the countries in the Greater Horn of Africa region.
- Expansion of the Southern Africa ROI to include also the islands of Madagascar and Mauritius (both SADC member states), was decided to be unpractical, as it would include also a lot of useless sea data and thus cost significant disk space, whereas there are already 2 ROIs, the MARS-FOOD SAC and the GMFS SAD, that cover SADC completely, including both islands. Hence, it was decided to redefine the Southern Africa ROI to include only the “continental SADC member states”. To cover these countries entirely, the eastern boundary was expanded by 1°. The western boundary included a little too much sea and was moved to the East, closer to the coastline.
- The West Africa ROI covered at the same time a large latitudinal range (from the Mediterranean coastline of Africa down to Equatorial Guinea) and included also the Cape Verde islands, which implied that a lot of the Atlantic Ocean was also included. On the other hand, the CILSS region didn't include the Cape Verde islands, a CILSS member state and covers a smaller latitudinal range than the West Africa ROI. Hence, it was decided that it was practical to include the Cape Verde islands in the CILSS ROI and exclude from the West Africa ROI.
- After this exchange of the Cape Verde islands, it was seen that the CILSS ROI's definition almost matched that of the GMFS CILSS ROI. For this reason, it was decided to suppress the CILSS ROI altogether.

In the next table, these ROI corrections are shown, with the changed latitude/longitude values highlighted by cell shading. The longitude and latitude values are all given in decimal degrees.



ROI ID	ROI NAME	Before ROI boundary check				After ROI boundary check			
		Lon		Lat		Lon		Lat	
1	Africa	-26	60	-35	38	-26	60	-35	38
2	Southern Africa	8	40	-35	6	11	41	-35	6
3	Eastern Africa	26	47	-12	17	21	52	-12	24
4	West Africa	-26	17	1	37	-18	17	1	38
5	Angola	11	25	-19	-4	11	25	-19	-4
6	Burundi	28	31	-5	-2	28	31	-5	-2
7	Benin	0	4	6	13	0	4	6	13
8	Burkina Faso	-6	3	9	16	-6	3	9	16
9	Botswana	20	30	-27	-17	19	30	-27	-17
10	Central African Republic	14	28	2	12	14	28	2	12
11	Cameroun	8	17	1	14	8	17	1	14
12	Ivory Coast	-9	-2	4	11	-9	-2	4	11
13	Congo	11	19	-6	4	11	19	-6	4
14	Comoros	43	46	-13	-11	43	46	-14	-11
15	Cape Verde	-25.5	-22.5	14.5	17.5	-25.5	-22.5	14.5	17.5
16	Djibouti	41	44	10	13	41	44	10	13
17	Algeria	-9	12	18	38	-9	12	18	38
18	Egypt	24	36	21	32	24	36	21	32
19	Eritrea	36	44	12	18	36	44	12	18
20	Ethiopia	33	48	3	15	32	48	3	15
21	Gabon	8	15	-4	3	8	15	-4	3
22	Ghana	-4	2	4	12	-4	2	4	12
23	Guinea	-16	-7	7	13	-16	-7	7	13
24	Gambia, the	-17	-13	13	14	-17	-13	13	14
25	Guinea-Bissau	-17	-13	10	13	-17	-13	10	13
26	Equatorial Guinea	5	12	-2	4	5	12	-2	4
27	Kenya	33	42	-5	5	33	42	-5	5
28	Liberia	-12	-7	4	9	-12	-7	4	9



29	Libya	9	26	19	34	9	26	19	34
30	Lesotho	27	30	-31	-28	27	30	-31	-28
31	Morocco	-18	0	20	36	-18	0	20	36
32	Madagascar	42	51	-26	-11	42	51	-26	-11
33	Mali	-12.5	5.5	10	25	-12.5	5.5	10	25
34	Mozambique	30	41	-27	-10	30	41	-27	-10
35	Mauritania	-17.5	-4.5	14	28	-17.5	-4.5	14	28
36	Mauritius	57	58	-21	-20	57	58	-21	-19
37	Malawi	32	36	-18	-9	32	36	-18	-9
38	Namibia	11	26	-29	-16	11	26	-29	-16
39	Niger	0	16	11	24	0	16	11	24
40	Nigeria	2	15	4	14	2	15	4	14
41	Reunion	55	56	-22	-20	55	56	-22	-20
42	Rwanda	28	31	-3	-1	28	31	-3	-1
43	Sudan	21	39	3	24	21	39	3	24
44	Senegal	-18	-11	12	17	-18	-11	12	17
45	Sierra Leone	-14	-10	6	10	-14	-10	6	10
46	Somalia	40	52	-2	12	40	52	-2	12
47	Sao Tome and Principe	6	8	0	2	6	8	-1	2
48	Swaziland	30	33	-28	-25	30	33	-28	-25
49	Seychelles	55	56	-5	-4	55	56	-5	-3
50	Chad	13	25	6	24	13	25	6	24
51	Togo	-1	2	6	12	-1	2	6	12
52	Tunisia	7	12	30	38	7	12	30	38
53	Tanzania, United Republic of	29	41	-12	0	29	41	-12	0
54	Uganda	29	36	-2	5	29	36	-2	5
55	South Africa	14	33	-35	-22	14	33	-35	-22
56	Congo, Democratic Republic	12	32	-14	6	12	32	-14	6
57	Zambia	22	34	-19	-8	22	34	-19	-8
58	Zimbabwe	25	34	-23	-15	25	34	-23	-15



59	CILSS region	-18	25	4	28	CILSS region has been omitted.			
60	Africa, as defined by MARSFOOD	-18	52	-36	38	-18	52	-36	38
61	IGA, as defined by MARSFOOD	20	54	-6	28	20	54	-6	28
62	WAF, as defined by MARSFOOD	-19	25	4	28	-19	25	4	28
63	SAC, as defined by MARSFOOD	10	59	-36	6	10	59	-36	6
64	CILSS, as defined by GMFS	-25.5	25	4	28	-25.5	25	4	28
65	EAF, as defined by GMFS	21	52	-12	23	21	52	-12	23
66	SAD, as defined by GMFS	7	58.5	-36	6	7	58.5	-36	6
67	Malawi, as defined by GMFS	32.38	36.06	-17.22	-9.13	32.38	36.06	-17.22	-9.13
68	Sudan, as defined by GMFS	20.35	40.07	3.6	23.15	20.35	40.07	3.6	23.15
69	Senegal, as defined by GMFS	-17.5	-11.1	12.2	16.5	-17.5	-11.1	12.2	16.5
70	Ethiopia, as defined by GMFS	33	48.1	3.2	15.2	33	48.1	3.2	15.2
71	Zimbabwe, as defined by GMFS	25.1	33.3	-22.5	-15.35	25.1	33.3	-22.5	-15.35