UNIVERSITAT DE VALÈNCIA

"USE OF HICO DATA TO STUDY THE WATER QUALITY OF COASTAL AND INLAND WATER BODIES"

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HICO UV Proposal Objectives

- Testing and improvement of atmospheric correction models before developed, in order to its adaptation to HICO imagery bands, considering the adjacency effects and preventing anomalies in the spectrum line, especially in the Red / NIR and Blue spectral zones.

- Use the HICO imagery for Mapping Chlorophyll-a and Phycocyanin (as Cyanobacteria indicator) temporal and spatial distribution, testing several algorithms for Phytoplanktonic pigments.

- Validation of Algorithms for estimation of Photosynthetic Pigments and other variables.

Southern Europe, between Atlantic Ocean and Mediterranean Sea
There are 1500 inland water bodies, mostly reservoirs for irrigation and water supply.

The UV (Univ. of Valencia) project has requested, during this period, 3 targets to work on coastal and inland water bodies:

Target #1: AlbuferaLake_SP. Valencia area. Mediterranean coast.
Center image Coordinates: Lat: 39.33º N; Lon: 0.36º W
(Albufera : coastal lake; Tous, Muela, etc. : inland waters, reservoirs)

Target #2: SP_EbroBasin. Lleida area. Eastern Ebro river basin.
Center image Coordinates: Lat: 41.856º N; Lon: 0.82º W
(Mediano, Grado, Barasona, etc. : inland waters, reservoirs)

Target #3: ESP_EbroBasin. Reinosa area. Western Ebro river basin.
Center image Coordinates: Lat: 42.5475º N; Lon: 3.2589º W
(Ebro, Urrunaga, Ullivarri, etc. : inland waters, reservoirs)


Ligurian Sea3 asc
DFAMED Site
Thau FR
Ligurian Sea6 asc
ESP EbroBasinW
SP EbroBasin
AlbuferaLake SP
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2012 Cnes/Spot Image

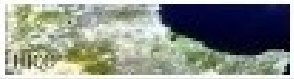

ESP_EbroBasinW
HICO target
ESP_EbroBasinW
SP_EbroBasin
HICO Target
SP_EbroBasin
AlbuferaLake_SP
Albufera de Valencia.
(coastal lake)
Ligurian Sea3 asc
DFAMED Site
Thau FR
Ligurian Sea6 asc
Ligurian Sea4
ESP EbroBasinW
uferaLake SP
GEBCO

HICO image sets Acquisition in the UV Project activity period (20120223 – 20120831)

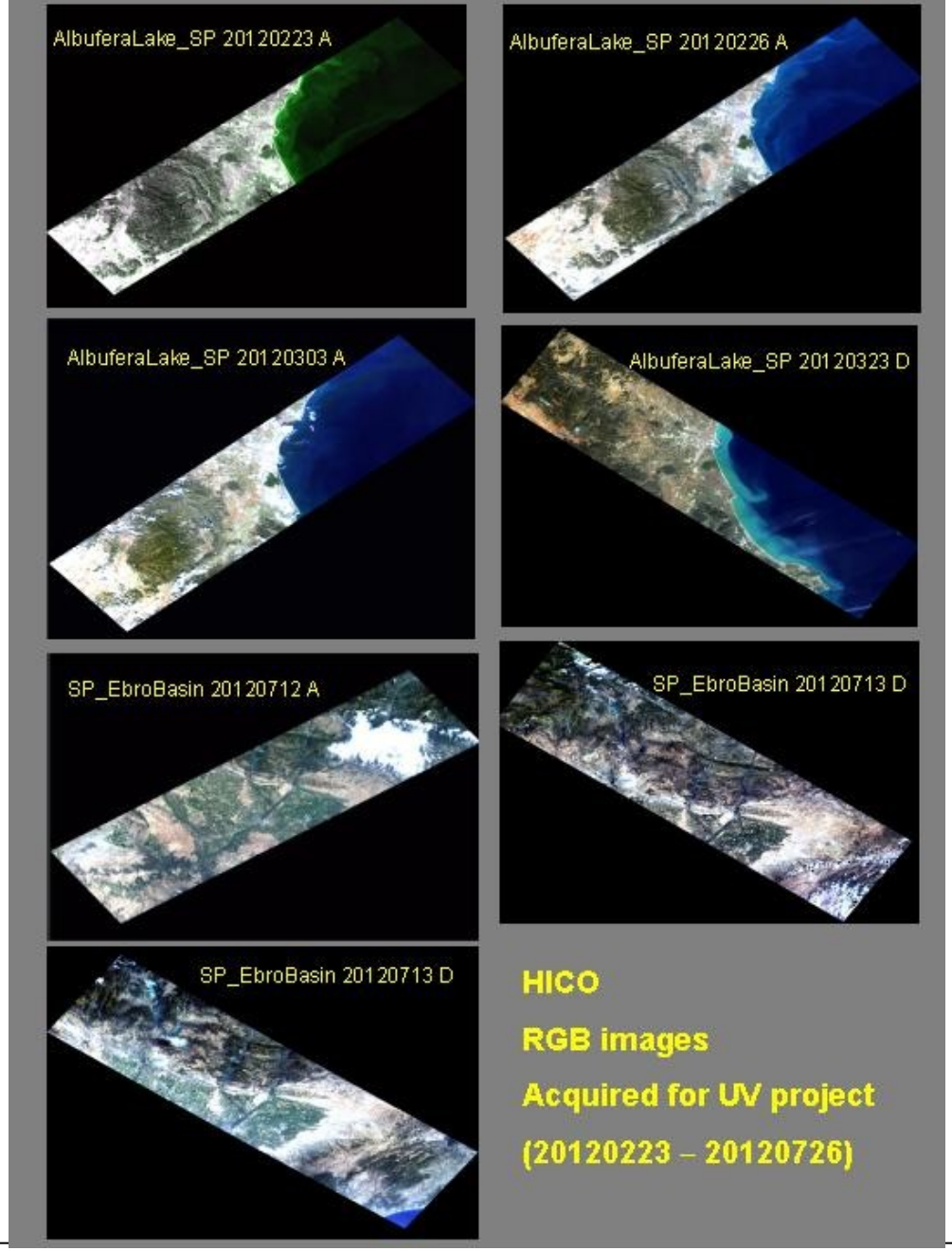
Date (UTC)	Target	Scene ID	Angle	Orient	Status
2012-02-23 14:59:29	AlbuferaLake_SP	9526	5	asc	
2012-02-26 13:44:41	AlbuferaLake_SP	9558	-2.6	asc	
2012-03-03 11:16:35	AlbuferaLake_SP	9612	-14.7	asc	
2012-03-17 12:30:36	AlbuferaLake_SP	9752	-10.8	des	lockup
2012-03-20 11:15:37	AlbuferaLake_SP	9782	-2.8	des	poor quality
2012-03-23 10:00:20	AlbuferaLake_SP	9815	5.6	des	
2012-03-26 08:44:46	AlbuferaLake_SP		13.9	des	cancelled
2012-05-21 10:25:15	AlbuferaLake_SP		3.5	des	cancelled
2012-05-24 09:19:06	AlbuferaLake_SP		5.2	des	cancelled
2012-05-27 08:12:30	AlbuferaLake_SP	10413	-12.3	des	lockup
2012-07-25 08:51:09	AlbuferaLake_SP	10952	-30.5	des	lockup
2012-07-12 07:30:48	SP_EbroBasin	10822	15.6	asc	
2012-07-13 13:04:23	SP_EbroBasin	10832	-20	des	
2012-07-26 07:58:07	SP_EbroBasin	10964	-18.4	des	

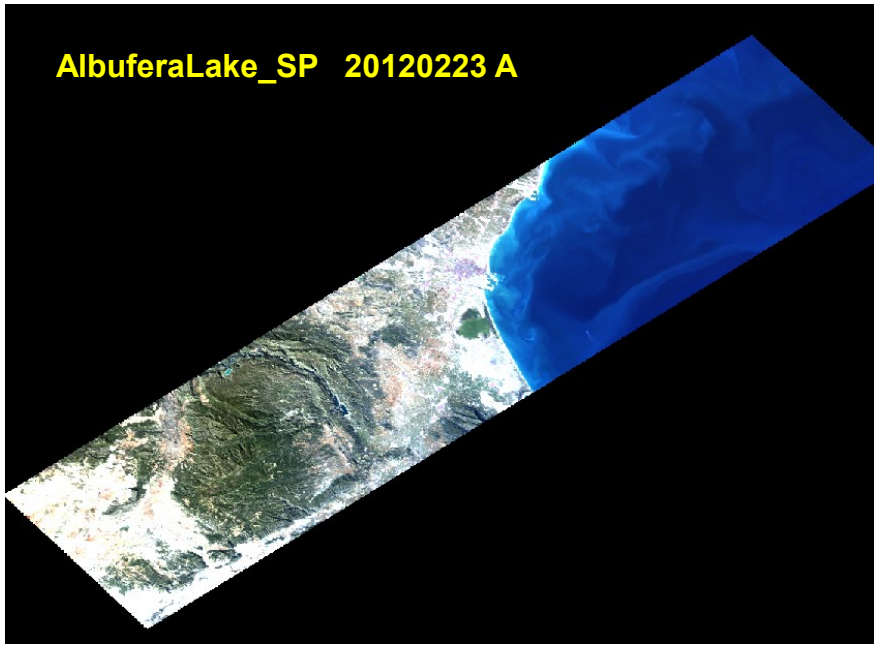
We have processed for the Progress Report all the image sets acquired since the beginning of the Project till August 31st 2012.

TIP: Click on a column name to order the results by that column.

Date (UTC)	Target	Scene ID	Angle	Orient	Status
2012-09-03 10:31:53	ESP_EbroBasinW	11282	-4.2	asc	poor quality
2012-09-04 09:43:51	SP_EbroBasin	11297	-9.4	asc	
2012-09-07 08:54:11	SP_EbroBasin	11329	22.3	asc	
2012-09-08 14:34:31	SP_EbroBasin	11343	-34.4	des	
2012-09-11 13:44:52	AlbuferaLake_SP	11381	-34.2	des	
2012-09-15 12:06:52	AlbuferaLake_SP		-28.1	des	cancelled
2012-09-17 10:30:16	SP_EbroBasin	11441	15.9	des	
2012-09-19 10:30:40	AlbuferaLake_SP	11465	-24	des	
2012-09-20 09:41:19	ESP_EbroBasinW	11476	-0.6	des	
2012-09-23 08:52:52	ESP_EbroBasinW	11501	-32.3	des	

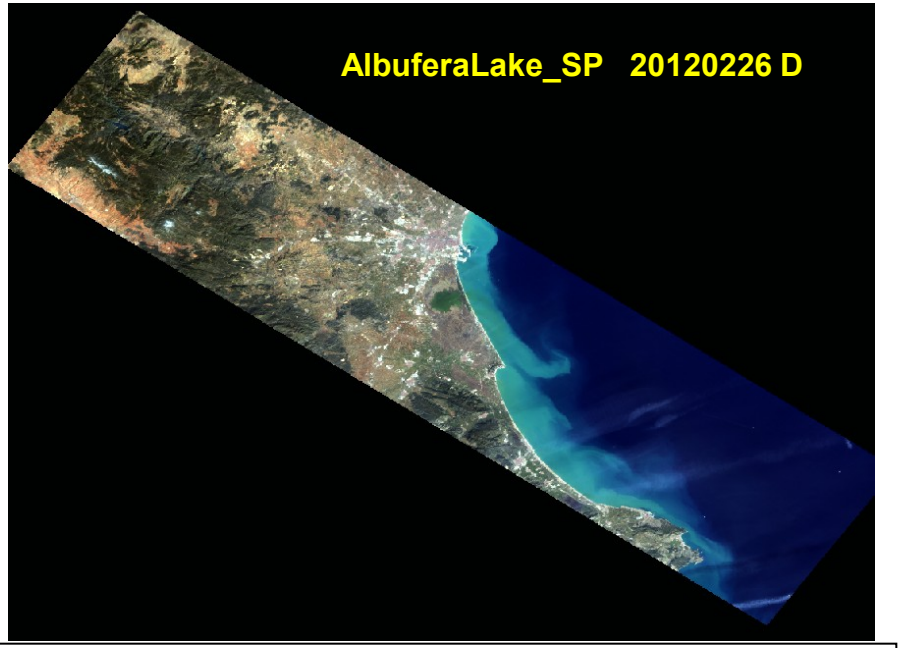
The acquisition of images and the field campaigns are continuing.
All images are being processed now and the complete results will be included in the next Progress Report and presented in the 3rd HICO Users Annual Meeting.

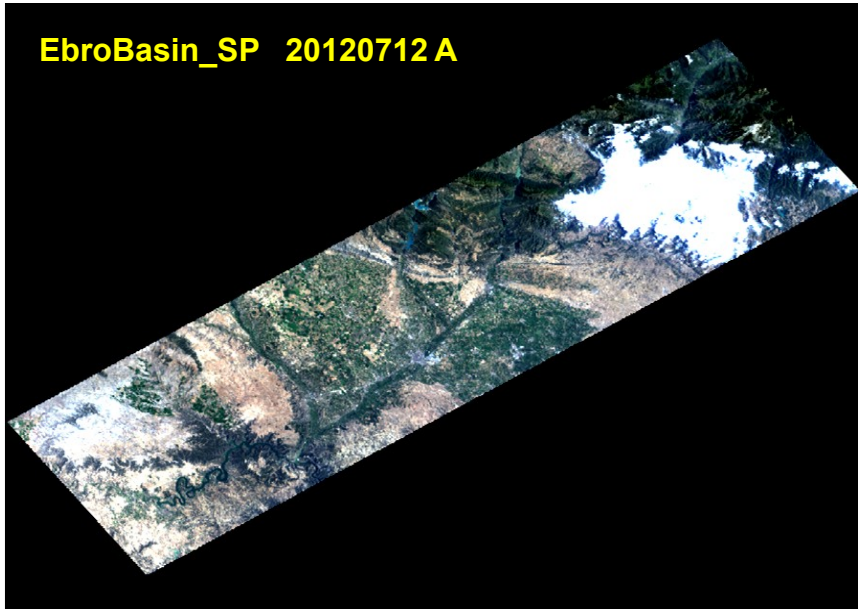

AlbuferaLake_SP 20120223 A
AlbuferaLake_SP 20120226 A
AlbuferaLake_SP 20120303 A
AlbuferaLake_SP 20120323 D
SP_EbroBasin 20120712 A
SP_EbroBasin 20120713 D
SP_EbroBasin 20120713 D
HICO
RGB images
Acquired for UV project
(20120223 – 20120726)

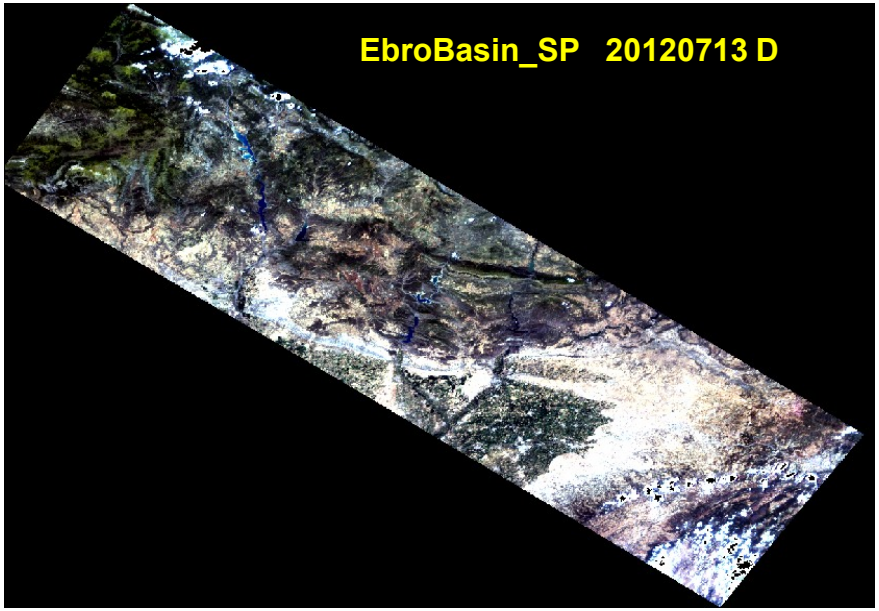

AlbuferaLake_SP 20120223 A

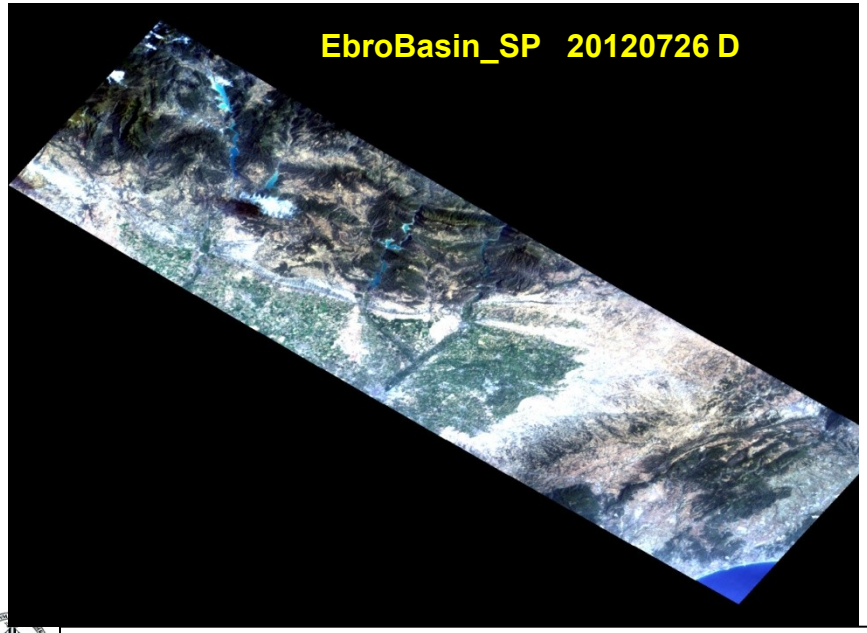

AlbuferaLake_SP 20120226 A


AlbuferaLake_SP 20120223 A


AlbuferaLake_SP 20120226 D







HICO imagery
RGB images (B42, B27, B11) corresponding to acquisitions in the period 20120223 - 20120831

Field work program for the sampling and observations in water bodies.

Ground campaigns

Since the initial acquisition in February 23rd, the field work plan has covered with operational constraints, the active dates selected:

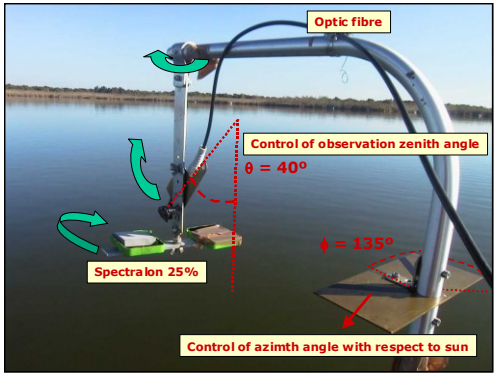
Albufera:	**02/23 Albufera lake**
	02/26 Albufera lake
	03/23 Albufera lake
Ebro (E):	**07/11 Calanda reservoir**
	07/12 Rialb
	07/13 Barasona
	07/14-17 Mequinenza, Oliana, Terradets

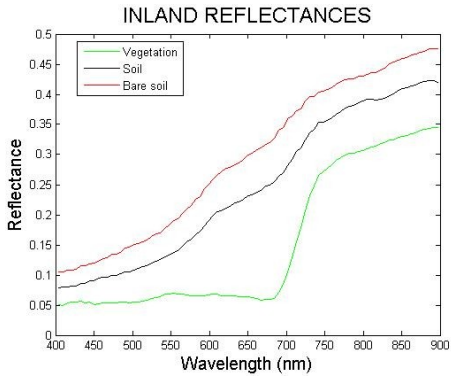
Taking data in several sampling points and measuring parameters as:

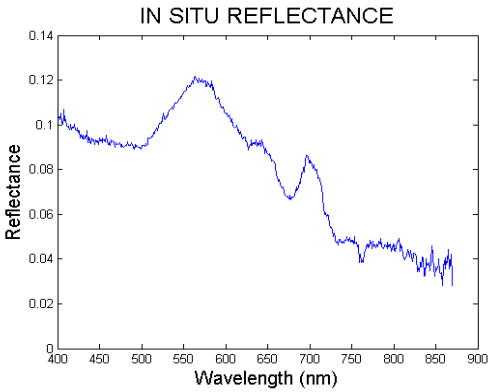
- **Phytoplankton pigment composition using HPLC and other techniques.**
- **Phytoplankton taxonomic composition and bio-volume estimation.**
- **Nutrients concentration, physicochemical parameters analysis.**
- **Water optics: above water radiometry; in water radiometry; inherent optical properties measurement (absorption coefficients), etc.**

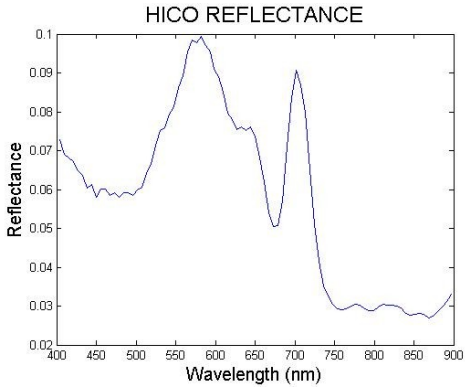
The ground campaigns are continuing till now with the same work program.

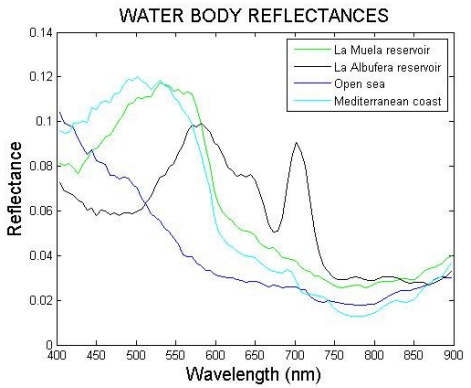
Field observation Equipment











	A	B	C	F	H	J	K	M	N	O	P	Q	R
1													
2													
3													
4	Fecha	Embalse	Pto	SD	SST	Turb580	Clfa	COORDENADAS		Hu	Cond	OBS	
5				m	mg/L	NTU	µg/L	X	Y		uS		
6	23/02/2012	Albufera	L 1	0,50	27,4000	25,0724	34,4840	729631	4356504	30S	2002		
7	23/02/2012	Albufera	L 2	0,46	33,9535	26,7516	94,7043	727751	4358099	30S	2000		
8	23/02/2012	Albufera	L 3	0,45	37,0588	28,2572	95,9855	727941	4359055	30S	2002		
9	23/02/2012	Albufera	L 4	0,51	29,5000	27,0991	75,3088	727022	4356394	30S	2110		
10	23/02/2012	Albufera	L 5	0,55	26,6667	22,9879	69,4885	727802	4356238	30S		0,50 / 0,58	
11	23/02/2012	Albufera	L 6	0,53	25,2778	23,6248	67,1416	729122	4358988	30S	1756		
12	26/02/2012	Albufera	L1		24,2222	24,0881	50,6427	729631	4356504	30S			
13	26/02/2012	Albufera	L2		28,5000	27,1570	83,5160	727751	4358099	30S			
14	26/02/2012	Albufera	L3		31,0556	28,0255	84,9280	727941	4359055	30S			
15	26/02/2012	Albufera	L6		25,3333	27,2728	70,5439	729122	4358988	30S			
16	03/03/2012	Albufera										sin muestreo	
17	23/03/2012	Albufera	L 1	0,33	50,4167	50,6660	132,5545	729765	4356590	30S	1645		
18	23/03/2012	Albufera	L 2	0,38	44,7500	48,2340	144,2528	727843	4358103	30S	1792		
19	23/03/2012	Albufera	L 3	0,52	41,2500	30,8628	104,7089	727969	4359058	30S	1556		
20	23/03/2012	Albufera	L 4	0,43	40,7500	35,0898	116,6225	727116	4356330	30S	1717		
21	23/03/2012	Albufera	L 5	0,35	46,5833	49,4500	145,4093	729186	4358743	30S			
22													
23													

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Fecha	Embalse	Pto	Prof mu	Temperatu	SD	Z Fo me	SST	Turb400	Turb580	Clfa	NPOC-T	COORDENADAS			OBS	
2				m	ºC	m	m	mg/L	NTU	NTU	µg/L	mg/L C	X	Y			
3	20-06-12	Caspe	1	2,00	23,6 (sup.)	4,9	13	2,6615	1,6100	1,9687	1,6679	3,5520	751303	4558457	30T		
4	24-06-12	Ullivarri	1	int. 12 m	21,5 (sup.)	5,5	12		6,3792	8,0487	3,4500	3,8130	531340	4753661	30T		
5	24-06-12		1	5 m	20,9				1,7315	1,9687	3,6257	3,8030					
6	11-07-12	Calanda	1	int. 9 m	24,9 (sup)	3,9	12	3,5769	2,2175	2,7215	1,4020	1,8540	734527	4532723	30T		
7	11-07-12		1	2 m	24,4				1,7011	1,7950	0,8328	2,0790					
8	11-07-12	Calanda	2	2m		3,8	12	4,0612	1,9138	2,6636	1,2298	1,7440	734944	4532160	30T		
9	12-07-12	Rialb	1	int. 9 m	24 (sup)	2,3	9	2,6500	6,2273	14,3023	8,2661	2,7890	350850	4645363	31T		
10	12-07-12		1	2 m	23,8				9,2650	20,6717	5,7010	2,7450					
11	12-07-12		2	2m		2,4	9		3,3415	4,2849	6,2350	2,8300	351466	4646203	31T		
12	13-07-12	Barasona	1	int. 12 m	25 (sup)	5,5	12	5,9286	2,3694	2,4899	1,4659	1,3950	278458	4667788	31T		
13	13-07-12		1	2 m	24,5				2,5517	1,9108	1,2433	1,4730					
14	13-07-12		2	2 m	25 (sup)	3,7	9	1,2439	2,4302	2,7794	1,4357	1,7880	279027	4668821	31T		
15	17-07-12	Mequinenza	1	int. 12 m	27,1 (sup)	3,4	11	2,8769	2,8251	2,5478	5,0641	3,6930	271324	4583476	31T		
16	17-07-12		1	3 m	25,7				2,6732	2,4899	5,9474	4,1280					
17	17-07-12	Oliana	1	int. 10 m	23 (sup)	3	9	3,0077	2,9162	2,6636	8,5536	2,2220	359207	4662342	31T		
18	17-07-12			5 m	22,6				2,7036	2,3741	9,1046	2,0460					
19	17-07-12	Sobrón	1	int. 8 m	25,8 (sup)	2,4	7		3,7364	3,5900	6,0292	3,4290	491620	4734926	30T		
20	17-07-12		1	2 m	25,7				4,3135	3,4742	7,8219	3,2110					
21	17-07-12	Terradets	1	int. 6 m	20,5 (sup)	1,1	3,5	13,4800	13,6393	19,1662	1,9739	1,2900	325092	4658350	31T		
22	17-07-12		1	4 m	17,2				12,5153	17,5449	1,8749	1,0930					26 s/av HICO
23	24-07-12	Urrúnaga	1	int. 11 m	22,7 (sup)	4,95	10		4,1616	3,6480	2,6983	3,9060	528134	4756889	30T		
24	24-07-12		1	4 m	20,9				2,5213	1,7950	2,7706	3,9050					

Archivo Edición Ver Insertar Formato Herramientas Datos Ventana ?

L30

	A	B	C	D	E	F	G	H	I	J
1	[Header]		**Radiometric measurements**							
2	RadSoft Version= 1.1									
3	Device Type=HydroRad-1									
4	File Creation Date=6/29/2012 9:29:38 PM									
5	Data Source=D:\Albufera\Albu_120226A.BIN									
6	Data Source Date=3/28/2012 12:42:02 PM									
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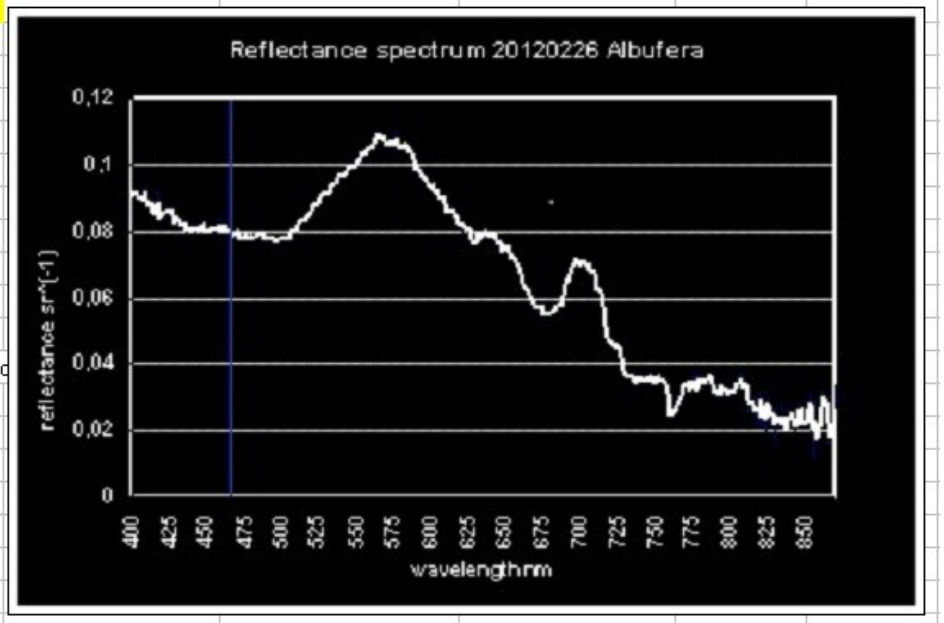
13	Channel Name=Ed									
14	Data Type=Irradiance									
15	Units=counts									
16	Depth Offset=4904									
17	Depth Coefficient=0.00209814									
18	Time Format=1899									
19	Process=4									
20	Wavelengths=541									
21	Fecha: 26 de febrero de 2012									
22	Muestra	**Sol**	Sol	Sol	Agua desde aire	Agua desde aire	**Agua desde aire**	Agua desde agua	Agua desde	Agua desde a
23	Time	40965,5921	40965,5921	40965,5921	40965,59245	40965,59248	40965,5925	40965,59369	40965,5937	40965,5938
24	Temperature	25,14	25,15	25,14	25,18	25,17	25,23	25,43	25,46	25,45
25	Voltage	12,01	12,01	12,01	12,01	12,01	12,01	11,99	11,99	11,99
26	Depth	0,06	0,06	0,06	-0,14	-0,14	-0,15	-0,16	-0,16	-0,16
27	#Averaged	1	1	1	1	1	1	1	1	1
28	Do	1034,7	1028,4	1030,2	1017,8	1024,9	1027,6	1011,6	1015,1	1015,1
29	Dt	1034,5	1024,5	1029	1029,5	1043,5	1040	1031	1035	1037,5
30	IntTime	37	37	37	343	343	254	409	409	409
31	330	0	0	0	0	0	0	0	0	0
32	331	0,41018	0,39541	0,39251	0,04867	0,045969	0,038929	0,00090529	0,00018444	0,0048572
33	332	0,3272	0,39596	0,43136	0,042644	0,043733	0,036424	0,0055528	0,003422	0,0019532



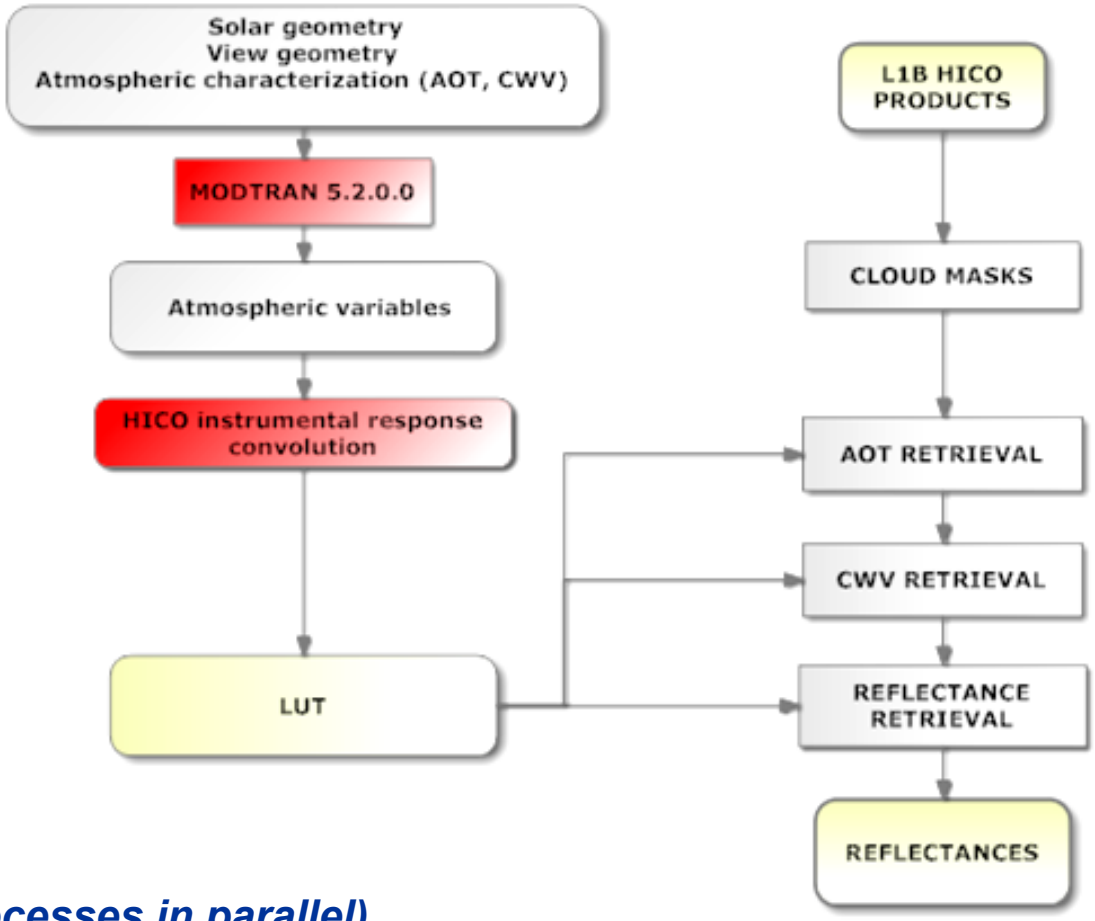
HICO UV Project Achievements

1. Development of an specific Atmospheric Correction Model following the line of previous tools developped for MERIS and CHRIS imagery.

- **ATMOSPHERIC CORRECTION ALGORITHM APPLIED TO HICO**

(Illumination and solar geometry)

(Atmospheric correction algorithm)

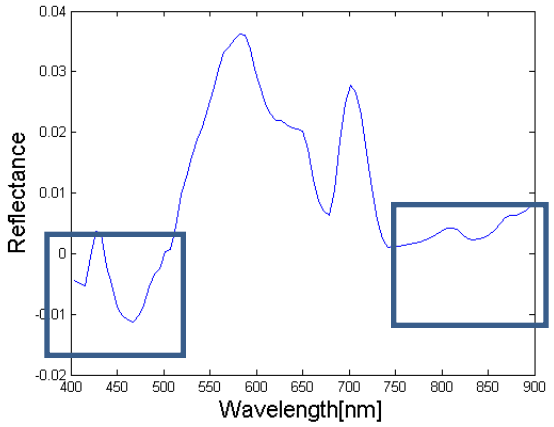


(Two processes in parallel)

ATMOSPHERIC CORRECTION ALGORITHMS

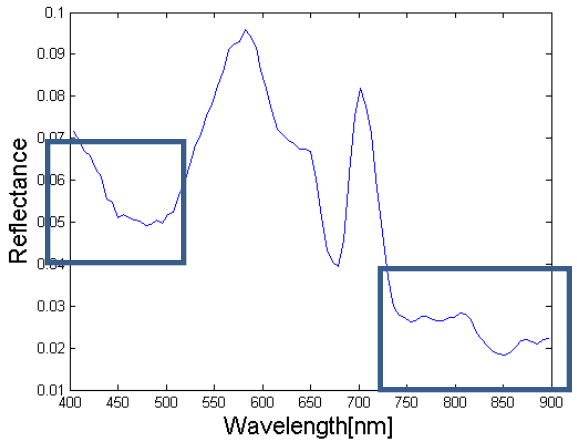
HICO ATMOSPHERIC CORRECTION ALGORITHM

INVERSION OF LUT



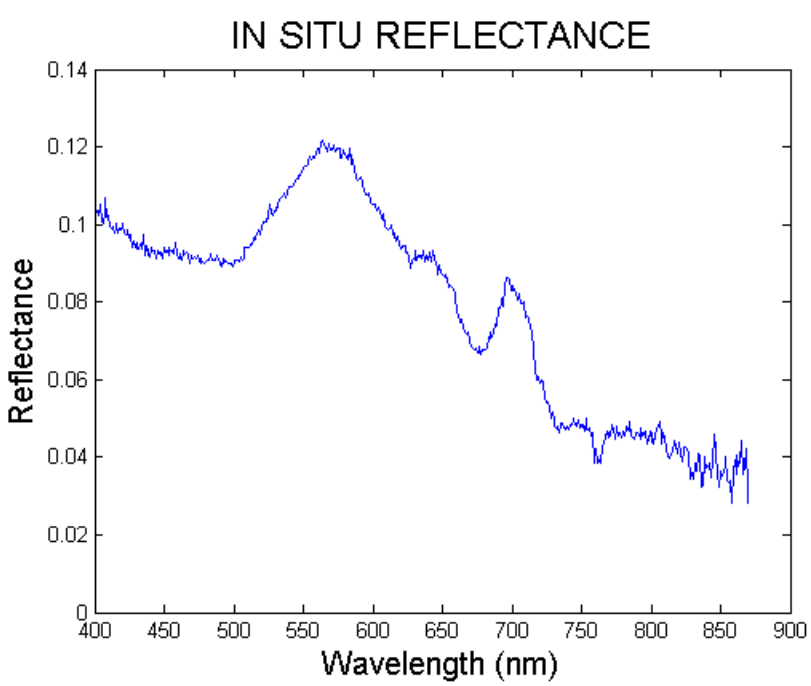
QUAC

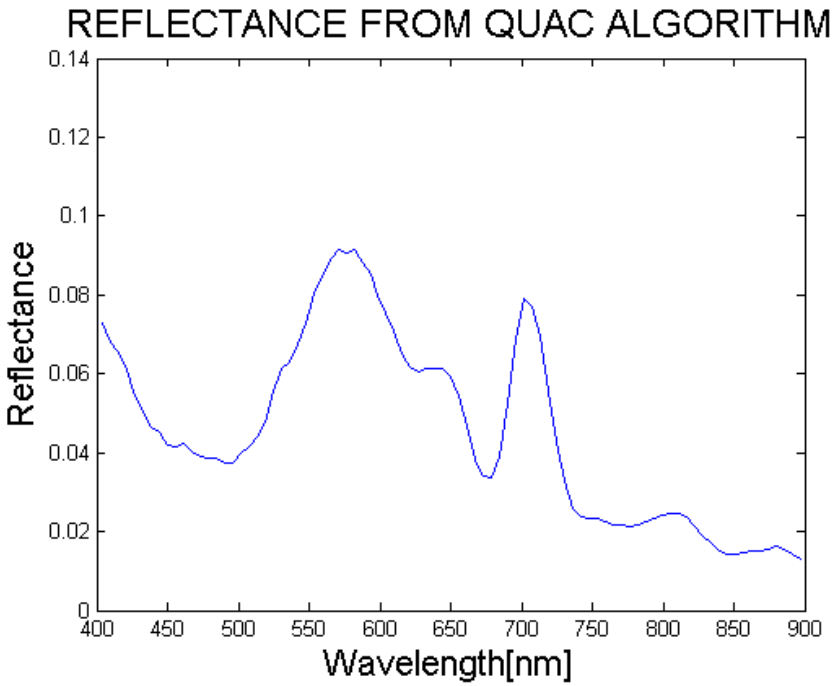
STATISTICAL METHODS (NOT SENSITIVE TO SENSOR CALIBRATION)



- **Reflectance obtained from QUAC is higher than the one obtained from the atmospheric correction algorithm**
- **Areas selected shows diferences between both spectra**

- **COMPARISON BETWEEN REFLECTANCE FROM IN SITU MEASUREMENTS AND OBTAINED WITH QUAC**

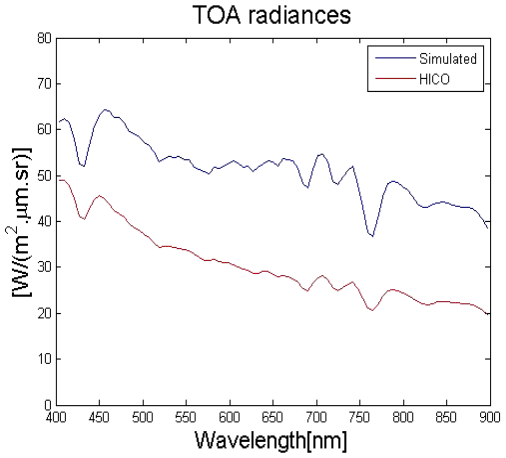




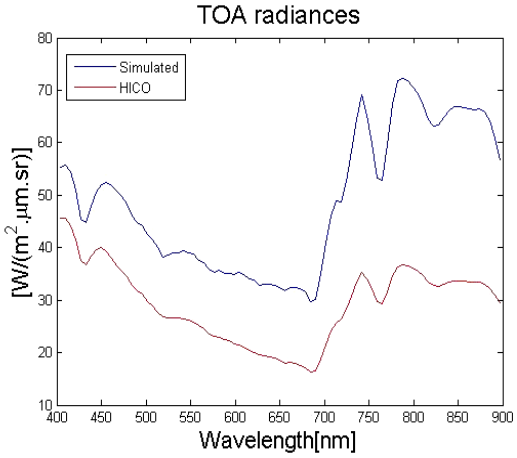
(Considering the HICO spatial resolution ~100 m, the differences are acceptable)

- **DIFFERENCES BETWEEN HICO RADIANCE AND SIMULATED RADIANCE WITH MODTRAN 5.2.0.0**
- **QUAC SPECTRA HAVE BEEN USED FOR THE GENERATION OF TOA RADIANCES**

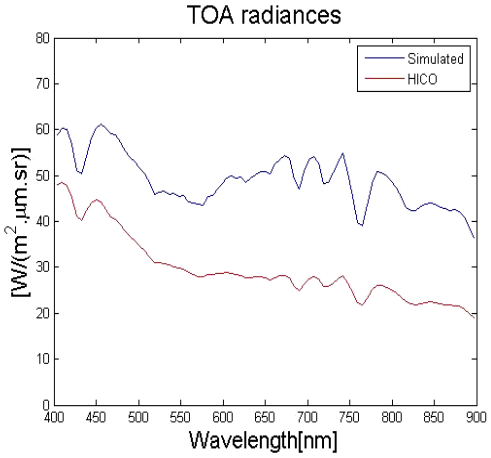
$$L_{TOA} = L_0 + \frac{1}{\pi}\frac{\rho_s E_{tot} T_{\uparrow}}{1 - S\rho_s}$$



Bare soil pixel



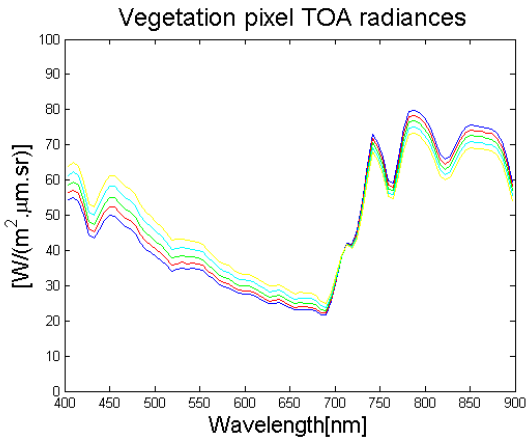
Vegetation pixel

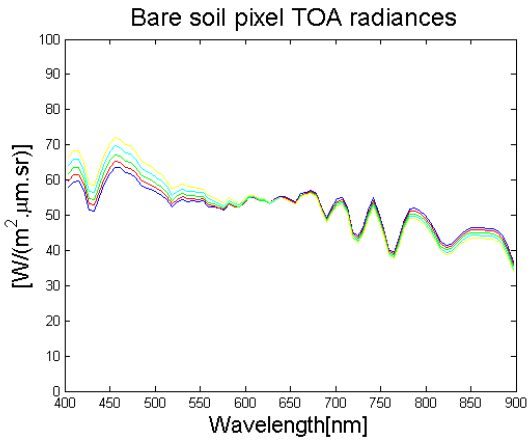


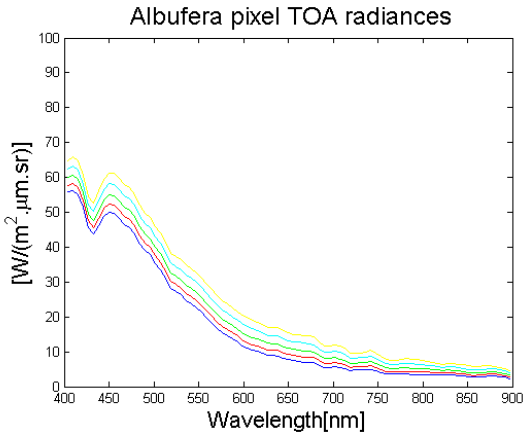
Man made material pixel

- **THESE DIFFERENCES CAN BE CAUSED BY:**
  - **OVERESTIMATION / UNDERESTIMATION OF AEROSOL OPTICAL THICKNESS**
  - **CHANGES IN THE CONSIDERATION OF AEROSOL TYPE**
  - **NOT A VERY ACCURATE SENSOR CALIBRATION**

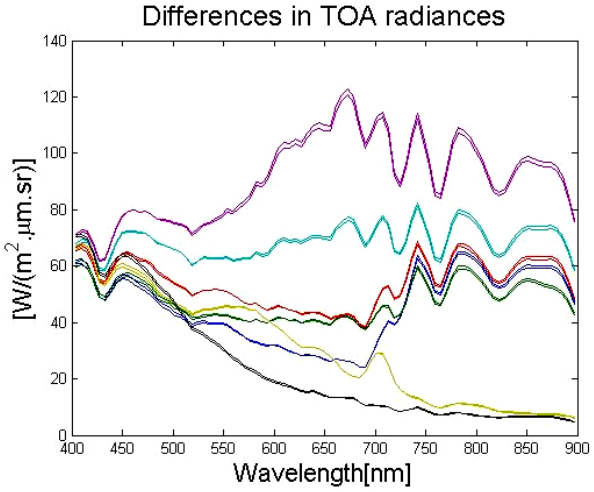
- **TOA RADIANCES SIMULATED FOR THREE PIXELS WITH A WIDE RANGE OF AOT VALUES**







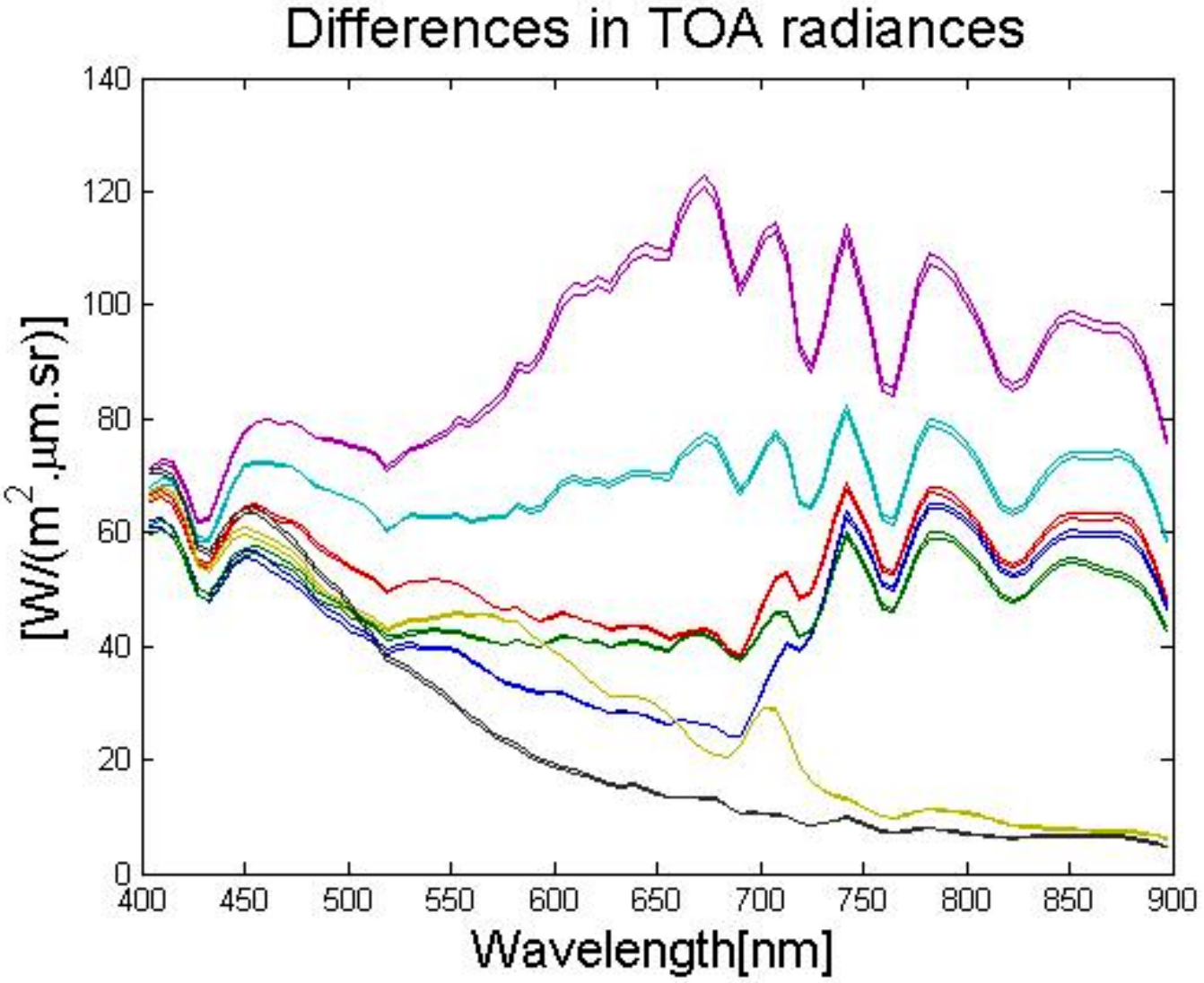
- **AEROSOL TYPE DOES NOT GENERATE LARGE CHANGES IN TOA RADIANCE**



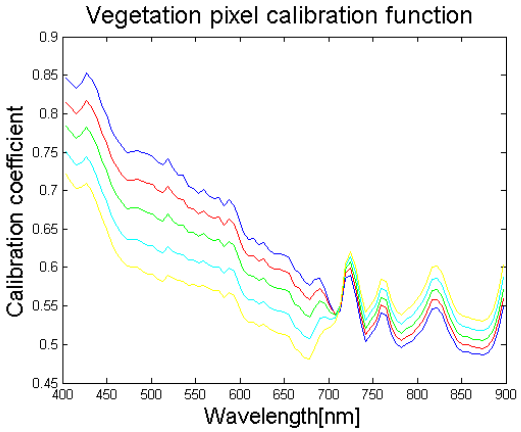
- **AEROSOLS MODEL CONSIDERED HAVE BEEN RURAL AND MARITIM.**

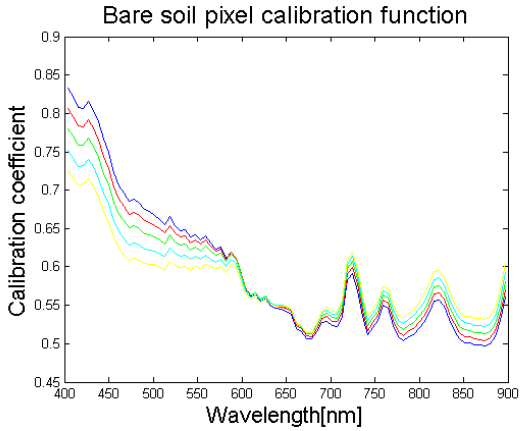
Legend

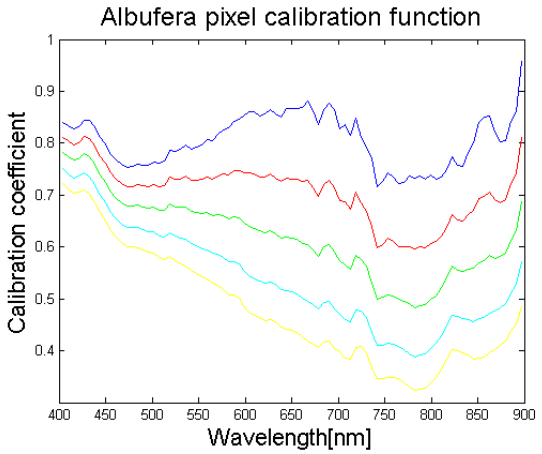
- **AOT = 0.06**
- **AOT = 0.12**
- **AOT = 0.20**
- **AOT = 0.30**
- **AOT = 0.40**
- **AOT = 0.60**


Differences in TOA radiances
[W/(m2.µm.sr)]
Wavelength[nm]
0
20
40
60
80
100
120
140
400
450
500
550
600
650
700
750
800
850
900

- **CALIBRATION FUNCTION HAS BEEN DEFINED AS THE RATIO BETWEEN HICO TOA RADIANCE AND SIMULATED TOA RADIANCE**

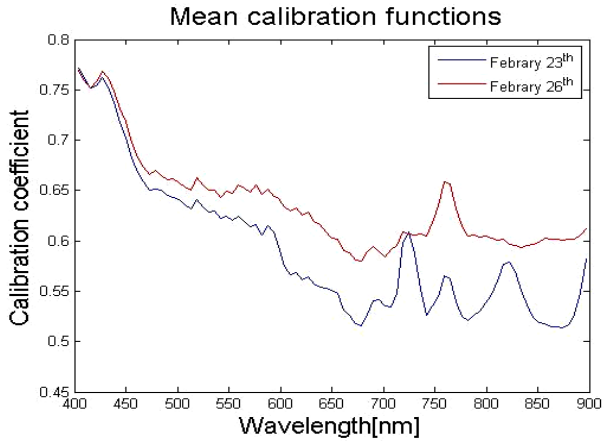




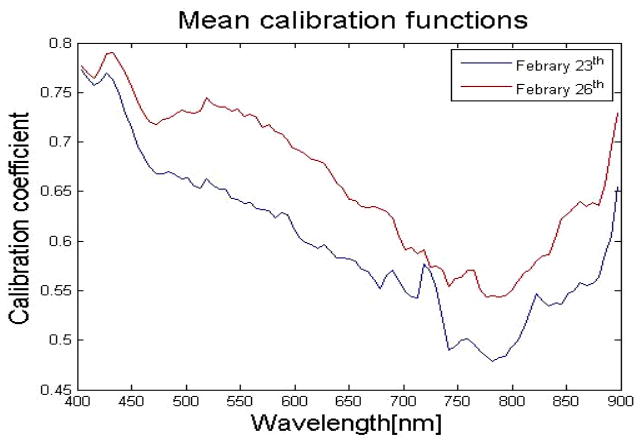


CALIBRATION FUNCTION	**IS NOT SO INFLUENCED BY AOT VARIATIONS IN HIGHT TOA RADIANCES** **BUT IS INFLUENCED BY AOT VARIATIONS IN LOW TOA RADIANCES**

- **CALIBRATION FUNCTION HAS BEEN CALCULATED FOR 5 DIFFERENT PIXELS IN TWO HICO IMAGES.**



VEGETATION AND SOIL PIXELS

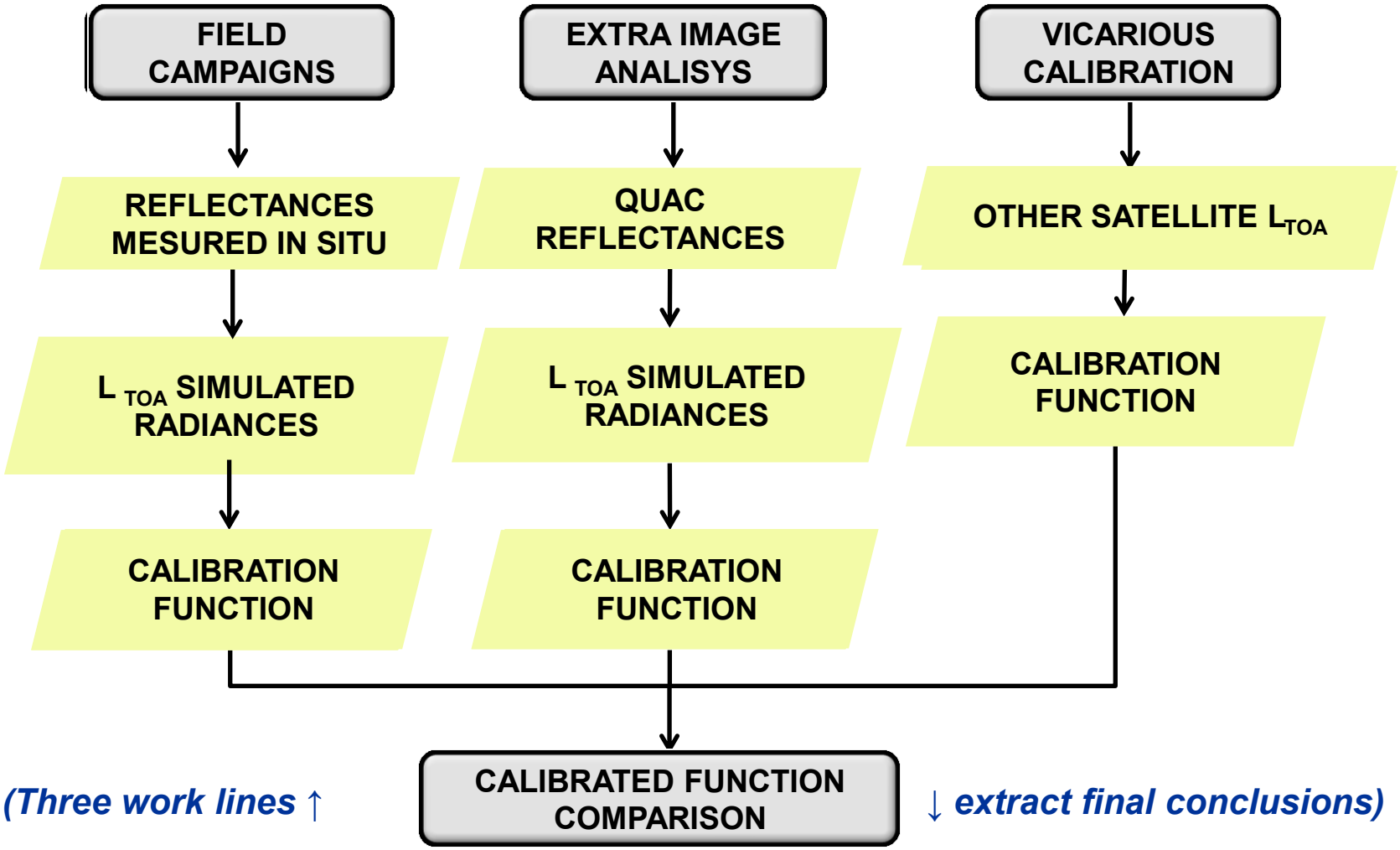


WATER PIXELS

- **CONCLUSIONS ABOUT ATMOSPHERIC CORRECTION**

  - **DIFFERENT METHODS AND RESULTS FOR ATMOSPHERIC CORRECTION OF HICO DATA HAVE BEEN PRESENTED.**
  - **QUAC RESULTS HAVE BEEN ACCEPTED AS A FIRST ATTEMPT OF REFLECTANCE RETRIEVAL**
  - **REFLECTANCES OBTAINED BY QUAC ALGORITHMS HAVE BEEN TAKEN INTO ACCOUNT FOR THE SIMULATION OF TOA RADIANCES AND A POSTERIORI GENERATION OF RE-CALIBRATION FUNCTIONS.**
  - **CALIBRATED FUNCTIONS HAVE BEEN OBTAINED FROM TWO HICO IMAGES FOR VEGETATION AND SOIL PIXELS AND FOR WATER PIXELS RESPECTIVELY**

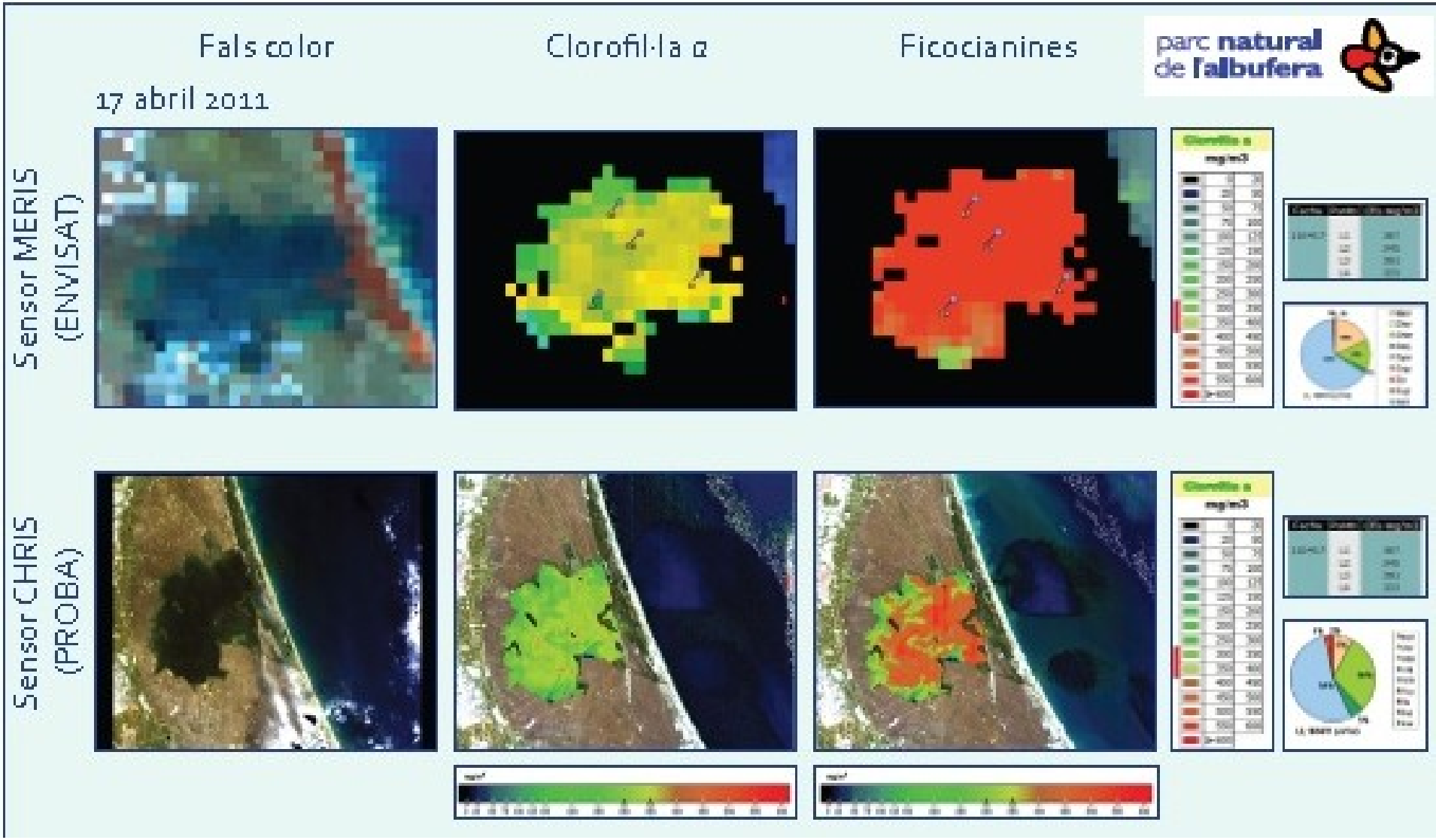
- **FUTURE WORK PLANNING**

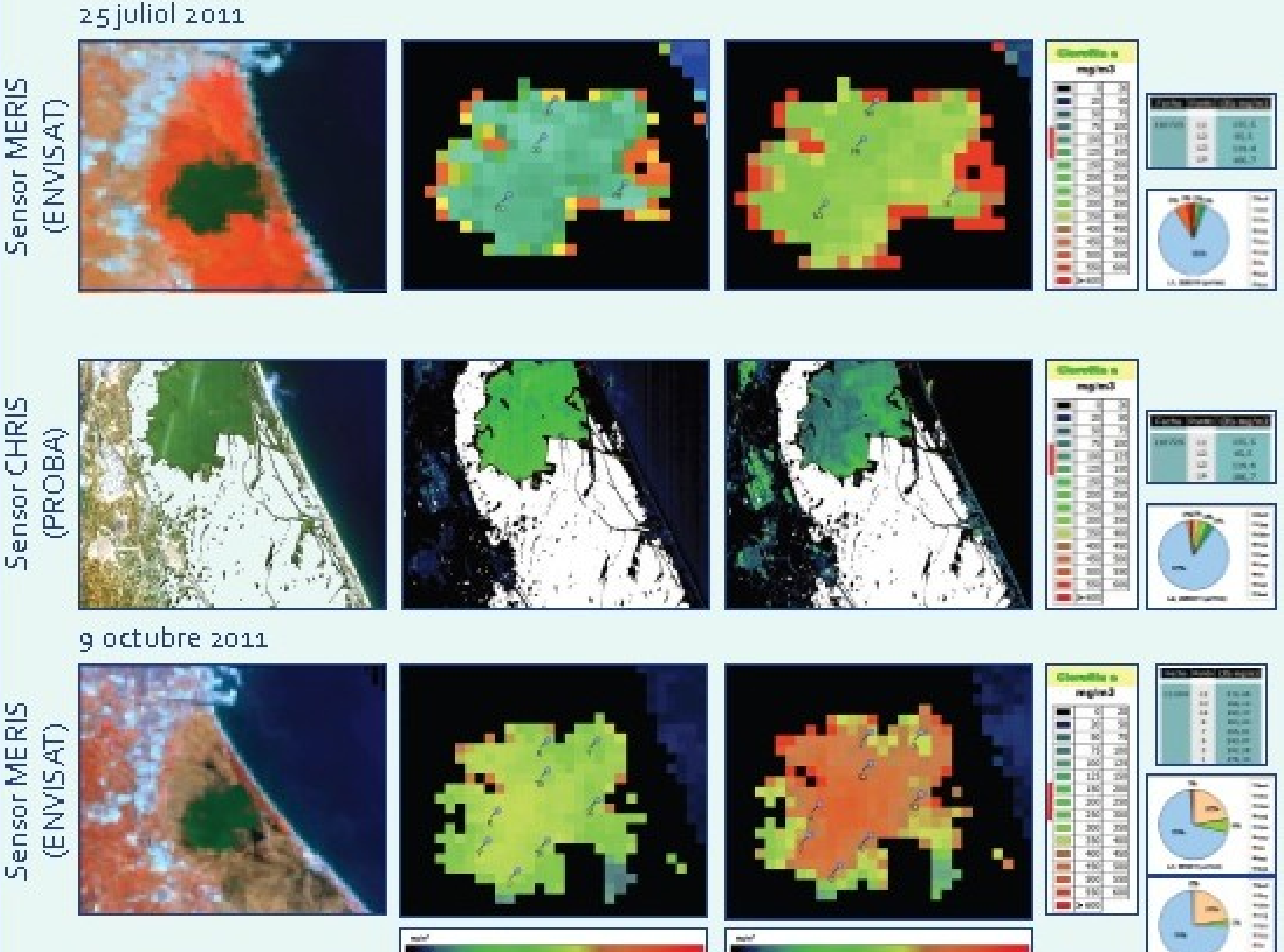


HICO UV Project Achievements

2. Use the HICO imagery for Mapping Chlorophyll-a and Phycocyanin (as Cyanobacteria indicator) temporal and spatial distribution, testing several algorithms for Phytoplankton pigments estimation.

Previous application of pigment algorithms on MERIS and CHRIS data

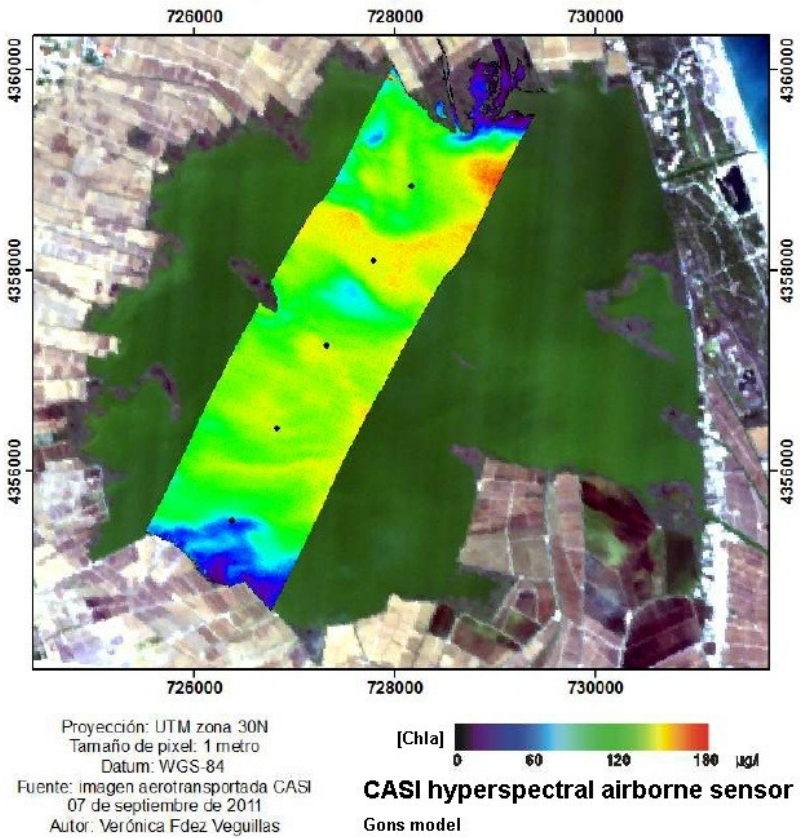


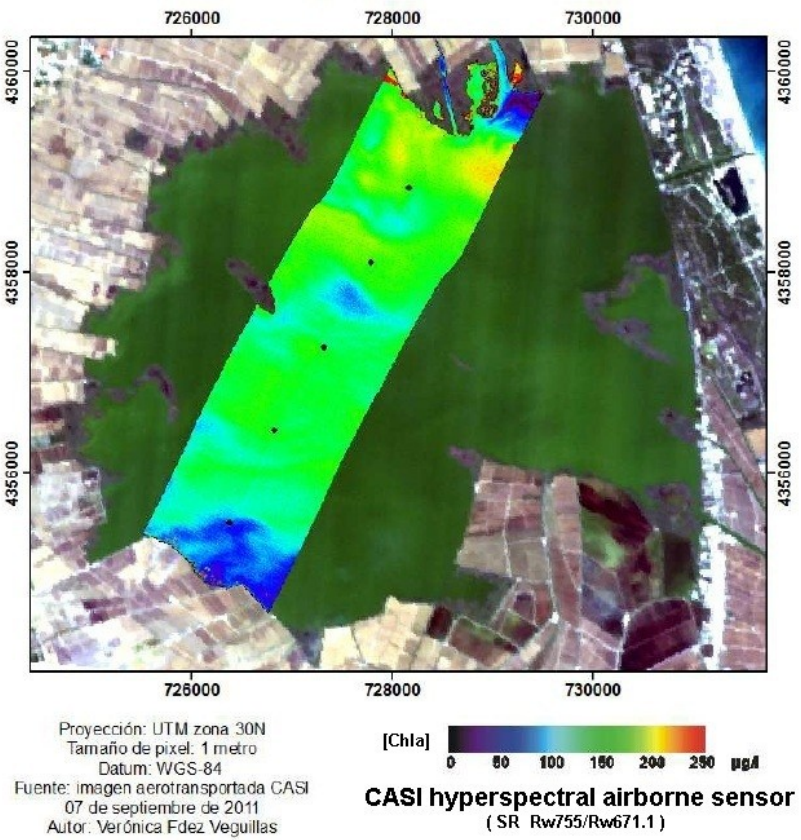

25 juliol 2011
Sensor MERIS (ENVISAT)
Sensor CHRIS (PROBA)
9 octubre 2011
Sensor MERIS (ENVISAT)

CASI hyperspectral airborne sensor

(INTA flight for UV. 20110907)

[Chlorophyll-a] maps





Thematic maps from HICO images in the UV Project activity period (20120223 – 20120831)

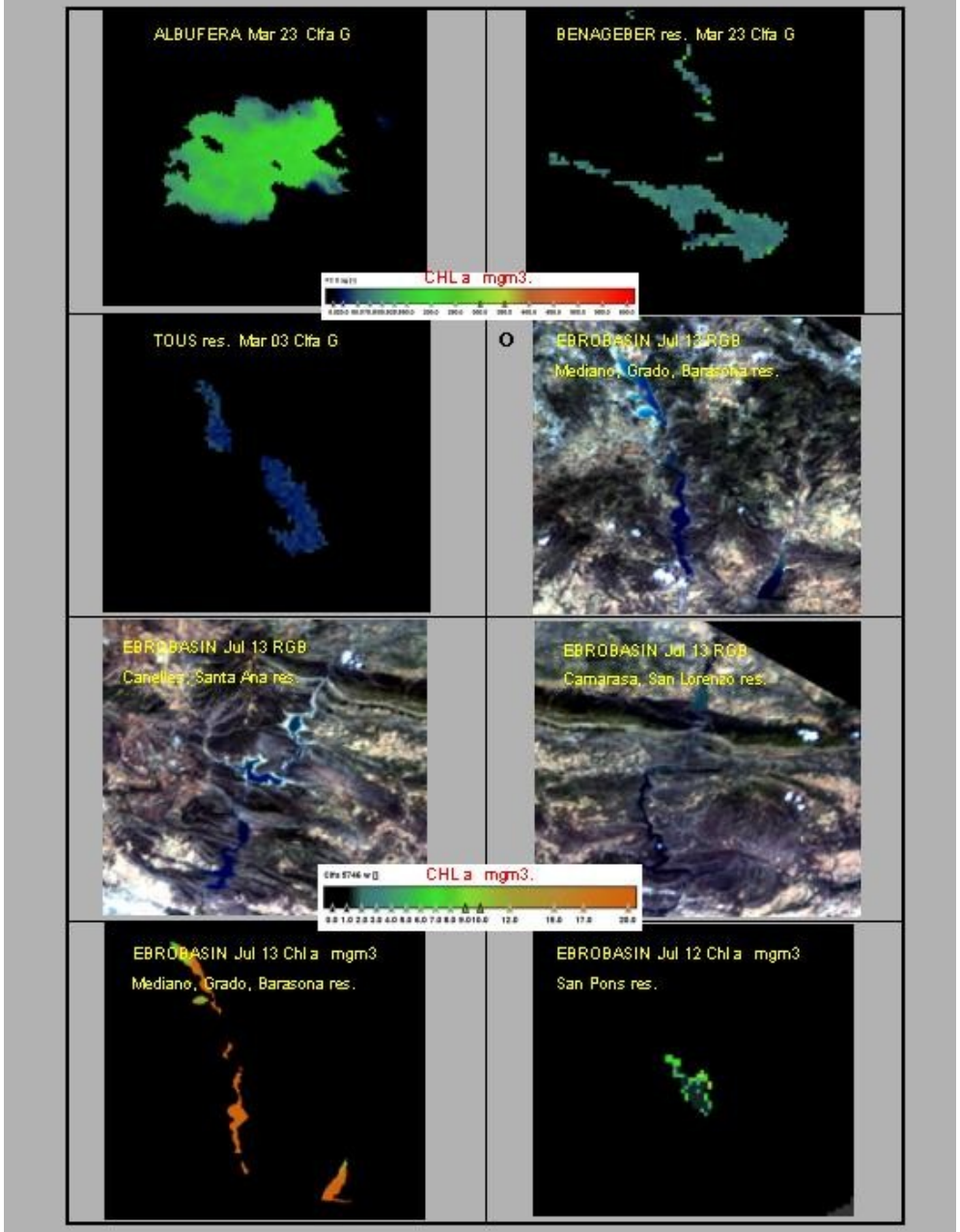
Applying the algorithms of Gons, H.J. (1999) and Simis, et al. (2005, 2007), based in the ratios 709/665 nm and 709/620 nm (HICO bands 54/46 and 54/39) and considering too the backscattering for 778 nm (band 66).

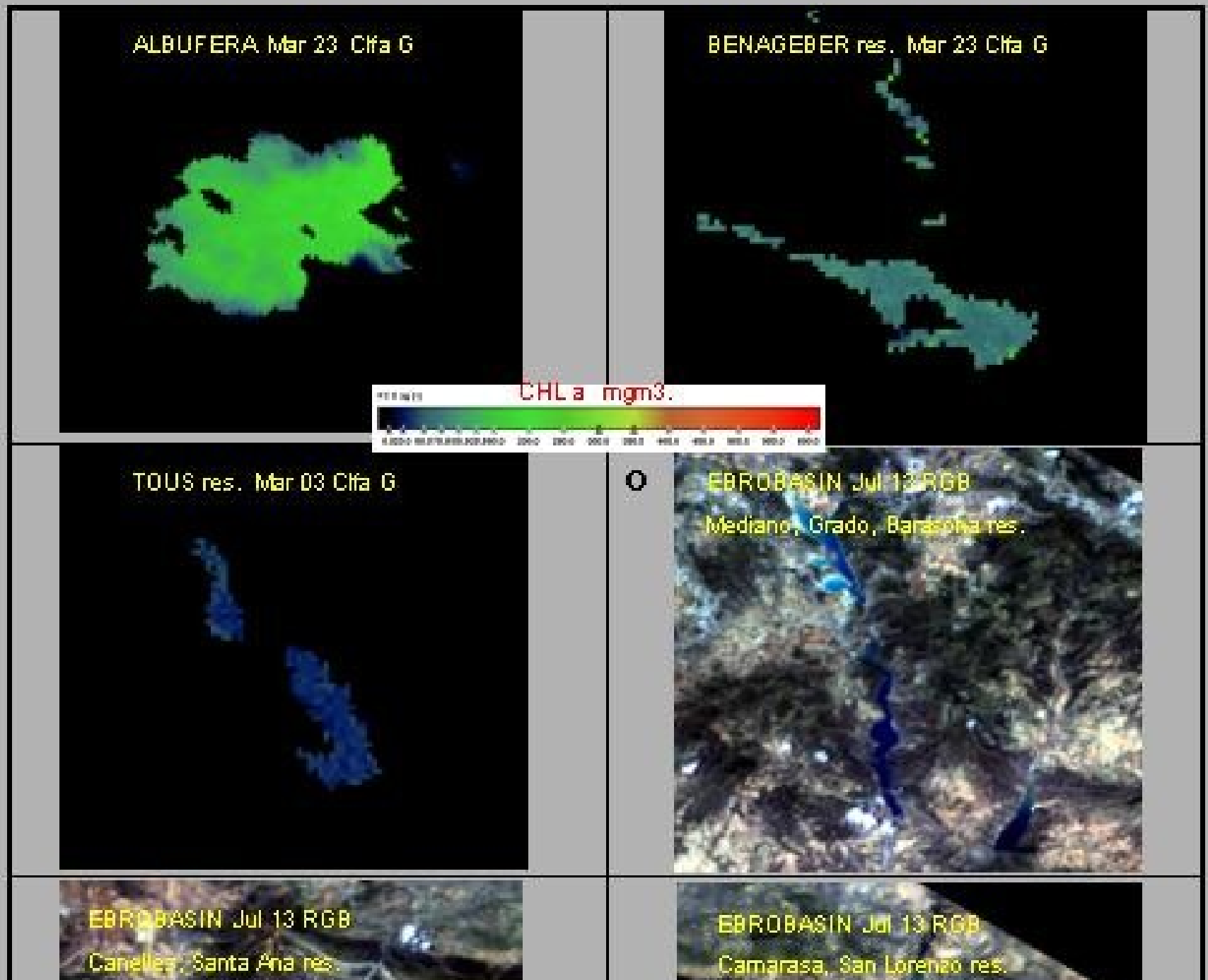
In addition has applied some band ratios, as HICO bands 57/46 (726/665 nm) or some three-band model (Gitelson et al., 2011) with the HICO bands 50, 53 and 56 (685, 700, 720 nm).

But the fit of the present reflectance bands to the sampling values till now are not absolutely satisfactories.

We need to improve the retrievals again, when the new AC tool may be fully completed and with more field data are considered.

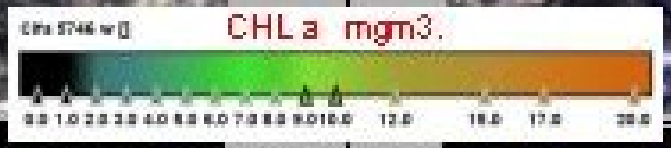
Then the next slides shows some provisional thematic maps.


ALBUFERA Mar 23 Clfa G
BENAGEBER res. Mar 23 Clfa G
CHL a mgm3.
TOUS res. Mar 03 Clfa G
EBROBASIN Jul 13 RGB
Mediano, Grado, Barasona res.
EBROBASIN Jul 13 RGB
Canelles, Santa Ana res.
EBROBASIN Jul 13 RGB
Camarasa, San Lorenzo res.
CHL a mgm3.
EBROBASIN Jul 13 Chl a mgm3
Mediano, Grado, Barasona res.
EBROBASIN Jul 12 Chl a mgm3
San Pons res.


ALBUFERA Mar 23 Clfa G
BENAGEBER res. Mar 23 Clfa G
CHL a mgm3.
TOUS res. Mar 03 Clfa G
EBROBASIN Jul 13 RGB
Mediano, Grado, Barasona res.
EBROBASIN Jul 13 RGB
Canelles, Santa Ana res.
EBROBASIN Jul 13 RGB
Camarasa, San Lorenzo res.

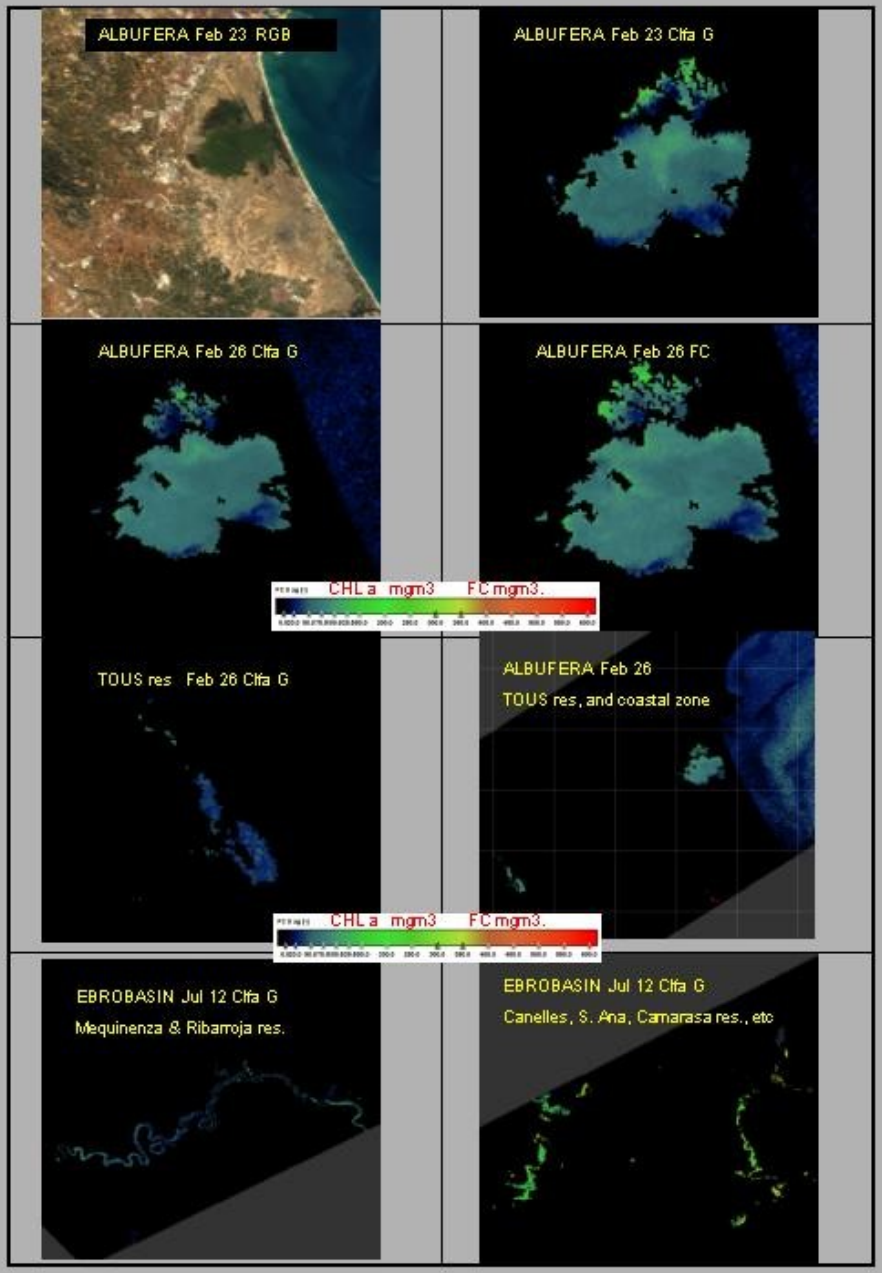

EBROBASIN Jul 13 RGB
Canelles, Santa Ana res.

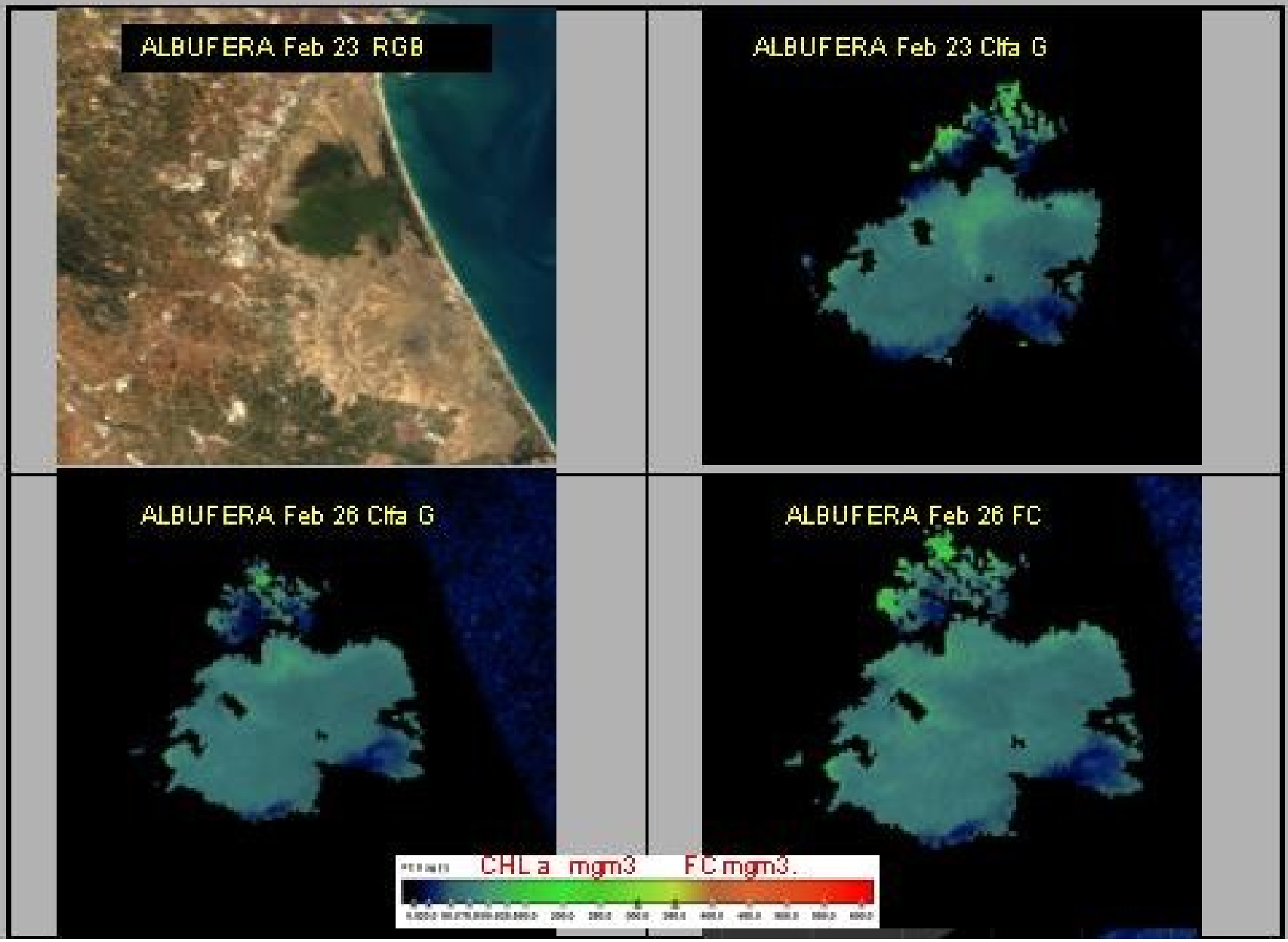

EBROBASIN Jul 13 RGB
Camarasa, San Lorenzo res.

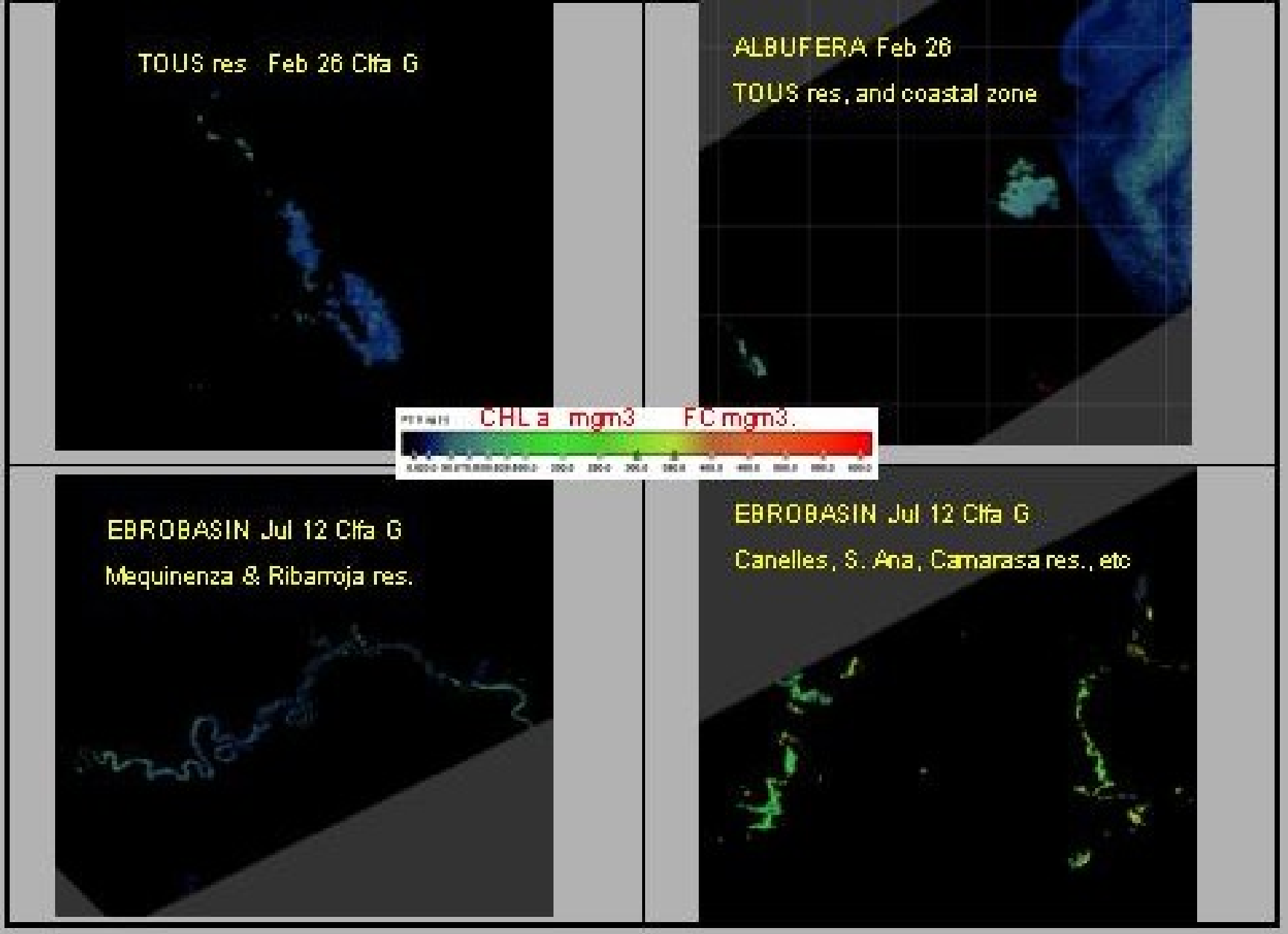

CHL a mgm3.


EBROBASIN Jul 13 Chl a mgm3
Mediano, Grado, Barasona res.

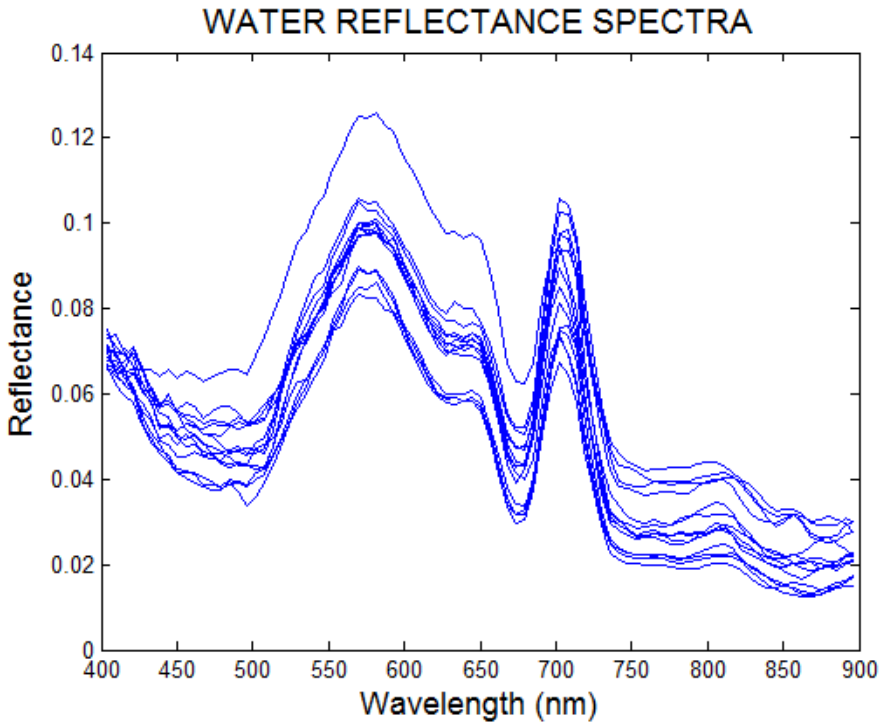

EBROBASIN Jul 12 Chl a mgm3
San Pons res.


ALBUFERA Feb 23 RGB
ALBUFERA Feb 23 Clfa G
ALBUFERA Feb 26 Clfa G
ALBUFERA Feb 26 FC
CHL a mgm3 FC mgm3.
TOUS res Feb 26 Clfa G
ALBUFERA Feb 26
TOUS res, and coastal zone
CHL a mgm3 FC mgm3.
EBROBASIN Jul 12 Clfa G
Mequinenza & Ribarroja res.
EBROBASIN Jul 12 Clfa G
Canelles, S. Ana, Camarasa res., etc


ALBUFERA Feb 23 RGB
ALBUFERA Feb 23 Clfa G
ALBUFERA Feb 26 Clfa G
ALBUFERA Feb 26 FC
CHL a mgm3
FC mgm3.


TOUS res Feb 26 Clfa G
ALBUFERA Feb 26
TOUS res, and coastal zone
CHL a mgm3
FC mgm3.
EBROBASIN Jul 12 Clfa G
Mequinenza & Ribarroja res.
EBROBASIN Jul 12 Clfa G
Canelles, S. Ana, Camarasa res., etc

Some examples of Estimation of [Chlorophyll-a], using HICO images, in the UV Project activity period (20120223 – 20120831)



HICO SENSOR IMAGERY

Chl-a concentration (µg/L)	
23-feb-2012 µ = 72,85	34,4840
	94,7043
	95,9855
	75,3088
	69,4885
	67,1416
26-feb-2012 µ = 72,41	50,6427
	83,5160
	84,9280
	70,5439
23-mar-2012 µ = 127,75	144,2528
	104,7089
	116,6225
	145,4093

Data from sampling

µ = mean value

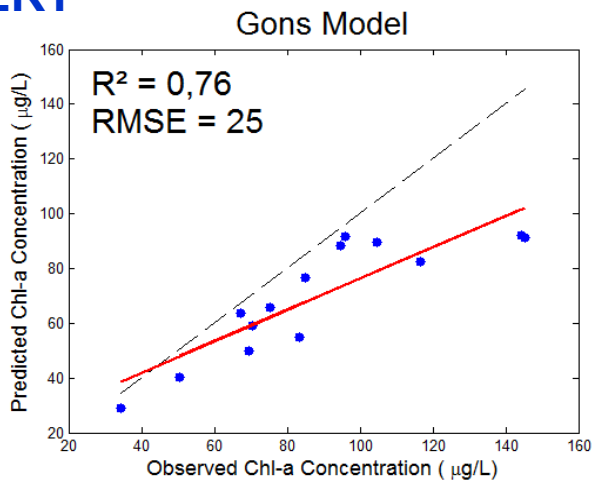
CHLOROPHYLL-a Estimation models

GONS algorithm

HICO SENSOR IMAGERY

$$b_b = \frac{1{,}61\, R_w(778)}{0{,}082 - 0{,}6 R_w(778)}$$

$$Chl\ a = \frac{\frac{R_w(708)}{R_w(664)} \times (0{,}70 + b_b) - 0{,}40 - {b_b}^{1{,}06}}{0{,}016}$$



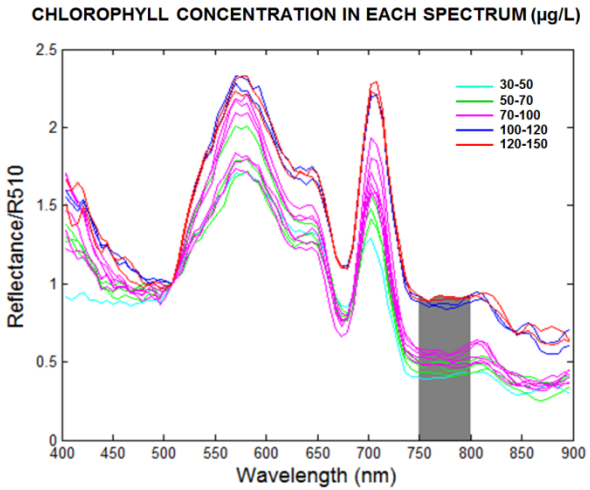
AURI algorithm

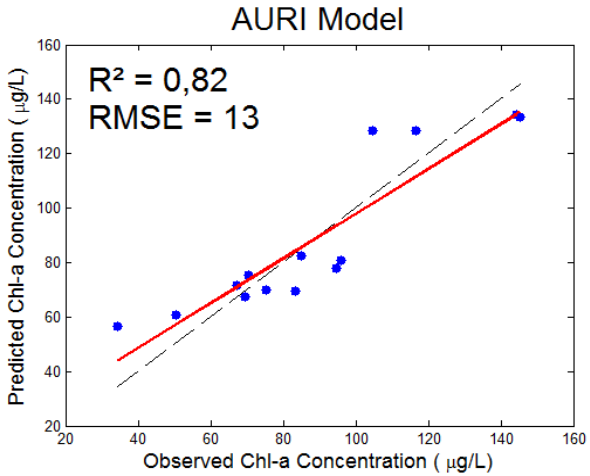
HICO SENSOR IMAGERY

$$Filtered\ Spectrum = \frac{Total\ Spectrum}{R_{rs}(510)}$$

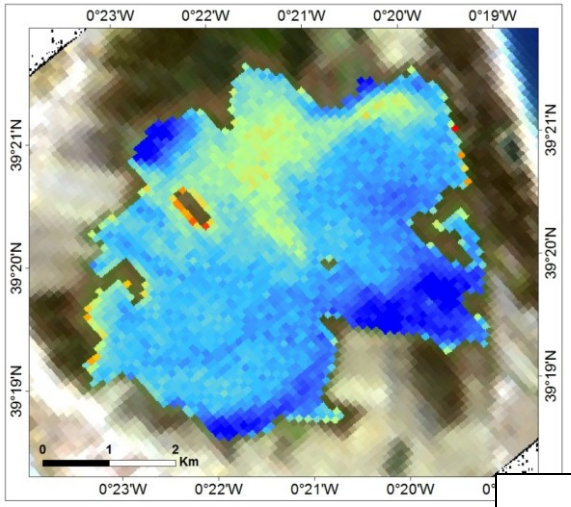
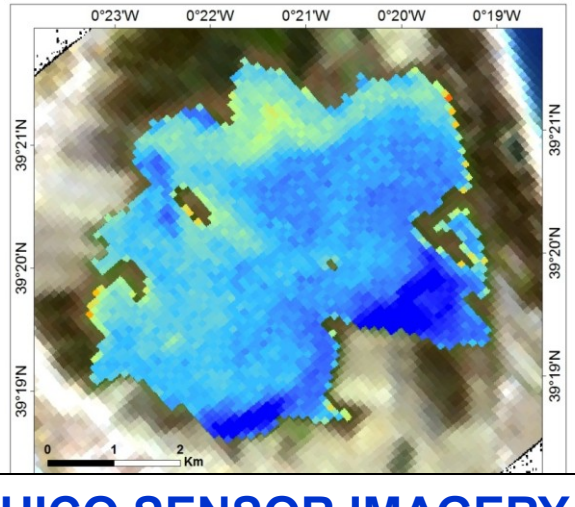
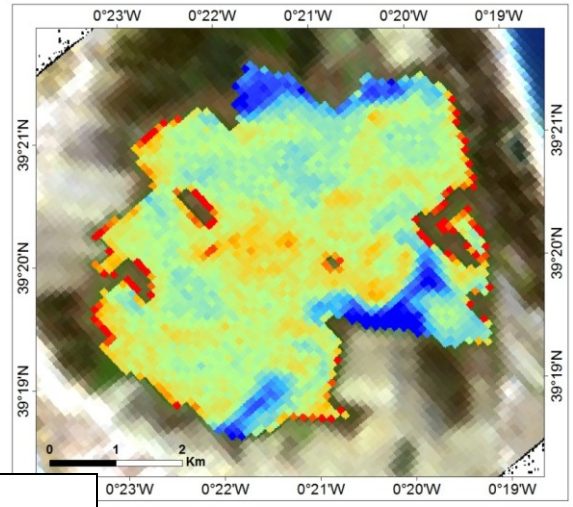
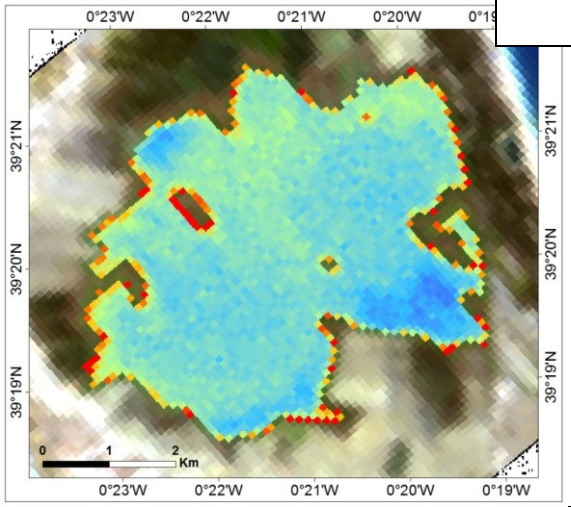
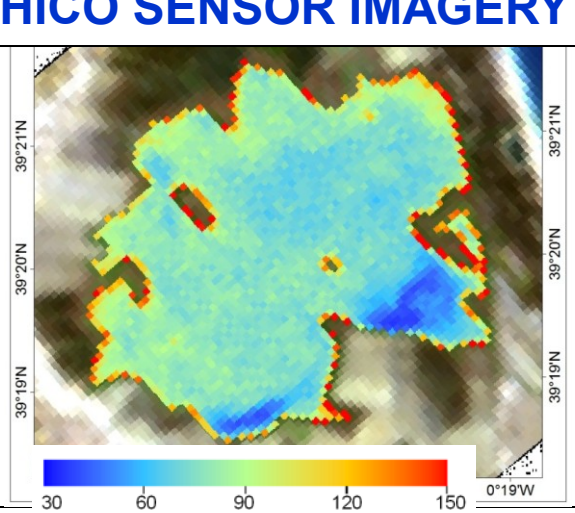
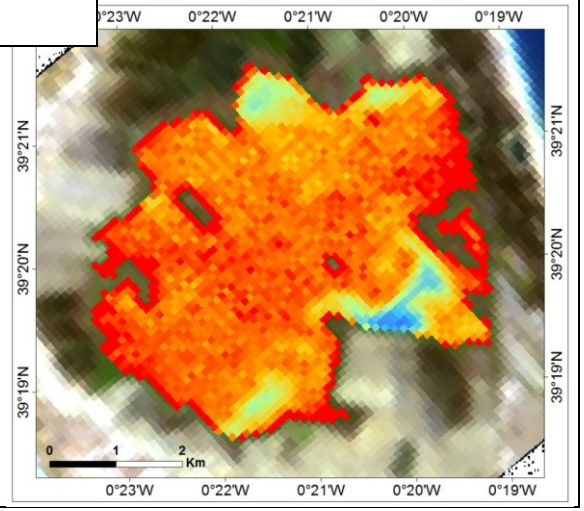
$$AURI = \int_{\lambda 750}^{\lambda 780} Filtered\ Spectrum\ d\lambda$$

$$Chl - a = 4{,}4\ AURI\ - 3{,}88$$





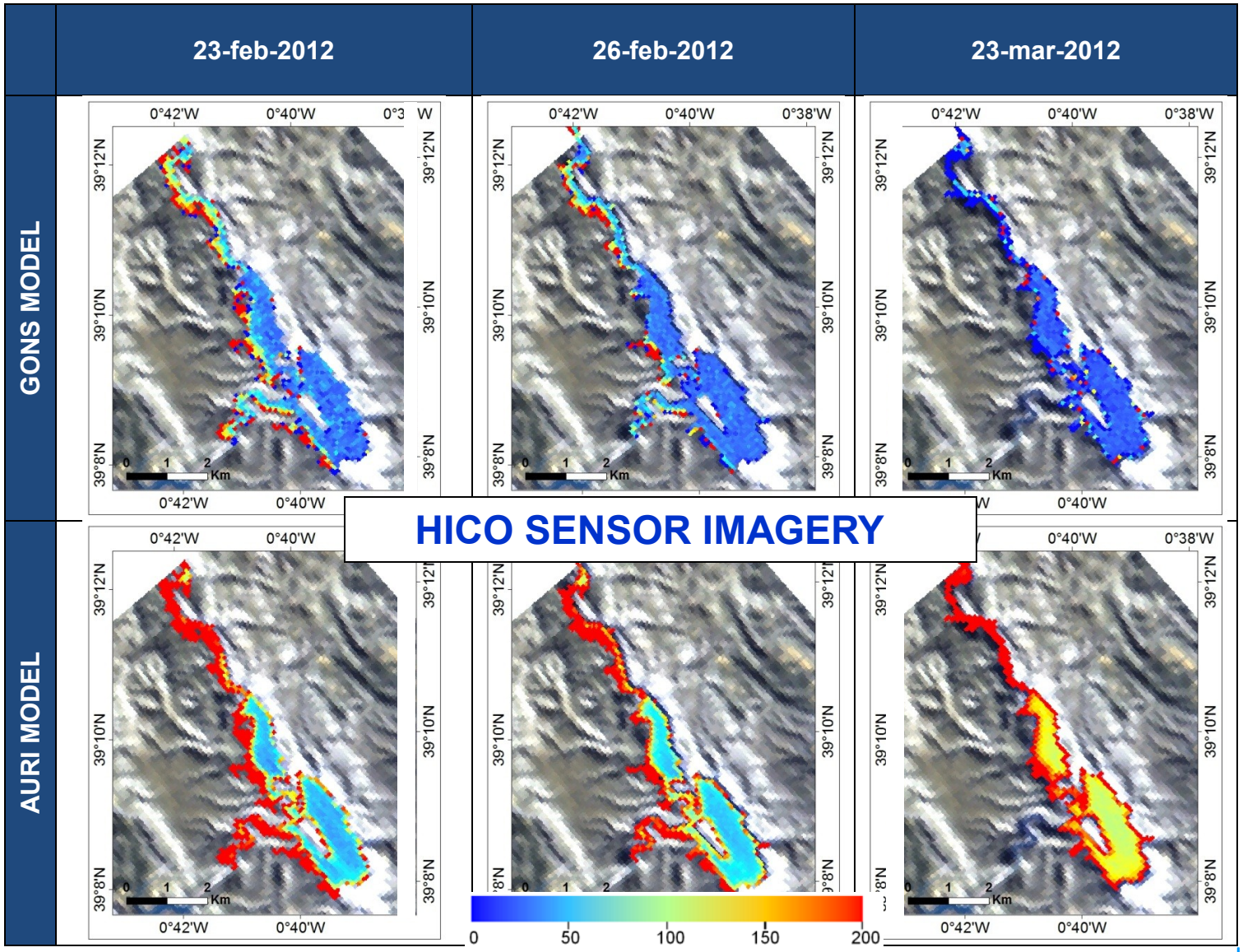
CHLOROPHYLL-a maps (ALBUFERA Lake)

	23-feb-2012 Chl-a μ = 72,85	26-feb-2012 Chl-a μ = 72,41	23-mar-2012 Chl-a μ = 127,75
GONS MODEL			
AURI MODEL			

HICO SENSOR IMAGERY

μ = mean value

CHLOROPHYLL-a maps (TOUS reservoir)



Conclusions

1 – The first important goal is the incorporation to the group of current Projects making remote sensing of inland waters using imagery of sensor HICO, aboard of International Space Station, orbiting the Earth at lower altitude from the Earth surface level (around 400 km) what other spacecraft. There are others advantages for this platform, as the best support in case of trouble or conflict, with the more direct supervision in that cases.

2 – HICO is truly a hyperspectral sensor with continuous sampling of its spectral windows, through its 87 spectral bands, very useful in any project studying variables related with the visible spectrum (water, vegetation, etc.).

3 – The organisation and management of the Oregon State University at Corvallis represent a good warranty to the best profit of sensor possibilities.

4 – In the next period, before the next Annual Meeting, we will work with the data improving as possible the new tool for HICO imagery Atmospheric Correction, as a cooperation with the scientific community involved in the HICO Current Projects in our common interest and goals.

5 – The experience of University of Valencia, was successful in general terms and very hopeful in the order of development of some image treatment tool and in the aspect of adaptation of algorithms for water quality parameters, specially the related with the photosynthetic pigments and the ecological evaluation of the inland waters.

6 – This work provides a comparison between HICO, MERIS and CHRIS thematic maps of photosynthetic pigments in order to evaluate differences in spatial and spectral resolution.

7 – We presented our Report of the year 2012 in this HICO users Annual Meeting of October 7th, with the present status, and some advances, but we need, after the meeting, to continue working, in different lines, with one deeper analysis of data, and advancing toward the final calibration function to fit the best code for the Atmospheric Correction. Then, after a new annual period working with HICO images and new progresses, we hope will have more useful results and solid conclusions.

8 - We want to cooperate with other HICO users in order to share the common problems and solutions, applying the power of the HICO sensor as imager, and rising much better possibilities for remote sensing applications in the future.

Valencia, August 31st 2012

UNIVERSITAT DE VALÈNCIA

"USE OF HICO DATA TO STUDY THE WATER QUALITY OF COASTAL AND INLAND WATER BODIES"

Moreno, J., Vicente, E.*, Miracle, R.*, Peña, R., Sabater, N., Servera, J., Tenjo, C., Delegido, J.

University of Valencia. Dept. Earth Physics and Thermodynamics, Fac. of Physics. Scientific Park. Image Processing Laboratory (IPL), Paterna Campus (Spain)
*** University of Valencia. Dept. Microbiology and Ecology. Burjassot Campus (Spain)**

emails: jose.moreno@uv.es; rpenamart@yahoo.es

Thank you very much for your attention!