

Practical Session 2.1 Import Bands in QGIS NDWI Index Estimation







Import Green and NIR Bands

Black



NDWI calculation

112 1100







NDWI calculation

Black







Practical part 2.2 Clip Image





Clip Image







Select the clipped area



え/長信友・陳敬べ口日ちゃい 半月	5-15555 VOB 8 X		
8 P 2000 A A D 000 K		*)@(+ *) / (*)@(*	an Elin a la companya a
<pre>Viet in the initial initia initial initial initial initial initial initial initia</pre>	Chip Sector by Poreri Prove Adds Prove A	X Colouble from Laya Lio Map Tanko Loter Provide Colour	 4. 4. 12 Conception (see a second second



für system komp (bollet)



Draw on Canvas

Black







Clipped file





C. Gattink and polety

Black Sea 112 1911

FL DODEVN I NICH



Open Basemap – QuickMapServices plug-in

Black

FURDER LAND







Open Basemap – QuickMapServices plug-in

Black

112 1000







Practical part 2.3 Shoreline Extraction





Semi-Automatic Classification plug-in







THE R. P. LEWIS CO., LANSING MICH.

Castur PETRODI & NALLOBERT BRANN 199. C Date LER D VIEW BERRICH





Working file definition and training file creation

Black





Create train .scp file

Black

FLD DEEKLINDS



Q thinks Argent-1945				
Nor on the Lerr brane Dame &	dy Selir Dearses 205 High ST Populary Dis-			
1 🔜 🖬 🖬 🦷 🖬 🔜 📋	·加州市的地方的市场。	🗏 🔜 🛣 S 🚍 - 📰 - 👔		
1.1日在版·圖畫生的名	A.C 9	▲ 圖 · 圖 第 · 图 · 卷 · 場 ·	🖣 🔌 🖉 🔤 🖬	Y 龍 X H - 1
THE REAL PRIME REPORTS	S. F. J. C. F. G. S. S. F. S.	No	× /0.+ 03 × 0.+	
Lasta	IO			
Value Alexandra de Ca		A DESCRIPTION OF THE OWNER OF THE		The second second
💐 🔹 🗸 🐕 <u>16.12 NDWI</u>	Crease SCP training input			×
Hard T S res)	+ - + + 1 > ThE PC > Desr	top + GECTEE > GEOTEE tight	U Search GECTEE train	100 State 100
20	- Honor worker			
le	Crigitize - New forder			W
M SKP gook	IO	No tentimatri yuut teantu		
S- 21				658 Y 101 Y 14
(6) 5 The Constant				11 TH. S. 16
CA B RESERVICE				
Var h	10 Million			
100 million (100 m				1000
: ta	and the second s			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
ž 12				
2	Solida Opc. Pacp			
36	and the			
27 Jul	Contract of the second s			
	A Hide Folders		Saec Canoo	
E ar	+	10.0 MIL 10.0	Contraction of the local division of the loc	the second s
	A CONTRACTOR OF		Second Second	S
10 ·				Harry and
VCD I C MCNers Water_Varia		HE ALL CHIPS		
CD Clarke www		CONTRACTOR OF A		
V Adamie V Spill				



Create Regions of Interest (ROI)









Create Regions of Interest (ROI)









entremented the store of the second states in second

Classification Preview







Black

FURDER ALLER



Run the Semi automatic classification algorithm



品作な・読む マンドムラ (中国)報告	• • • • • • • • • • • • • • • • • • •	6 📧 - Al - 🗛 - 🗛 🕹 VIIII	10 11 + Y W	Recth.
·		Refle Works Download avenue	1	
			- [3] [3] [2]	
			· La - (•) La - (+ La -	
5.52 - 320 Statistic	A Martine Statis	Service and the service of the servi		7 ×
A Class temp group	er en andere de la companya de la co		170	1 1
√ ¥ 20220214 19593539072391 temp €	Province.			
Do to classified i Easte too	IS IN THE REAL PROPERTY OF			8
1 - Weber Marto	s products			
Z - Net Jac 2 + Prestate	stag			
Dock with a state pro	in Unition Viewer Links	* Descar		-tes
💼 📑 Bertettitte annihere Besten, 🗔 📲 🔤 Cabilit				62
State Separate lat	+ 1172	Dawthe Dairs	14	125
ander Rander	Net Crathele ware		1744 1744	
y white with these light to Passandra	collarice Load an style			
VII / Worker Rids Vietnet	Sady mark			
Vi 1 0 Weber R55 S Ronch	Challe mater	Construction record	Save about on the	17.00
E LA VI N Water RSS V Settings		A CONTRACTOR OF A	200 Carlo 1995	
🖉 🖷 🖉 1 12 Walke R55 🔹 🚯 Liets	40,0			
V 1 13 Weter RSS Values				
Z V 1 12 Water Hilds	Die SC.P			
• 1 1 1 Wolver Co.5				
212 by Land Hall				
■ √12 10 (and 1555)				
212 X Lant 1855				
	173			
WC ID 3. C MC Basiw Intel wax -	1.000			-





Generate a Classified image





Tajan la tan la Fi Polyki La Iol

Black

112 1100



Convert the Raster to Vector











Convert the Raster to Vector

Black



Convert the Polygons to Lines



PONTOS

Black

The same

FL POPEVN L NICH



Historical shoreline extraction

Black







Historical shorelines









Evaluation of the Shoreline Evolution





Introduction in DSAS tool









DSAS statistical parameters





Black

FL DODEVN I NICH

Weighted Linear Regression (WLR)







Methodology in steps - ArcMap & DSAS



Step 1st : Import the shorelines In ArcMap Step 2nd : Design a baseline Step 3rd : Create a new Personal Geodatadase (. mdb) **Step 4th :** Define the technical characteristics of the vertical Transects in DSAS toolbox Step 5th : Edit Transects **Step 6th :** Select the **Statistical Parameters** Step 7th : DSAS calculates and export the results Step 8th : Visualization of the results **Step 9th : Post- processing** of the results





Create a new Personal Geodatabase

- 1. Create a new Personal Geodatabase
- Catalog \rightarrow New Personal Geodatabase
- Rename \rightarrow OVS_PGB.mdb

2. Create 2 Feature Classes

(shoreline & baseline)

 OVS_PGB.mdb (Right click) → New → Feature class...









Create new Feature Classes for shorelines and baseline



In the Tab Catalog → OVS_PGB.mdb (right click) → New → Feature class...

New Twitzee Class X	Name Feature Dans X	Meet (sold a User
Name Incentive Incenting Incenting Incenting Incenting Incenting Incenting Incenting I	Choose the coordinate system that will be used for XY coordinates in the data. Geographic coordinate systems are lettered and forgetistic coordinates on a systemical model of the sector service - Projection coordinates pysitions are in understand conversion to transitions lettered and length de coordinates in a letter dimensional linear system The sector service is asserted and the sector dimensional linear system	Telefitarie Data Type * 00000000 Deject D * 24047 Gestedry * 24048 Gestedry * 24047 Gestedry * 24052 Gestedry * 24052 Gestedry *
Geometry Properties Coordinates include Minates. Used to store cone data. Coordinates include Ziralaes. Used to store 30 data.	0 WG5 1984 UTM Zone 27N * 0 WG5 1984 UTM Zone 28N * 0 WG5 1984 UTM Zone 28N * 0 WG5 1984 UTM Zone 28N * 0 WG5 1984 UTM Zone 38N *	v Click any field is use to properties Field Properties Face Allow Visits Celture Visits Longits 10
	Projection: Tramswise Meridian Pole, Easting: 90000.0 Pole, Fainting: 6.0 Tartist, Pendar. 1), A Scale, Factor: 6.000 Laborat. 00, 0100: U.B Linear Unit: Meter (1-0)	To add annee field type the same into an empty one in the Tield Name solution, slick in the One Type columnia shares the deletings, then eith the Tield Property.
illian Net - Debut	vBack Name Cancer	<gacs carcel<="" print="" td=""></gacs>





Create new Feature Classes for shorelines and baseline



New General Cline	New Federa Care >	New Centure Class
Kine: Que type Type of Decrees store france Sectore clear Une regiune (Control Sectore clear (Une regiune (Control Sectore clear (Control Sectore Control Sectore clear (Control Sectore Control Sectore Contr	Choose the coordinate system that will be used for K* coordinate in the cate Generative marked to option much index an interactive marked between a spin of the off the source and the glues coordinates a two demands of these spins the source of the source of the Wills 1984 UTM Zone-200 Wills 1984 UTM Zone-200	Yeld Same Data Type CERENTO Oken O SHAFE Oken ov SHAFE Datas D Datas
Second Statement Construction of the Vielant Cherlin and an end of the Construction of the Construction 20 data Construction of the Construction 20 data	WGS 1984 JTM Zone JTN WGS 1984 JTM Zone JSN WGS 1984 JTM Zone JSN	Océ un Actio actionage des Téchnologies
	MCS_2261_UTV_Zone_255 MILIO 22625 AuJ union of 51 Projection: Trans.wine_Vectorian	-
	Pales Destring: 200000.0 Note://witings.200 Destring Particles.200 Destring Destring (200 Destring Destring (200 Destring Destring (200 Destring Destring (200	To act a new feet is performent with an experiment to field New actions of Units type columns shores the designs then each the field increases.





Transects creation in DSAS tool

Black

FLPOPERN LNICH



Desalsis		C-5 514 / 9 6017 (248/25 602 6018 8 - 16 56 5)
Install Contends Image: Contends	9 × Ser Default Revenues Image: Secting: Hetadata Setting: Bankine Parameters Bankine Parameters Image: Bankine Parameters Bankine Opport Image: Bankine Opport Bankine Coupe Field Image: Opport Optored Parameters Image: Opport Bankine Coupe Field Image: Opport Optored Parameters Image: Opport Bankine Coupe Field Image: Opport Interface of Land Relative to Banative Orientation Image: Opport Store Causeions Orientation Image: Opport Store Causeions Orientation Image: Opport Image: Opport Image: Opport Image: Op	Sec Difference Definier Metadous definier Sec Difference Definier Metadous definier Derestine Loover decementer Metadous definier Derestine Loover definier Derestine
	Log Re Dutjut O Regular O Extended I None Show Log Docation Caroot OK	Sog File Durput O Heg Jav C Consider (@ None Show I ing Location Cancel OR



Transects creation in DSAS tool









Calculation of Statistical parameters in DSAS tool



		विवराज मन्द्र मन्द्र स
Contents # X	9 Calculate Rates	- = ×
9 9 12	Select Statistics to Calculate	
Transects CVS	Select all	
-	Distance Neasurement) SCE: Shoreline Change Envelop	pd
baseline	[v] [Distance Measurement] NSM. Net Shoreline Movement.	15.
-	Regression Statistics) LRR: Linear Regression Rate	···
shoteline	[Pegression Statistics] WLR: Weighted Linear Regression	m
shoreline_OVS	Additional Parameters	120001
=	Second Transition	Outputs
shorelines_Smoothed_1986	A sector mesnoz	Display calculation results using color ramp
shareline smoothed 1994		Select Rete For Color Remp Display 🛄 🚽 🔞
-	Confidence Interval	ALC: 2002 C
shoreline_smoothed_2002	Pick: 90% V or, type: % Clear	Create 05AS Summery Report
-	the second	Location D \Dwekton\ODYSSEA_SUMME
shoreline_smoothed_2010		
shoreline smoothed 2018		Cancel/Exit Calculate
	1110-12-125	APPARTITITI





Visualization of the DSAS analysis results in ArcGIS







PONTOS



D-X

Data produced from DSAS tool

Contractory of the Association of the																					
and conversion and the	NACE AND A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTIONO																				
object destates?"	promoting -	Tranceil	Baseline()	GeneralD	Townadation:	419-10-2	Stational.	THE	AMP Length	302	1014	180	230.000	1.16	(#2)	19	1.020	NID	6.30	Meth.	VICES
	1 244412	11 24		rain.		432	- 8	R.	. 26	12.87	-77.45	28	22	3472	-55	1.6	.0.14	-4.61	2.30	9.2	- 65
	5.7988 inc.	- C.		1 state		32.00		. 60	200	21.52	31.84	1.58	112	1010	0.54	3.39	0.5	167	0.06	1.11	- 63
	2 Million	3		1.341		104	- C 8	195	205	20.05	20.16	2.83	1.32	5.50	2.8	-441	0.10	3.89	1.48	2,6	- 61
	4. 198/910	11		1.000		40.04	3	1.18	185	11.00	121.00	-7.56	1.02	-4.11	2.081	8.63	1925	+022	918	4.0	83
	A Digitize			i siale		No 16		100	762	24.1×	JM 14	-551	127	3.44	2.00	221	0.74	3.44	2.44	5.7*	1
	1.641.0			1-34-		12.8		181	200	38.04	26-31	1.94	1.00	181	2.00	8.10	0.05	8.83	0.08	841	
	1.198410			- 161-		1.8		25	25	44.40	-6.90	< 32	2.36	~5.D/	128	2.5	2.20	2.75	100	144	- 5
	A Palpice			1.969		47.36		244	36	2,30	72.27	~ 12	22	2121	- 5.9	8.45	- 58	- 81	05	577	
	P. Page 10	10		1 state	10	12.28		220	76	20.18	2138	100	1.32	184	28	8.33	20,08	- D	0.8	3.0	6
	IV HIRTS			1-101-	0	12/2	: 5	25	2%	3.4	4.46	-2.11	25.02	1.22	115	234	. 41	-0.24	2.16	5.1	5.
	Lt. Depter			1,000	2.82		28	1.38	36	Car	1.20	1.8		36.24	2.60	454	- 240	1.91	1.10	3.9	- 6
	D. Palyline	. D.		1 Sale		1.04		- 360	362	22.45	27.38	\$7	2.32	1.57	278	8.64	- 54	1.27	CTL	3.27	- 3
	12 Million	- H		1-161-		. 56-7.		201	200	20.10	22.14	1.131	>1.32	-354	241	4.15	1.14	.81	2.04	2.8	
	th Folder			1.000		47.28		:40	265	49.28	42.20	- S.H.	1.08	. 9.18	2010	2.24	-945	- 34	0.00	1.0	
	SX: Pulphar	P P	-	1 slab	. P	62.8		- 44	. 762	3. 11	20.44	- 29		-174	128	8.4*	0.00	1.74	111	3.27	6.
	12 Million	. P		- W-		.95	- 2	-495	200	29.40	20.35	2.83	1.32	124	28	240	2.08	-311	1.48	3.25	61
	1. and 1.	+0		1. 1997		10.75		1,000		Diff. Pr.	100.00	-0.947	1.11	10.06	11.25	4.61	1.000	10.002	10.00	210	1

Table			
able	-		
TRAVES.			
		-	

回 •	勘,	動動	日星来
------------	----	----	-----

13	object identifier * peom	ettry *	Transectil	TransOrder	BaselineID	Shoreline®	Distance	IntersectX	IntersectY	Uncertainty
Г	1 Point		2	2	1	06/05/1986	-53.020553	297938-838749	4529617.322503	38
Г	2 Point		2	2		06/05/1994	-59.281586	297943.119035	4523621.880965	30
1	3 Point		2	2		06/05/2002	-50.251566	297943.119035	4523521.880965	30
	4 Port.		2	2		06/95/2010	-89.60344	297998.382591	4529623-817009	30
	5 Port.		2	2	31	0//07/2018	-80.505233	297957.848948	4523637.353052	30
1	6 Point		3	3	31	06/05/1988	-50.037402	297956 /06169	4529/93 255851	- 30
1	Y Pont.		Ś	3	31	06/05/1904	-60.652050	297963.915468	4523601.084542	30
1	8 Pont.		Ś	3	31	06/08/2002	-60.852859	297963.915458	4529601.084542	30
1	9 Point		3	3		06/08/2010	-/1.266625	297971.124747	4523605.8/5253	30
Ľ	10 Point	_	3	. 3		0//97/2018	-81.881192	297978.334038	4523616.885064	- 30
Ľ	11 Point	_	4	4	1	06/25/1986	-51.438667	29/960.368208	4523772.315898	30
Ľ	12 Point		4	4		06/05/1994	-60.207549	23/365 483584	4523776 516416	30
Ľ	13 Pont.		4	4	3	06/06/2002	-80.29/549	297996.483584	4523778.518418	39
1	14 Point		4	4	1	06/08/2010	-79.716804	256666.184279	4525/12.407881	39

Transects_OVS_intersect_20201123_165052





Saving data



The parameters estimated from DSAS are:

- **TRANSECT INTERSECT** (data of the transect position)
- **TRANSECT RATES** (results of the **Statistical Analysis** for each transect) Save the file as .txt:

Table of Contents \rightarrow List by source \rightarrow transects_intersects (right click) \rightarrow Data \rightarrow Export \rightarrow Save

and a second			5.9
Lask in: 📷	Home - Erosion Jabi(05A5 🛼 🔒 🔂 🗔 👔		
shorelines			
Narte:	Export_Output_intersect.txt		darie .
Name: Save as type:	Export_Ovtput_intersect.bt	3	eve Incel
Narie: Sove as type:	Export_Output_intersect.bd Taid File File and Personal Geodotobare tables		eve incel
Narie: Sove as type: X/7 TT	Export_Output_intersect.bd Two His File and Personal Geodatabase tables dBASE Table onto tables		ene uncel
Narre: Seve as type: X// 11	Export_Output_intersect.bt Text File File and Personal Geodatabase tables daASSE Table This tables This tables		itwe unceil





Results for Thracian sea











Results – East Nestos Estuaries

	Value	Units
Average rate	-0.70) m/year
max accretio	1.93	3 m/year
max erosion	-3.78	8 m/year
Average Erro	0.3	5 m









Shoreline change from 1985 to 2020





Shoreline change from 2015 to 2020





Links for software and manuals

PONTOS

Satellite images:

- Earth Explorer: https://earthexplorer.usgs.gov/
- Copernicus Hub: https://scihub.copernicus.eu/dhus/
- Planet Explorer: https://www.planet.com/explorer/

Plug-ins

- SCP plug in: <u>https://plugins.qgis.org/plugins/SemiAutomaticClassificationPlugin/</u>
- DSAS tool:

https://www.usgs.gov/centers/whcmsc/science/digital-shoreline-analysis-syste m-dsas?qt-science_center_objects=0#qt-science_center_objects

GIS Links

QGIS: https://qgis.org/en/site/forusers/download.html



 ArcMap: <u>https://pro.arcgis.com/en/pro-app/get-started/install-and-sign-in-to-arcgis-pro.h</u>

