



UNIVERSITY OF ABDELMALEK ESSAADI
TETUAN - MOROCCO



INVENTORY AND MONITORING THE EVOLUTION OF THE QUARRYING EXPLOITATION IN THE REGION TANGIERS - TETUAN (MOROCCO) GIS TOOL FOR THE MANAGEMENT OF USEFUL GEOMATERIALS

TS06H - Geospatial Data Processing 1, 6867

EL MAFTOUHI TARIK, DELLERO Hatim and EL KHARIM YOUNESS

Inventory and Monitoring the Evolution of the Quarrying Exploitation in the Region Tangiers-Tetouan (Morocco) in Order to Design a Gis Tool for the Management of Useful Geomaterials (6867)

FIG Congress 2014 Engaging the Challenges, Enhancing the Relevance

Kuala Lumpur, Malaysia, 16 - 21 June 2014

Planning

- INTRODUCTION
- STATEMENT OF PROBLEM
- AIM AND OBJECTIVES
- AREA OF STUDY
- METHODOLOGY
- DATA CONCEPTION
- ANALYSE OF RESULT
- INTO A WEB MAPPING
- CONCLUSION

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Introduction

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The northern region of Morocco has experienced in the last decade an increased economic growth and made much progress developing its infrastructure, public works, urban and industrial areas.

Using a Geographic Information Systems (GIS) with its extensive capabilities to dealing with spatial problems and multilayering, would be necessary to provide a diagnosis and an overview to the current situation.

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STATEMENT OF PROBLEM

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ANARCHIC AUTORISATION (NO
UPDATED MAP FOR GEOMATERIALS)

NO RESPECT OF QUARRYING LIMITS

NO GEOLOGICAL DIGITIZED MAPS

NOTHING TO GET FROM
GOVERNMENT ADMINISTRATION
EXCEPT)

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STATEMENT OF PROBLEM



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1 VERY HARD
WORK
HUGE DATA

2 HOW TO ACCESS
TO INFORMATION

3 VERY SENSITIVE
FIELD



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AIMS AND OBJECTIVES

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GIS AND A WEB MAPPING FOR QUARRYING IN THE REGION OF
TANGIERS-TETUAN

OBJECTIVES

Database design

Geometric and attribute data
acquisition

Database creation

Spatial analyses

Analysis of Results



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AREA OF STUDY

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Source: Esri, DigitalGlobe, GeoEye, IGN, Aerotech, USDA, GNS, AFX, Garmin, AeroMap, IGN, CNP, swisstopo, and the GIS User Community

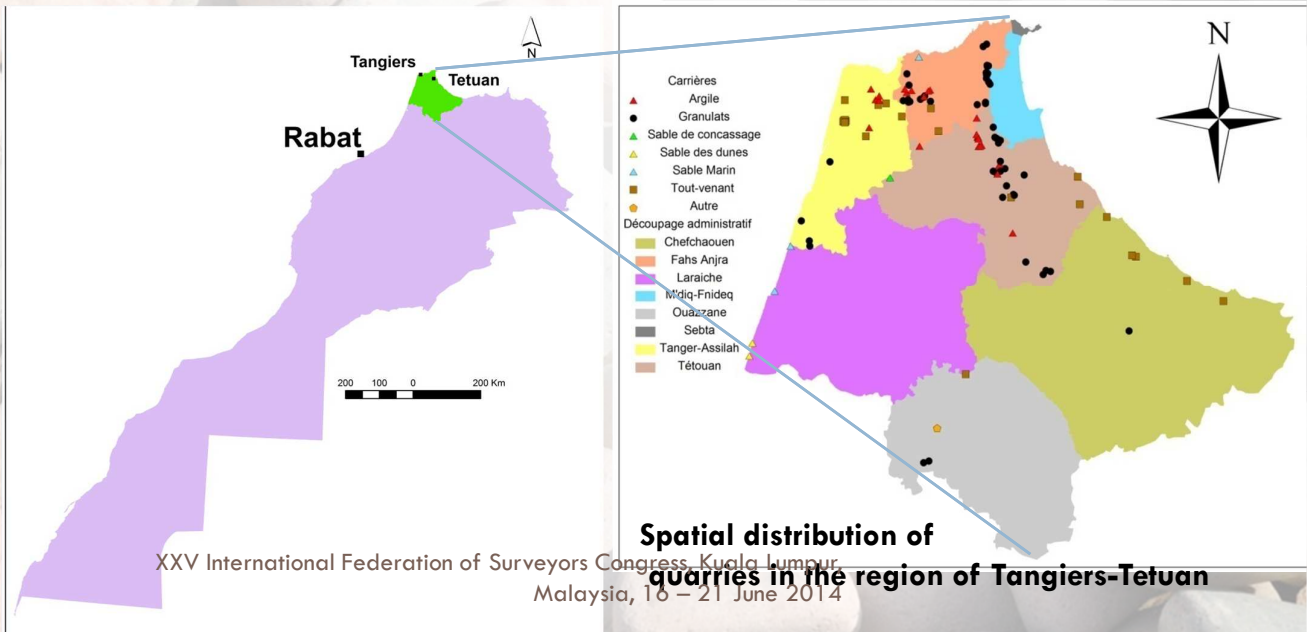


AREA OF STUDY



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The region of Tangier-Tetuan is experiencing an intense Extractive activity of geo-materials in construction.



METHODOLOGY



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DETERMINATION OF NEED

- GEOLOGICAL MAPS
- TOPOGRAPHIC MAPS
- SOIL MAPS
- ROAD MAPS
- ADMINISTRATIVE MAPS
- POPULATION MAPS
- QUARRYING MAPS

DIGITIZING

- ALL GEOLOGICAL MAPS
- QUARRYING COORDINATES

CREATING SHAPFILE OF MAPS

ANALYZING

- WITH GOOGLE MAP
- SOIL
- WITH GEOLOGIE

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DATA CONCEPTION 1



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Geology

Table

codegeol	formationD	lithologie	litholog 1	PIPA AR	PIPA CNT	litholog 2	gisement	litholog3
cTg	argiles pétiques feuilletées et séttes non datées	argiles-séttes	argiles-séttes	0	0	Argiles		
t4-5da	dolomies à Stromatolites	dolomies	dolomies	0	0	Carbonatés		
t2-5ca	calcaire à silex	calcaire-silex	calcaires	0	0	Carbonatés		

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498362.338 567395.141 Meters



DATA CONCEPTION 1 GIS



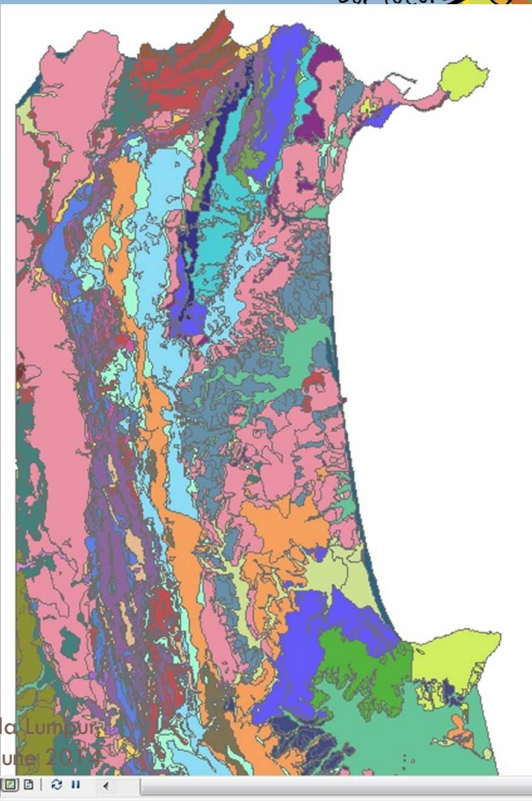
11

GEOLOGICAL MAP



Layers

- tetouan_fin
 - <all other values>
 - litholog_1
 - argiles-calcaires
 - argiles-dolomies
 - argiles-grès
 - argiles-sérites
 - argilites
 - arénites-pélites
 - calcaires
 - calcaires-dolomies
 - calcaires-grès-marnes
 - calcaires-marnes
 - carbonates
 - dolomies
 - gneiss
 - greywackes-pélites
 - greywackes-pélites-calcaires
 - grès
 - grès-calcaires
 - grès-calcaires-schistes
 - grès-pélites
 - grès-quartzites
 - kinzigites
 - limons
 - limons-sables
 - marnes
 - marnes-arénites
 - micachistes



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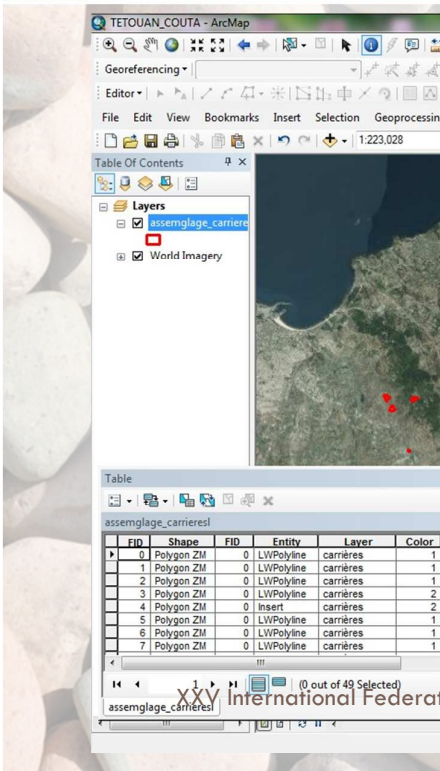


DATA CONCEPTION 2 GIS



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The quarrying



TETOUAN_COUTA - ArcMap

Georeferencing

Editor

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:223,028

Table of Contents

Layers

- assemblage_carrières
- World Imagery

Identify

Identify from: <Top-most layer>

assemblage_carrières1

Location: 495,352.866 583,622.796 Meter

Field	Value
FID	36
Shape	Polygon ZM
FID_0	0
Entity	LWPolyline
Layer	carrières
Color	2
Linetype	Continuous
Elevation	0

Identified 1 feature

Table

FID	Shape	FID_0	Entity	Layer	Color	Linetype	Elevation	LineWt	RefNam
0	Polygon ZM	0	LWPolyline	carrières	1	BYBLOCK	0	25	
1	Polygon ZM	0	LWPolyline	carrières	1	Continuous	383.5619	25	
2	Polygon ZM	0	LWPolyline	carrières	1	Continuous	438.42	25	
3	Polygon ZM	0	LWPolyline	carrières	2	Continuous	0	25	
4	Polygon ZM	0	Insert	carrières	2	Continuous	0	25	StocksCarrière07
5	Polygon ZM	0	LWPolyline	carrières	1	Continuous	0	25	
6	Polygon ZM	0	LWPolyline	carrières	1	Continuous	62.6875	25	
7	Polygon ZM	0	LWPolyline	carrières	1	Continuous	51.9943	25	

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495352.866 583622.796 Meters



ANALYST AND RESULTS



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GEOLOGIE AND QUARRYING

Table of Contents:

- Layers
 - insert2
 - <all other values>
 - litholog_2
 - Argiles
 - Carbonatés
 - Siliceux
 - geo_tetouan_couta
 - GEO-fin
 - CLIP2
 - inter
 - tetouan_fin
 - assemblee_carriere
 - Table

Identify window:

Identify from: Top-most layer

- insert2
 - sdBH
 - sdBH

Location: 495,111.780 582,902.645 Meter

Field	Value
FID	368
Shape	Polygon
FID_tetoua	3849
codegeol	sdBH
formationD	grès grossiers à débris de plant...
lithologie	grès-calcaires-schistes
litholog_1	grès-calcaires-schistes
PIPA_AR	0

Identified 2 features

FID_tetoua	codegeol	formationD
413	egE	marnes, arénites et formation indifférenciées/Conglomérats
4404	egE	marnes, arénites et formation indifférenciées/Conglomérats
414	I2-3cb	calcaires massifs blancs

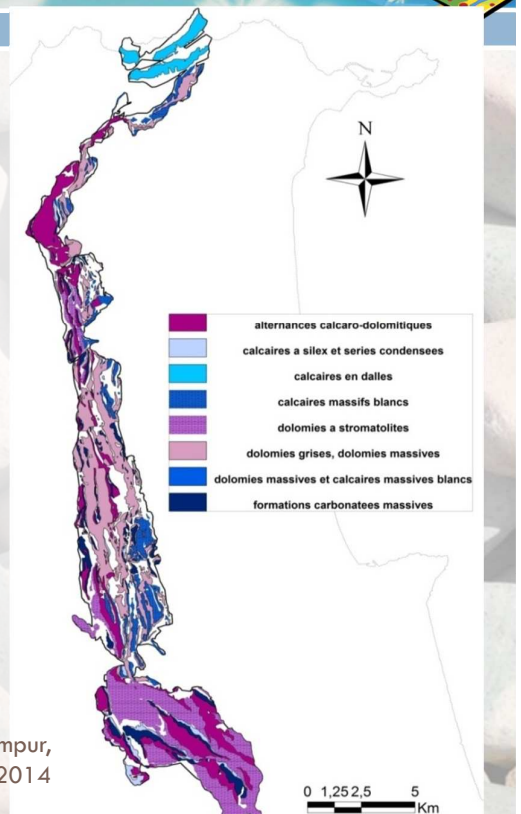
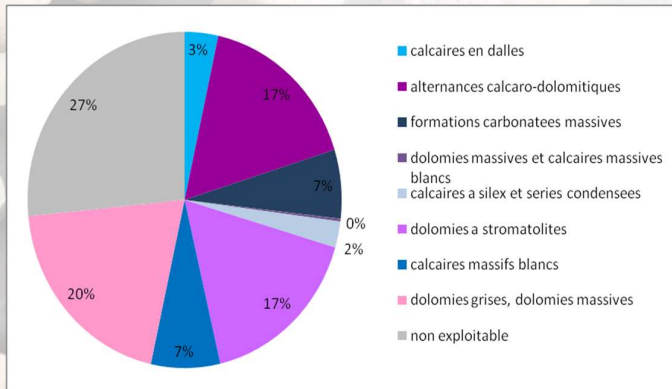
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ANALYST AND RESULTS



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GEOLOGIE AND QUARRYING



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ANALYSE OF RESULT



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GEOLOGIE AND QUARRYING

The screenshot shows the ArcMap interface with a geological map of TETOUAN, COUTA. The map displays various lithological units in different colors. A 'Table' window is open, showing the following data:

lithologie	litholog_1	litholog_2	Nome_Carri
grès	grès	Siliceux	HAFAT AL BAN
grès	grès	Siliceux	HAFAT AL BAN
grès-argiles	argiles-grès	Siliceux	HAFAT AL BAN
grès-argiles	argiles-grès	Siliceux	HAFAT AL BAN
dolomies			
calcaires			
calcaires			
grès-argiles			
grès-argiles			
calcaires			
calcaires			
calcaires			
grès-argiles			
grès-argiles			
marnes-arénites			
marnes-arénites			
calcaires			
calcaires			
calcaires-silex			
calcaires-silex			
calcaires-silex			
calcaires-silex			
grès-calcaires-schistes			
grès-calcaires-schistes			
marnes-arénites			
marnes-arénites			
calcaires-silex			
calcaires-silex			

An 'Identify' window is also open, showing the selected feature 'inter' with a location of 495,621.618 583,253.903 Meters and a 'Nome_Carri' value of HAFAT AL BANATA.

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ANALYST AND RESULTS



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GOOGLE MAP AND QUARRYING

The image shows a satellite map with several irregular black outlines representing quarrying areas. A compass rose is centered on the map. At the bottom, there is a scale bar and the text:

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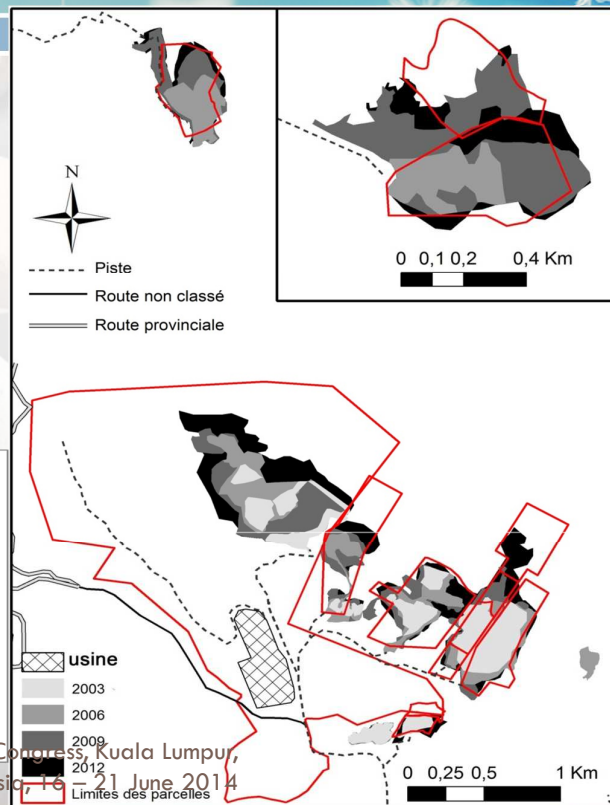
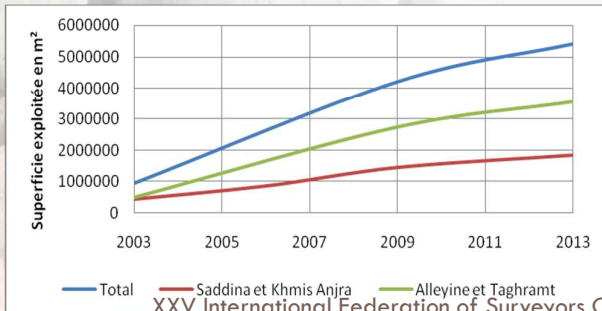
800 m



ANALYSE OF RESULT

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Evolution of the surface used in Saddina - khmis Anjra between 2003 and 2013

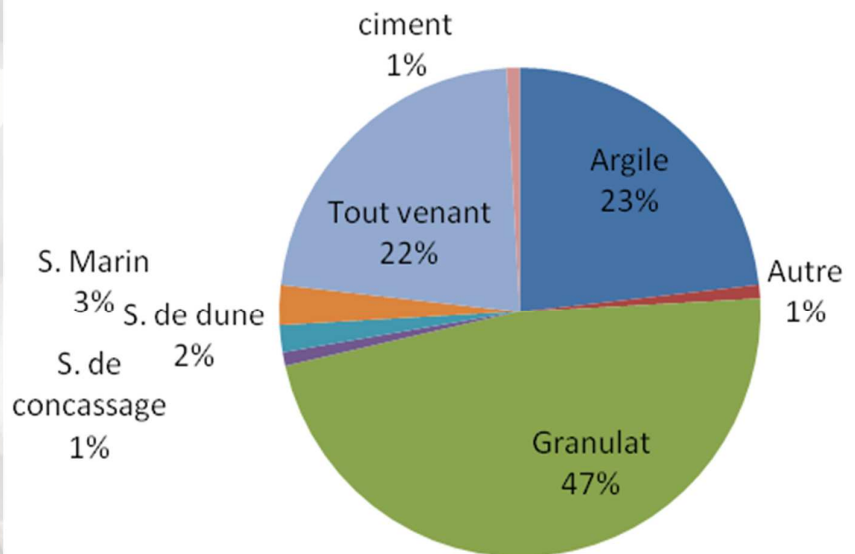


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ANALYSE OF RESULT

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The materials extracted in the region vary between materials derived from crushing of massive rocks, clays, alluvial Sand, dune sands or marine sand. The exploitations in the region Tangiers- Tetuan are intended exclusively for the production of the construction materials (aggregate, cement, precast concrete, concrete, bricks, ceramics,... etc.)



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Web Mapping Conception



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SOFTWARES

Data Layer

- Geological Map
- PostGIS DB
- Imagery Satellitaire
- RS\GIS data
- Forest Inventory
- Other Non-Spatial data

Application Layer

- WMS
- WFS
- JAVA
- SCRIPT
- PHP
- GEO SERVER
- POSTGRES/POSTGIS

Presentation Layer

- Public User View
- Custom FC User View
- Custom FC ADMIN View



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Conception of Web Mapping



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The screenshot shows a web browser window displaying a web mapping application. The URL is http://localhost:8080/geoexplorer/composer/?layers=North_Morocco_Geology%3Atetouan_fin&bbox=-612114. The interface includes a map of Tetouan, Morocco, with geological data layers. The 'Layers' panel on the left shows 'Overlays' and 'Base Maps'. The 'Feature Info' window displays the following data:

Name	Value
codegeol	travertins
formationD	alternances d...
lithologie	grès-pélinesm...
litholog_1	grès-pélines
PIPA_AR	0.0
PIPA_CNT	0
litholog_2	Siliceux
gisement	

Other feature info windows show a list of features with IDs like tetouan_fin.3775, tetouan_fin.3795, tetouan_fin.3796, tetouan_fin.7767, tetouan_fin.7787, and tetouan_fin.7788. The map includes a scale bar (10 km, 5 m) and a scale of 1:545977.

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Conclusion

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- There is a large variation of quarries production, and comes from the inequitable needs from different sites.
- The design of this database throughout the region of Tetouan, will help us to draw up the sectorial plan of materials on the region entire.

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Thank you

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