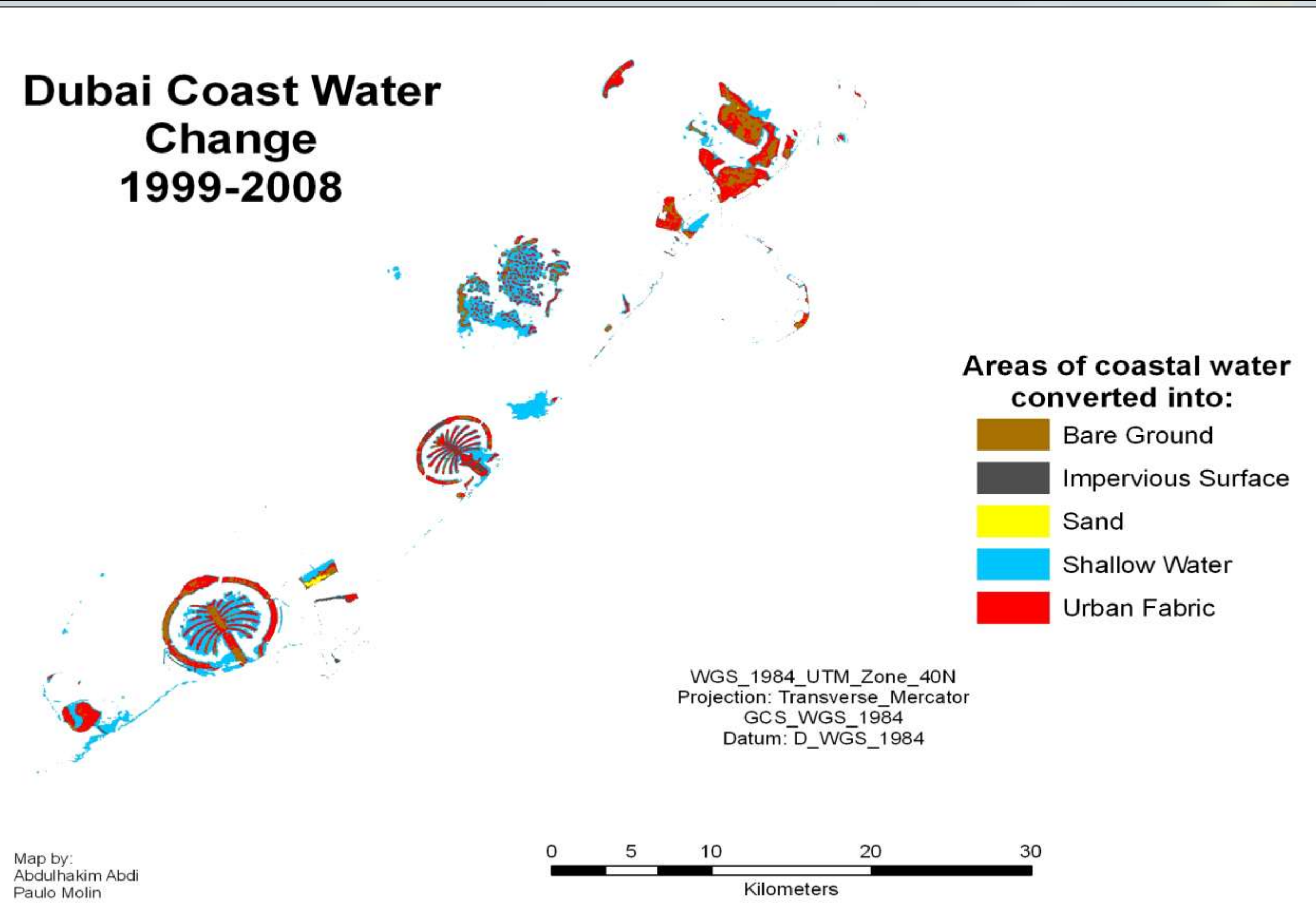
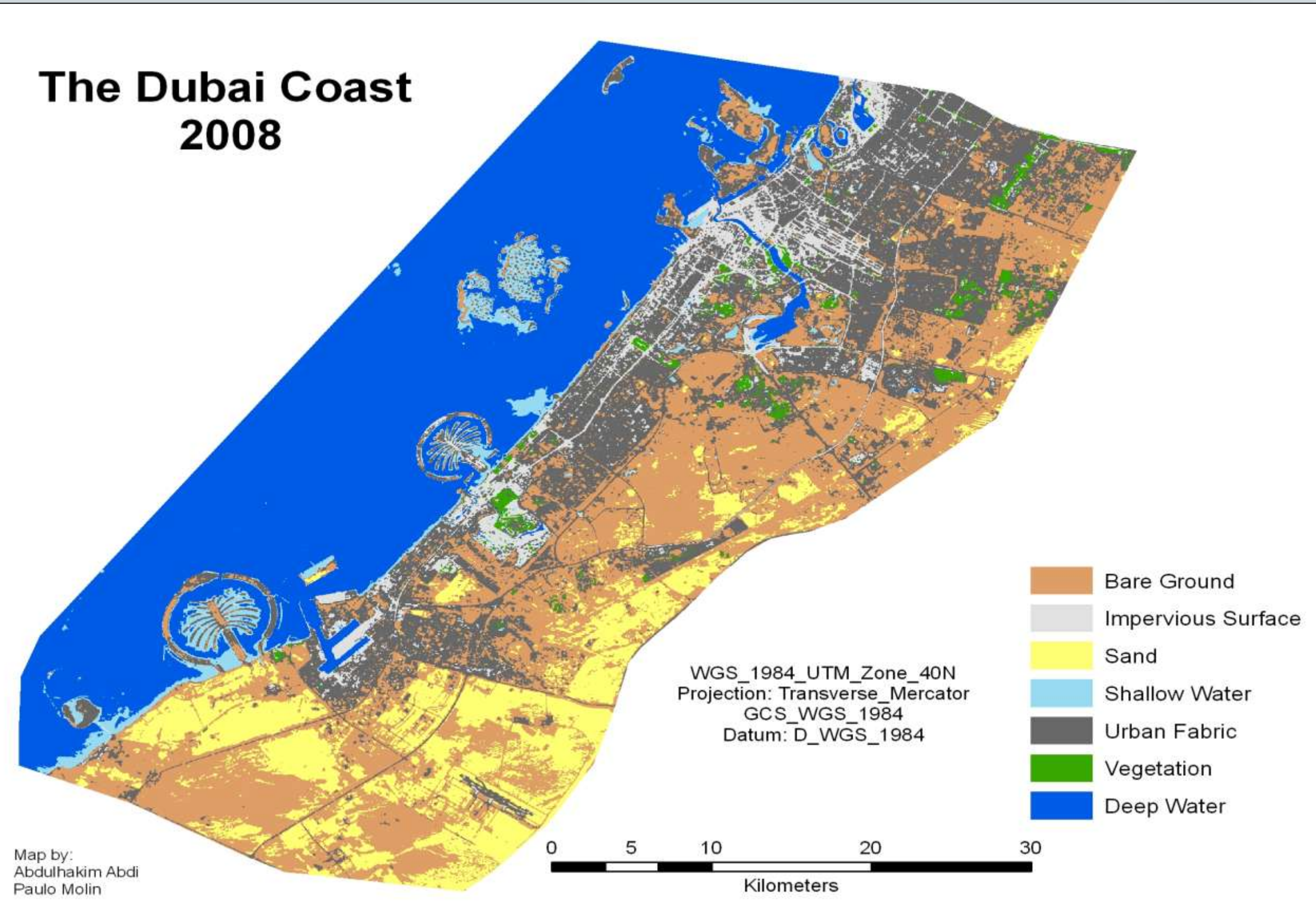
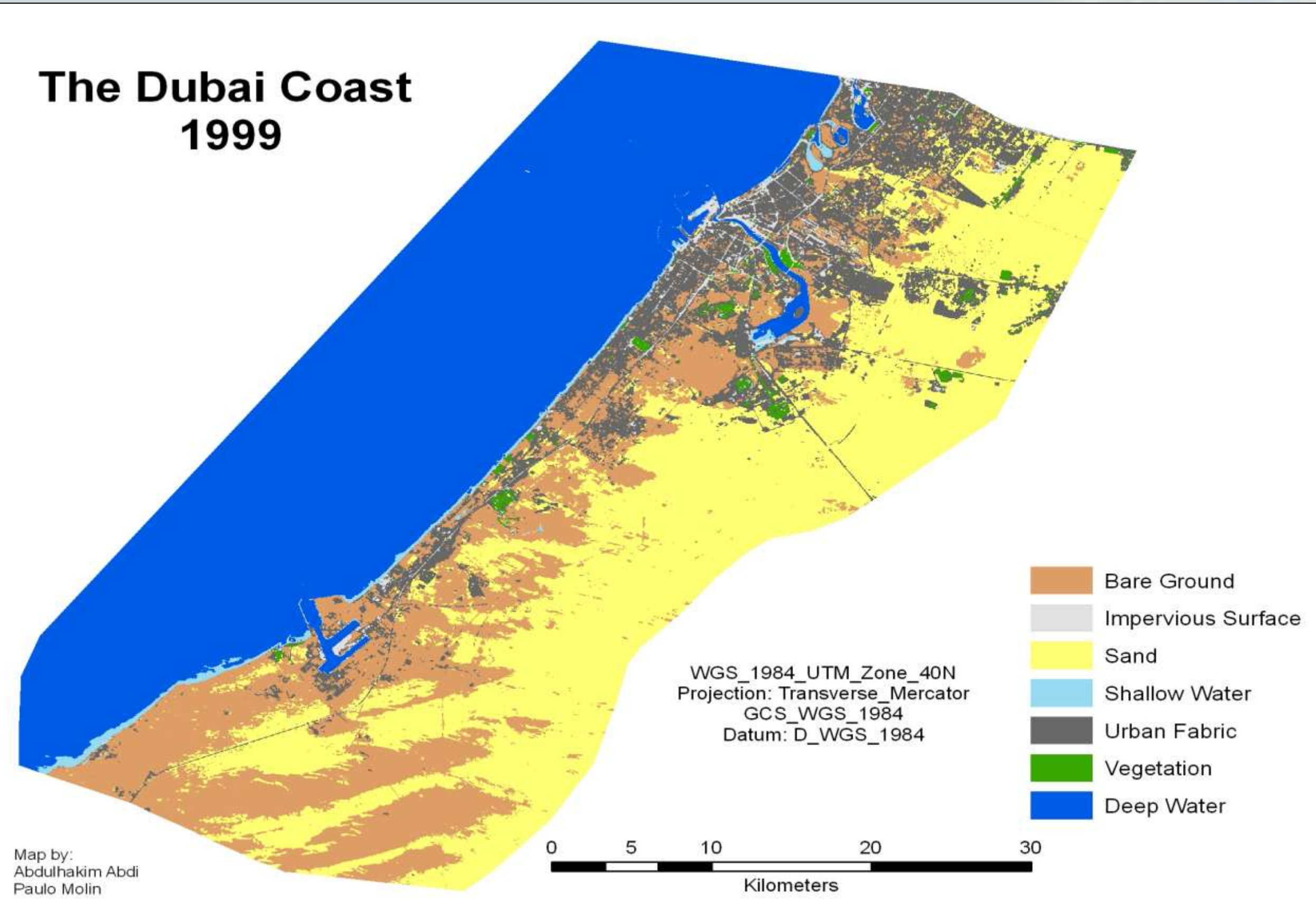


Coastal Change Analysis Using Remote Sensing

A Case of Dubai, UAE

Abdulkhaki ABDI
 Instituto Superior de Estatística e
 Gestão de Informação
 Universidade Nova de Lisboa
 hakim.abdi@gmail.com
<http://isegi.unl.pt>

Paulo Guilherme MOLIN
 Institut für Geoinformatik
 Westfälische Wilhelms-
 Universität Münster
 pgmolin@gmail.com
<http://ifgi.uni-muenster.de>



Introduction

The emirate of Dubai is the most populous and most developed of the seven emirates that comprise the United Arab Emirates (UAE). During the last ten years the emirate has gradually shifted its economy from being petroleum-based to a focus on tourism and business. Dubai city has been growing rapidly; the population in 1999 was 862,000 inhabitants, a figure that ballooned 290% in ten years to 2.5 million by the end of 2008. This growth has been accompanied by ambitious land reclamation projects that include artificial islands such as “The Palm Islands” and “The World” as well as other developmental schemes that aim to raise the quality of life in the city.

Objectives

The objectives of this study is to utilize remote sensing as a tool to monitor coastal development in Dubai and quantify the amount of coastal alteration between 1999 and 2008.

Methodology

We used two Landsat ETM+ images from the same season in both years. Both images underwent classification and post-classification analysis for the quantification of coastal urbanization, which also includes near-shore land reclamation. Accuracy assessment of the classified imagery was done using high resolution imagery .

1999

Overall Accuracy = 91.86%
 Kappa Coefficient = 0.88

2008

Overall Accuracy = 83.99%
 Kappa Coefficient = 0.80

Results

The results show that in offshore deep water:
 53.58 sq.km. has been transformed into **shallow water**
 35.06 sq.km. has been transformed into **urban fabric**
 16.46 sq.km. has been transformed into **bare ground**
 10.41 sq.km. has been transformed into **impervious surfaces**

In the shallow water category:
 4.93 sq.km has been converted into **deep water** which is a sign of dredging activities

In the bare ground category:
 131.62 sq.km. along the coast has been transformed to **urban fabric** and signifies intensive development of coastal zone properties.

Overall, there has been a **30%** change in the landscape of the study area over 10 years.

Conclusion

It has been demonstrated that change detection techniques in remote sensing are a viable tool in monitoring rapidly growing coastal cities such as Dubai for the sake of sustainable development and management. Coastal developments such as these alter the shoreline and not only interfere with the sediment transport mechanisms but also have the potential to cause environmental impacts. Therefore, mapping the extent of coastal development is an essential precautionary measure.