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THE POTENTIALS OF USING SATELLITE IMAGES FOR MAP UPDATING: A CASE STUDY OF ONITSHA SOUTH EAST NIGERIA

Chuma Obiamaka Vivian
Department of Hospitality and Tourism
Federal University Wukari,
Taraba State, Nigeria.

Asogwa Vivian Ndidiamaka
Department of Surveying and Geoinformatics
,
Federal Polytechnic Nekede Owerri,
Nigeria

Dante Angyu Budi
Department of Hospitality and Tourism Federal University
Wukari, Taraba State,
Nigeria.

ABSTRACT

Maps can be updated using satellite imageries, satellite imageries ranges from high to low resolution. In this study ikonos and cropped out imageries from Google earth was used. ikonos was for 2005 while the cropped imagery was for 2008. Comparism to identify changes over the years was done which eventually lead to the production of an updated map of Onitsha.

The main differences were in resolution, accuracy and change in features. The satellite imageries were digitized n Arc GIs software. Field work was conducted to gather sample of recent features in the study area ad to verify what was seen on the image to ground. The various layers of the first two satellites were brought together and thoroughly examined. The changes observed were then used to produce updated map of Onitsha.

KEYWORDS: ***Spatial, Resolution, Satellite Imagery, Ikonos, Google***

INTRODUCTION

Updating of maps are very essential for the growth of any environment. Satellite imageries has also made it easier. Therefore**,** This high resolution of the imagery reveals very fine details in urban areas and greatly facilitates the classification and extraction of urban-related features such as buildings Jin et al 205

The availability of high resolution satellite imagery has led to increased interest in the use of satellite data for large scale mapping applications and detailed land use assessment Amuyunzu et al 1999

The IKONOS satellite simultaneously collects 1-m panchromatic and 4-m multispectral images, providing the commercial and scientific community with a dramatic improvement in spatial resolution over previously available satellite imagery. The sun-synchronous IKONOS orbit provides global coverage, consistent access times, and near-nadir viewing angles. The system is capable of 1:10,000 scale mapping without ground control and 1:2400 scale mapping with ground control. The IKONOS ground station produces radiometric ally corrected images, georectified images, orthorectified images, stereo pairs, and digital elevation models (DEMs) for image analysis, photogrammetric, and cartographic applications. Gene et al 2003

High-resolution image from the IKONOS may be useful for many resource management applications. Scot et al 2003

Satellite imagery can augment, and in some cases even replace, M&E data collected from traditional methods on the ground. Goldilocks Deep Dive 2016

MATERIAL AND METHODS

The study was carried out on Onitsha South East Nigeria. Four major datasets were used for the study Ikonos satellite imagery, 1/50,000 topographic map of the study area, cropped out imagery from Google Earth and randomly distributed GPS point data covering the study area. The dataset used in this are sourced from different places. The datasets and their sources are given below:

Dataset	Source	Scale/Resolution/Order	Format
Ikonos satellite imagery (2005)	National centre for Remote Sensing , jos Plateau State	0.6 m spatial resolution	GeoTiff
Topographic map (sheet 300)	Federal Surveys Obalende Lagos State	1/50,000	JPEG
GPS point data (Differential GPS)	Magellan professional (borrowed from the federal polytechnic ilaro, ogun state)	1st/2nd order	Soft copy
Cropped out Google Earth imagery			

The Ikonos satellite imagery was digitized in Arc Gis 9.3 and all the layers brought together, then the study area was cropped out from 2008 Google Earth Satellite imagery , Georeferenced, merged and digitized. The layers from both Ikonos and Google Earth Satellite Imagery were examined thoroughly to determine the various changes which have occurred overtime. Then an overlay of both imageries was done to produce an updated map.

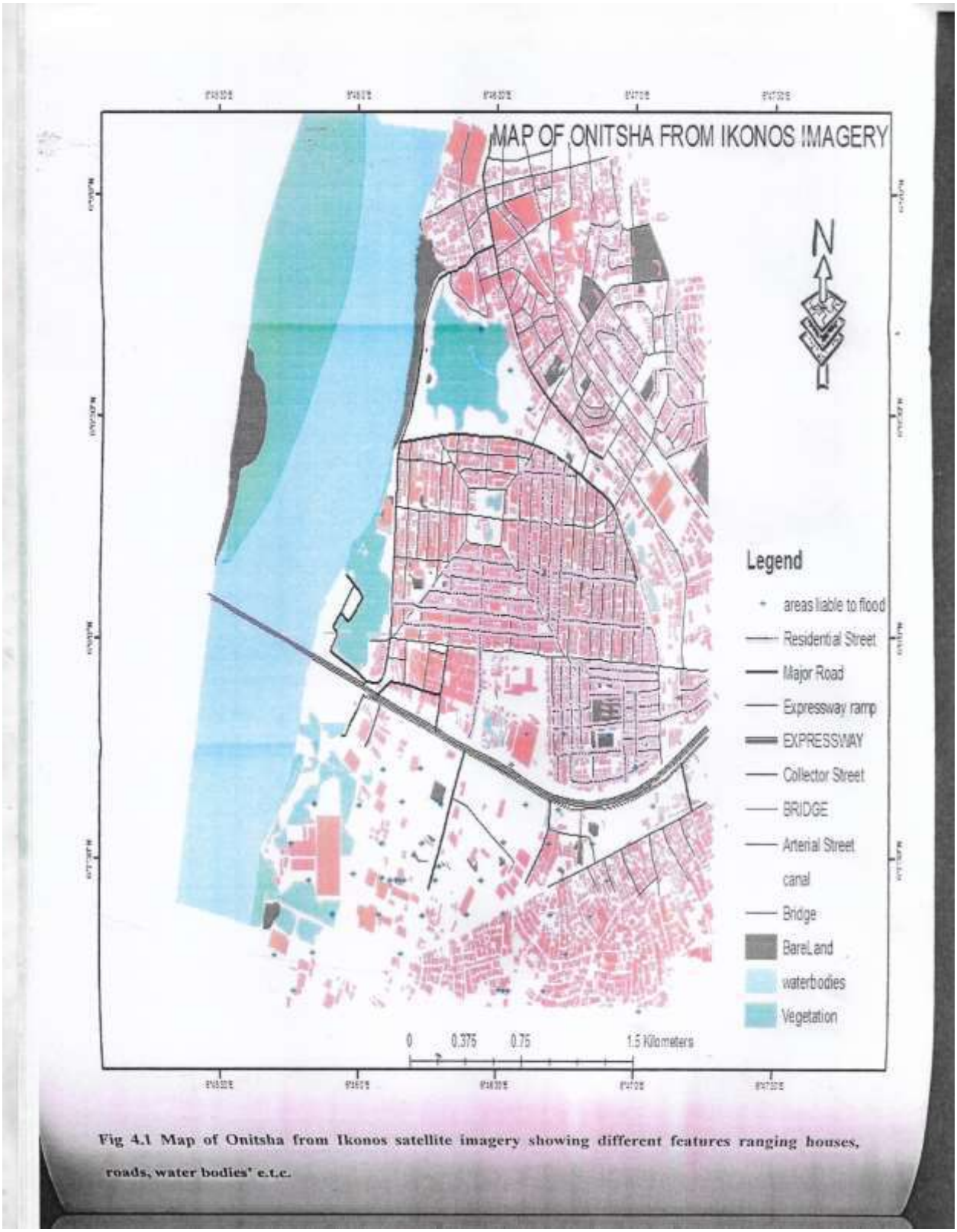

Fig 1

The second was satellite imagery cropped out from Google Earth was also used for comparism

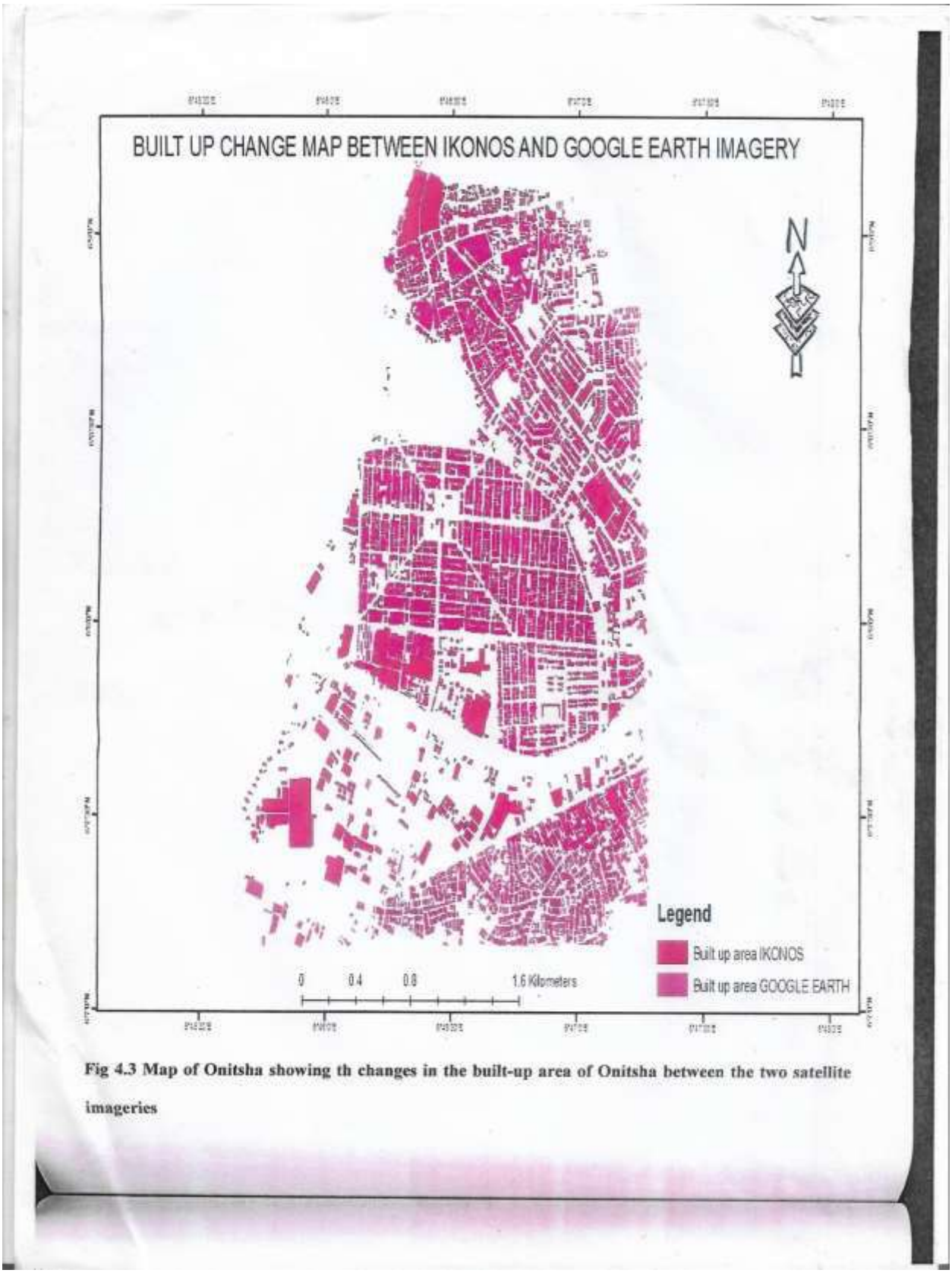

Fig 4.3 Map of Onitsha showing th changes in the built-up area of Onitsha between the two satellite imageries

Fig 1.0

RESULT AND DISCUSSION

The various results obtained during the course of this research are presented here, an in depth step of each results is also presented here. The various images, maps and the tables below are some of the end products of the processed data obtained during the research.

The various images shown are some of the results obtained during the course of the study. Figure 1 shows the map produced from ikonos satellite imagery while fig 1.0 shows the updated map produced

Since the two satellite imageries are of different dates 2005 for Ikonos and 2008 for Google Earth respectively, thorough examination was done on both satellite imageries and it was discovered that there was an increase in the built up areas in the Google Earth meaning that houses has increased within the three years interval. Secondly it was also discovered that the new houses are still clustered together just like the old ones thereby giving room to flooding, the third observation Is the difference in resolution the features in the Ikonos imageries were brighter because it's of a higher resolution

Furthermore, the research was geared towards producing an up to date of Onitsha which will enhance proper planning and giving warning in cases of natural disaster such as flooding in parts of Onitsha, it also examined the various changes which have occurred in the study area by a comprehensive analysis between the images. The various processing tasks executed were based on a 0.6 resolution of Ikonos and Google Earth imagery of the study capture at close range. 1: 50,000 topographic maps of the test site and DGPS point readings. Analyses presented in this paper indicates increase in built- up areas.

These findings therefore indicate that the new map produced can be used for proper planning of the study area and forewarning for those areas liable to natural disaster such as flooding.

In addition to all of the above, the following recommendations were put forward:

- With this topographic map produced , proper drainage system should be put in place which will take the place of the deteriorated and blocked drainage existing in some areas and an effective maintenance culture should be encouraged which will monitor and consistently remove deposited materials from drainage lines.
- An effective meteorological forecast service should be set up which will provide weather data regularly for the forewarning in cases of flooding.
- The public should be enlighten and educated on the disadvantages of erecting building any how without using original master plan.
- An active commission should be established in Onitsha and its environs on the management of river Niger which t will look into the issue of sudden release of water.
- Research of this nature should be encourage with regular data collection i.e consistent production of current maps

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