Lake Abiad: New building structures and road works near northern/southern Sudanese border

ANALYSIS SUMMARY: This analysis shows the village at the southern edge of Lake Abiad in South Sudan. Four very high resolution satellite images were acquired and analyzed. The time sequence spans from summer 2010 to January 2011. Please see the timeline below for further details. The report shows two significant changes, first a new development area with hundreds of new structures, possibly tents, and a road that appeared after 15 January 2011.

This timeline shows the satellite image acquisitions which were considered in this analysis report.

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ANALYSIS: This is a satellite based qualitative analysis map series showing the most recent development close to Lake Abiad, Sudan. For this analysis four very high resolution images were available, including GeoEye-1 images from the 10 July & 30 September 2010 and 15 January 2011 as well as a most recent WorldView 2 image from the 26 January 2011. During this period two significant observations were made: firstly the development of building structures between the lake and the village and secondly the construction of a larger road.

The focus maps 1 and 2 show areas of building structures which appeared between the 30 September 2010 and 15 January 2011. Approximately 260 new building structures/tents showed up. They are located 200m south of the lake and divided into two sections with a separation of approximately 300m. Each section shows a more or less ordered structure of buildings, which differs greatly from other village areas. Also the density of buildings is high and not comparable to other parts of the village. It is noteworthy that these buildings are not encircled by a fence or within a compound.

A count of already existing buildings (buildings that were visible between the 10 July 2010 and 26 January 2011) in the area resulted in about 890 permanent buildings. Therefore an increase of 260 new buildings is a significant change for this village.

The second development is the road that connects to the mentioned village to the North. This development occurred between the 15 and 26 January 2011. Within this relatively short time span of 11 days an approximately 9,500m long road segment was constructed. However, this figure is only valid for the analyzed extent for which an image was available. The road bypasses Lake Abiad and is for most sections relatively straight additionally the width is between 12 and 20m which indicates the construction of a primary road.
**OVERVIEW OF NEW BUILDING STRUCTURES AND ROAD WORKS NEAR LAKE ABIAD**

This overview shows the village south of Lake Abiad, changes are marked and roads/paths are visualized as well. This image was acquired on the 26 January 2011. In the North of the scene is Lake Abiad and 200m further south an area with recent development was detected, see focus map 1 and 2 for more details. In the lower centre of the map extent is the village itself which is now connected to a very recently created road which bypasses the east side of the lake, see focus map 3 for further details about the road.

Please note that the map frame is rotated by 30 degrees.

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**VISUAL SATELLITE ASSESSMENT:**

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**Legend**

- New road (26 January 2011)
- Path

Satellite Imagery (4): WorldView-2
Resolution: 0.5m
Imagery Date: 26 January 2011
Source: DigitalGlobe
Copyright: DigitalGlobe 2011
Report Analysis: UNITAR / UNOSAT
Projection: UTM Zone 35N
Datum: WGS-84
Produced using ArcGIS
**FOCUS 1: TEMPORAL COMPARISON OF DEVELOPMENT EAST SECTION**

**Security Event**
14 February 2011
12:00 UTC - Version 1.0
CE-2010-001201-SDN

This focus map shows the comparison of two images acquired on the 30 September 2010 and 26 January 2011. Within this time 260 new building structures appeared south of Lake Abiad and north of the village nearby – only the eastern section with 140 buildings is shown in this subset. The structures were already visible in the GeoEye-1 image from the 15 of January 2011 and have not changed in the following 11 days of observation. The building structures are dense and compared to other areas of the village relatively ordered, but without compound/fence.

**VISUAL SATELLITE ASSESSMENT:**

**Satellite Imagery (left):** GeoEye-1
**Resolution:** 0.5m
**Imagery Date:** 30 Sept. 2010
**Source:** GeoEye
**Copyright:** GeoEye 2011

**Satellite Imagery (right):** WorldView-2
**Resolution:** 0.5m
**Imagery Date:** 26 January 2011
**Source:** DigitalGlobe
**Copyright:** DigitalGlobe 2011

**Report Analysis:** UNITAR / UNOSAT

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Produced using ArcGIS
FOCUS 2: TEMPORAL COMPARISON OF DEVELOPMENT WEST SECTION

30 SEPTEMBER 2010

26 JANUARY 2011

VISUAL SATELLITE ASSESSMENT:
This focus map shows the comparison of two images acquired on the 30 September 2010 and 26 January 2011. This subset shows the western section of the mentioned development where approximately 120 new building structures appeared. The distance between both areas is around 300m. These structures were already visible in the GeoEye-1 image from the 15 of January 2011 and have not changed in the following 11 days of observation. The building structures are dense and compared to other areas of the village are relatively ordered, but without compound/fence.

No human activity as of 30 September 2010

Approximately 120 new buildings in this area appeared after the 30 September 2010

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Satellite Imagery (left): GeoEye-1
Resolution: 0.5m
Imagery Date: 30 Sept. 2010
Source: GeoEye
Copyright: GeoEye 2011

Satellite Imagery (right): WorldView-2
Resolution: 0.5m
Imagery Date: 26 January 2011
Source: DigitalGlobe
Copyright: DigitalGlobe 2011

Report Analysis: UNITAR / UNOSAT
Projection: UTM Zone 35N
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FOCUS 3: NORTH-SOUTH ROAD CLOSE TO LAKE ABIAD - MOST RECENT DEVELOPMENT

15 JANUARY 2011

26 JANUARY 2011

New road is visible in the image from 26 January 2011

Savanna like environment on the 15 January 2011

VISUAL SATELLITE ASSESSMENT:

This focus map shows the comparison of two images acquired on the 15 and 26 January 2011. Within a time span of 11 days a road was constructed which bypasses Lake Abiad and stretches from the North to the South where it connects to a already existing road of the same kind. However, the road seems to be preliminary and not fully completed. The available image extent shows a road length of approximately 9,500m and a width between 12 and 20m. From the pre-image on the left (15 January 2011) it is evident that this land was not influenced by human activity before.

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