CMS: LiDAR Data for Mangrove Forests in the Zambezi River Delta, Mozambique, 2014

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Documentation Revision Date: 2017-07-19

Data Set Version: 1

Summary

This data set provides high-resolution LiDAR point cloud data collected during surveys over mangrove forests in the Zambezi River Delta in Mozambique in May 2014. The data are arranged into 144 1- by 1-km tiles.

This data set contains 144 data files in LiDAR .laz file format and one file in ESRI Shapefile format providing the tile footprints.

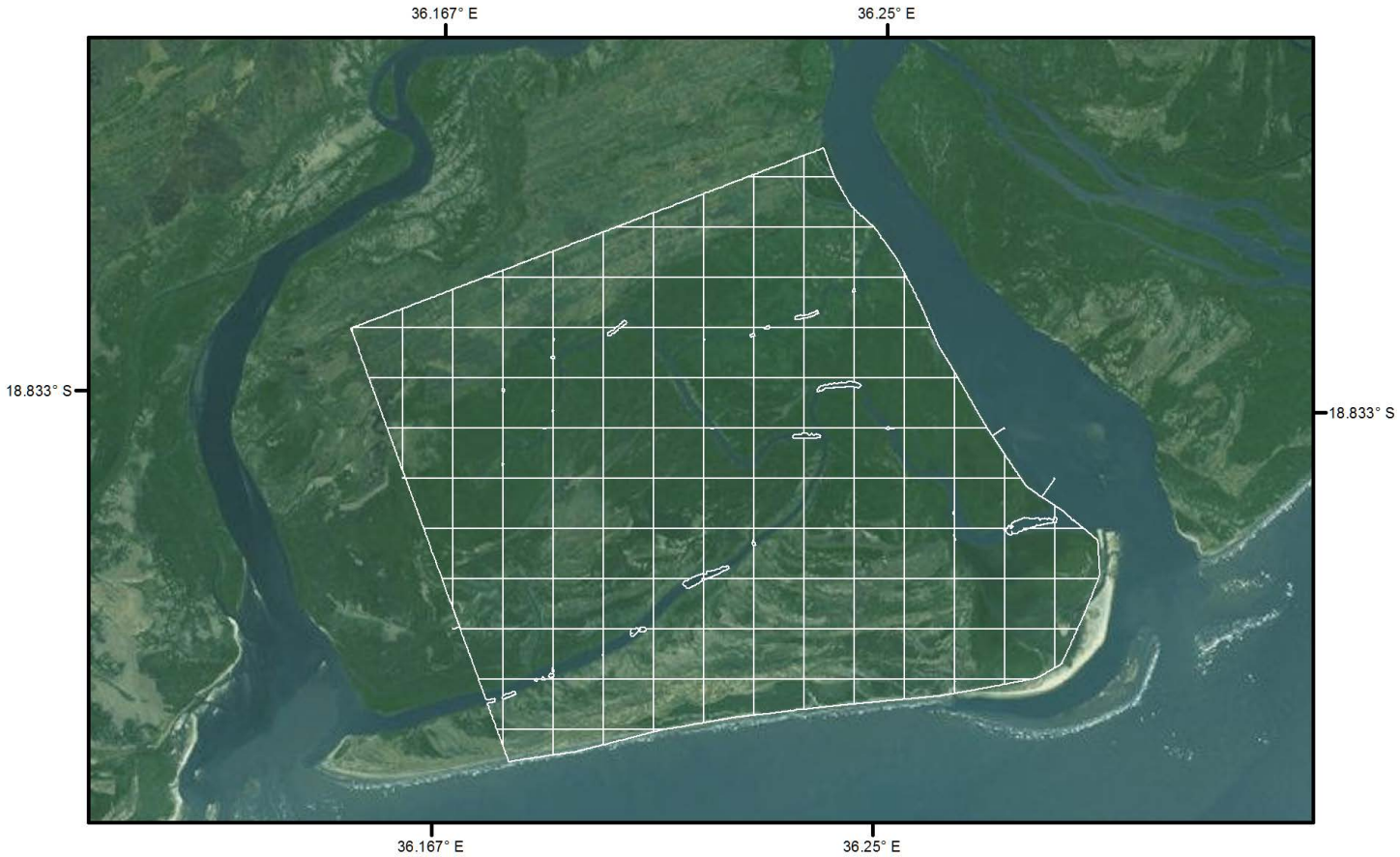

Figure 1. Boundaries of the 144 LiDAR point cloud tiles from ZambeziDeltaTiles.shp

Citation

Fatoyinbo, T., and C. Trettin. 2017. CMS: LiDAR Data for Mangrove Forests in the Zambezi River Delta, Mozambique, 2014. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1521

Table of Contents

1. Data Set Overview

This data set provides high-resolution LiDAR point cloud data collected during surveys over mangrove forested land in the Zambezi River Delta in Mozambique in May 2014. The data are arranged into 144 1- by 1-km tiles.

Project: Carbon Monitoring System (CMS)

The NASA Carbon Monitoring System (CMS) is designed to make significant contributions in characterizing, quantifying, understanding, and predicting the evolution of global carbon sources and sinks through improved monitoring of carbon stocks and fluxes. The System will use the full range of NASA satellite observations and modeling/analysis capabilities to establish the accuracy, quantitative uncertainties, and utility of products for supporting national and international policy, regulatory, and management activities. CMS will maintain a global emphasis while providing finer scale regional information, utilizing space-based and surface-based data and will rapidly initiate generation and distribution of products both for user evaluation and to inform near-term policy development and planning.

Related Data Sets:

Lagomasino, D., T. Fatoyinbo, S. Lee, E. Feliciano, M. Simard, and C. Trettin. 2016. CMS: Mangrove Canopy Height Estimates from Remote Imagery, Zambezi Delta, Mozambique. ORNL DAAC, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1357

Fatoyinbo, T., E.A. Feliciano, D. Lagomasino, S.K. Lee, C. Trettin. 2017. CMS: Mangrove Structure and Biomass in the Zambezi River Delta, Mozambique, 2014. ORNL DAAC, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1522

Acknowledgements:

This data collection was funded through CMS Project grant number 14-CMS14-0028.

2. Data Characteristics

Spatial Coverage: Mangrove forested land of the Zambezi River Delta, Mozambique

Spatial Resolution: < 1 meter

Temporal Resolution: one day

Temporal Coverage: measurements were taken on a single day: 20140505

Spatial Extent: (All latitude and longitude given in decimal degrees)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Zambezi River Delta, Mozambique	36.2918	36.1495	-18.7928	-18.8930

Data File Information

There are 144 compressed LiDAR point cloud (LAZ; *.laz) data files and one ESRI Shapefile (*.shp) included in this data set. The shapefile has four files provided in a zipped folder (*ZambeziDeltaTiles.zip*) and contains the footprint of each LAZ file as a feature record identified by the "FILE" attribute. The spatial reference properties for the data files are listed below.

LAZ files are numbered sequentially by location from north-west to south-east, e.g. *ZambeziDelta001.laz*

The shapefile is also provided as a companion file in KMZ (*.kmz) format for viewing in Google Earth.

Spatial Reference Properties

WGS 84 / UTM 36S
Authority: Custom

Projection: Transverse_Mercator
false_easting: 500000.0
false_northing: 10000000.0
central_meridian: 33.0
scale_factor: 0.9996
latitude_of_origin: 0.0
Linear Unit: Meter (1.0)

Geographic Coordinate System: GCS_WGS_1984
Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_WGS_1984
Spheroid: WGS_1984
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314245179
Inverse Flattening: 298.257223563

3. Application and Derivation

This data set provides the basis for aboveground biomass estimates of tall mangrove forests in the Zambezi Delta, Mozambique. Mangroves are ecologically and economically important forested wetlands with the highest carbon density of all terrestrial ecosystems. Because of their large carbon stocks and importance as a coastal buffer, their protection and restoration has been proposed as effective mitigation strategy for climate change and coastline loss.

4. Quality Assessment

No uncertainty estimates are provided with this data set.

5. Data Acquisition, Materials, and Methods

Site Description

The Zambezi River sheds water from a 1,570,000 km^2 area encompassing eight African countries and eventually discharges into the Indian Ocean via the Zambezi Delta. The wet season occurs from April to October with approximately 1,000 to 1,400 mm annual rainfall.

Airborne LiDAR Survey

To compare, enhance, and validate spaceborne-based assessments, airborne LiDAR data were acquired 5 May 2014 by Land Resources International (Pietermaritzburg, South Africa). The airborne survey comprised an approximate area of 115 km^2 in the Zambezi Delta region, Mozambique, with a point density that ranged between 5 and 7 points per m^2 (Lagomasino et al., 2016). The data were processed in Global Mapper and arranged into 144 1-km^2 tiles for distribution with this data package.

Canopy height models and biomass estimates generated using the point cloud data are available in the related data sets listed above in the Data Set Overview section.

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

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Contact for Data Center Access Information:

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7. References

Lagomasino, D., Fatoyinbo, T., Lee, S., Feliciano, L., Trettin, C., and Simard, M. A Comparison of Mangrove Canopy Height Using Multiple Independent Measurements from Land, Air, and Space. *Remote Sens.* 2016, *8*(4), 327; https://doi.org/10.3390/rs8040327