

WSCI Data Dictionary

Dimension Variable	Description
MT	Number of shots

Group: /				
short_name	(Attribute)	GEDI04_C		
Group:/METADATA/Dataset Identification				
abstract	(Attribute)	The GEDI04_C standard data product contains predictions of the waveform structural complexity index (WSCI) within each laser footprint		
characterSet	(Attribute)	utf8		
creationDate	(Attribute)	File creation date		
credit	(Attribute)	The software that generates the WSCI product was implemented at the Department of Geographical Sciences at the University of Maryland (UMD)		
fileName	(Attribute)	Original file name		
language	(Attribute)	Eng		
Originator Organization Name	(Attribute)	GEDI Science Data Processing System and University of Maryland		
PGEVersion	(Attribute)	Product generating executive SDPS release ID		
purpose	(Attribute)	The purpose of the WSCI dataset is to provide an estimate of forest structural complexity, similarly to what is measured by airborne LiDAR in the 3D space, using GEDI waveforms		
shortName	(Attribute)	GEDI04_C		
spatialRepresentationType	(Attribute)	Along-track		
status	(Attribute)	On Going		
topicCategory	(Attribute)	Geoscientific Information		
uuid	(Attribute)	Universally unique identifier (UUID) for this file		
VersionID	(Attribute)	SDPS DAAC release ID		
gedi_l4a_githash	(Attribute)	Git commit hash of the software used to create the WSCI file		
Group:/BEAMXXXX				
Label	Datatype (Dimensions)	long_name	Units source	Description

algorithm_run_flag	UINT8 MT	Algorithm run flag	-	The WSCI algorithm is run if this flag is set to 1. This flag selects data which have sufficient waveform fidelity for WSCI estimation.
beam	UINT16 MT	Beam	- L2A	Beam identifier
channel	UINT8 MT	Channel	- L2A	Channel identifier
degrade_flag	UINT8 MT	Degrade flag	- L2A	Flag indicating degraded state of pointing and/or positioning information
delta_time	FLOAT64 MT	Delta time	s L2A	Time delta since Jan 1 00:00 2018.
elev_lowestmode	FLOAT32 MT	Elevation of the lowest mode	m L2A	Elevation of center of lowest mode relative to reference ellipsoid
elev_outlier_flag	UINT8 MT	Elevation outlier flag	- L4B	Flag indicating shot is from a section of an orbit with L2A canopy elevation metrics classified as large outliers relative to reference data
fhd_normal	FLOAT64 MT	Foliage Height Diversity	m L2B	Foliage height diversity index calculated by vertical foliage profile normalized by total plant area index
l2_quality_flag	UINT8 MT	L2A quality flag	- L2A	Flag identifying the most useful L2A data for WSCI predictions
lat_lowestmode	FLOAT64 MT	Latitude of the lowest mode	degrees L2A	Latitude of center of lowest mode
lon_lowestmode	FLOAT64 MT	Longitude of the lowest mode	degrees L2A	Longitude of center of lowest mode
master_frac	FLOAT64 MT	Fraction component of shot time	s L2A	Master time, fractional part. master_int+master_frac is equivalent to /BEAMXXXX/delta_time.
master_int	UINT32 MT	Integer component of shot time	s L2A	Master time, integer part. Seconds since master_time_epoch.

				master_int+master_frac is equivalent to /BEAMXXXX/delta_time.
selected_algorithm	UINT8 MT	Selected algorithm setting group	- L2A	Selected algorithm setting group
sensitivity	FLOAT32 MT	Beam sensitivity	- L2A	Maximum canopy cover that can be penetrated considering the SNR of the waveform
shot_number	UINT64 MT	Shot number	- L2A	Shot number
solar_elevation	FLOAT32 MT	Solar elevation	degrees L2A	Solar elevation angle
surface_flag	UINT8 MT	Surface flag	- L2A	Indicates elev_lowestmode is within 300m of Digital Elevation Model (DEM) or Mean Sea Surface (MSS) elevation
wsci	FLOAT32 MT	Waveform Structural Complexity Index	-	Predicted 3D canopy entropy from the corresponding Plant Functional Type (PFT) model
wsci_pi_lower	FLOAT32 MT	Waveform Structural Complexity Index lower prediction interval	-	Lower prediction interval at 95% confidence
wsci_pi_upper	FLOAT32 MT	Waveform Structural Complexity Index upper prediction interval	-	Upper prediction interval at 95% confidence
wsci_quality_flag	UINT8 MT	WSCI quality flag	-	Flag simplifying selection of most useful WSCI predictions
wsci_xy	FLOAT32 MT	Horizontal Structural Complexity	-	Predicted WSCI horizontal term over the XY plane within the footprint
wsci_xy_pi_lower	FLOAT32 MT	Horizontal Structural Complexity	-	Lower prediction interval at 95% confidence

		lower prediction interval		
wsci_xy_pi_upper	FLOAT32 MT	Horizontal Structural Complexity upper prediction interval	-	Upper prediction interval at 95% confidence
wsci_z	FLOAT32 MT	Vertical Structural Complexity	-	Predicted WSCI vertical term along the Z axis within the footprint
wsci_z_pi_lower	FLOAT32 MT	Vertical Structural Complexity lower prediction interval	-	Lower prediction interval at 95% confidence
wsci_z_pi_upper	FLOAT32 MT	Vertical Structural Complexity upper prediction interval	-	Upper prediction interval at 95% confidence

Group:/BEAMXXXX/geolocation

Label	Datatype (Dimensions)	long_name	Units source	Description
elev_lowestmode_aN	FLOAT32 MT	Elevation of the lowest mode	m L2A	Elevation of center of lowest mode relative to reference ellipsoid
lat_lowestmode_aN	FLOAT64 MT	Latitude of the lowest mode	degrees L2A	Latitude of center of lowest mode
lon_lowestmode_aN	FLOAT64 MT	Longitude of the lowest mode	degrees L2A	Longitude of center of lowest mode
sensitivity_aN	FLOAT32 MT	Beam sensitivity	- L2A	Maximum canopy cover that can be penetrated considering the SNR of the waveform
shot_number	UINT64 MT	Shot number	- L2A	Shot number

stale_return_flag	UINT8 MT	Stale return flag	- L2A	Flag from digitizer indicating the real-time pulse detection algorithm did not detect a return signal above its detection threshold within the entire 10 km search window. The pulse location of the previous shot was used to select the telemetered waveform.
-------------------	-------------	----------------------	----------	---

Group:/BEAMXXXX/land_cover_data

Label	Datatype (Dimensions)	long_name	Units source	Description
landsat_treecover	FLOAT64 MT	Landsat tree canopy cover	percent L2A	Tree cover in the year 2010, defined as canopy closure for all vegetation taller than 5m in height (Hansen et al., 2013). Encoded as a percentage per output grid cell.
landsat_water_persistence	UINT8 MT	25 m Landsat water persistence	percent L2A	The percent UMD GLAD Landsat observations with classified surface water between 2018 and 2019. Values > 80 usually represent permanent water while values < 10 represent permanent land.
leaf_off_doy	INT16	1 km VIIRS leaf-off day- of-year	days L4A	GEDI 1 km EASE 2.0 grid leaf-off start day-of-year derived from the NPP VIIRS Global Land Surface Phenology Product.
leaf_off_flag	UINT8 MT	1 km VIIRS leaf-off flag	- L4A	GEDI 1 km EASE 2.0 grid flag derived from leaf_off_doy, leaf_on_doy and pft_class, indicating if the observation was recorded during leaf-off conditions in deciduous needleleaf or broadleaf forests and woodlands. 1 = leaf-off and 0 = leaf-on.
leaf_on_cycle	UINT8	1 km VIIRS leaf-on cycle number	- L4A	Flag that indicates the vegetation growing cycle for leaf-on observations. Values

				are 0 (leaf-off conditions), 1 (cycle 1) or 2 (cycle 2).
leaf_on_doy	INT16	1 km VIIRS leaf-on day-of-year	- L4A	GEDI 1 km EASE 2.0 grid leaf-on start day-of-year derived from the NPP VIIRS Global Land Surface Phenology Product.
pft_class	UINT8	1 km MODIS Plant Functional Type class	- L2A	GEDI 1 km EASE 2.0 grid Plant Functional Type (PFT) derived from the MODIS MCD12Q1v006 Product. Values follow the Land Cover Type 5 Classification scheme.
region_class	UINT8 MT	1 km geographic region class	- L2A	GEDI 1 km EASE 2.0 grid world continental regions (0: Water, 1: Europe, 2: North Asia, 3: Australasia, 4: Africa, 5: South Asia, 6: South America, 7: North America).
shot_number	UINT64 MT	Shot number	- L2A	Shot number
urban_focal_window_size	UINT8 MT	Urban focal window size	pixels L4A	The focal window size used to calculate urban_proportion. Values are 3 (3x3 pixel window size) or 5 (5x5 pixel window size).
urban_proportion	UINT8 MT	25 m TDX urban percentage	percent L4A	The percentage proportion of land area within a focal area surrounding each shot that is urban land cover. Urban land cover is derived from the DLR 12 m resolution TanDEM-X Global Urban Footprint Product.
worldcover_class	INT32 MT	ESA landcover class	-	Land cover class from the European Space Agency WorldCover v200 product

Group:/BEAMXXXX/wsci_prediction

Label	Datatype (Dimensions)	long_name	Units source	Description
algorithm_run_flag_aN	UINT8 MT	Algorithm run flag	-	The algorithm is run if this flag is set to 1. This flag selects data which have sufficient

				waveform fidelity for WSCI estimation.
l2_quality_flag_aN	UINT8 MT	Level 2 quality flag	- L2A	Flag identifying the most useful L2A data for WSCI predictions
shot_number	UINT64 MT	Shot number	- L2A	Shot number
wsci_aN	FLOAT32 MT	Waveform Structural Complexity Index	-	Waveform Structural Complexity Index
wsci_pi_lower_aN	FLOAT32 MT	Waveform Structural Complexity Index lower prediction interval	-	Lower prediction interval at 95% confidence
wsci_pi_upper_aN	FLOAT32 MT	Waveform Structural Complexity Index upper prediction interval	-	Upper prediction interval at 95% confidence
wsci_quality_flag_aN	UINT8 MT	WSCI quality flag	-	Flag simplifying selection of most useful WSCI predictions
wsci_xy_aN	FLOAT32 MT	Horizontal Structural Complexity	-	Horizontal Structural Complexity
wsci_xy_pi_lower_aN	FLOAT32 MT	Horizontal Structural Complexity lower prediction interval	-	Lower prediction interval at 95% confidence
wsci_xy_pi_upper_aN	FLOAT32 MT	Horizontal Structural Complexity upper prediction interval	-	Upper prediction interval at 95% confidence
wsci_z_aN	FLOAT32 MT	Vertical Structural Complexity	-	Vertical Structural Complexity

wsci_z_pi_lower_aN	FLOAT32 MT	Vertical Structural Complexity lower prediction interval	-	Lower prediction interval at 95% confidence
wsci_z_pi_upper_aN	FLOAT32 MT	Vertical Structural Complexity upper prediction interval	-	Upper prediction interval at 95% confidence