

GUF Product Specifications (GUF_DLR_v01):

DLR-DFD Oberpfaffenhofen, 21-November-2016

Specification of the GUF Raw Dataset:

- Global coverage of the Earth's land surface (generated based on ~180.000 single TerraSAR-X/TanDEM-X image products) for the reference year 2011.
- Data collection of satellite imagery between 2011 and 2012 (93 %); single scenes with more recent acquisition dates (2013 / 2014) used to fill data gaps.
- Processing: By an operational processing chain, namely by the Urban Footprint Processor (UFP).
- Projection: Geographic coordinates (Lat, Lon).
- Working units: 5 degree by 5 degree tiles.
- Product: Binary, thematic raster datasets in GeoTiff format (LZW-compressed, 8-bit), with values „255“ for built-up areas and „0“ for non-built-up areas; a built-up area is defined as a region featuring man-made building structures with a vertical component; NoData value is „128“.
- The raw GUF version includes 7 different versions, ranging from version 1 showing very conservative classification settings (strict assignment of settlement areas) to version 7 featuring relaxed classification settings (very comprehensive assignment of potential settlement areas).
- Geometric resolution: original in 0.4 arc seconds (~12 m, near the equator), available only for scientific research; spatially reduced version in 2.8 arc seconds (~84 m, near the equator; ~ 75 m in mid-latitudes).
- Geometric resolution (in arc seconds) is reduced towards the poles; the single scenes North of 55° N are available in different lower resolution – from 55° N up to 65° N in 0.6 arc seconds, from 65° up to 75° N in 0.8 arc seconds, and further up to 85° N in 1.2 arc seconds.

Applied Approach for the GUF Post-Processing:

- Positive and negative reference layers were integrated in the post-processing, for confirming or excluding indicated GUF built-up areas:
 - Positive reference layers (global or regional): e. g. Open Street Map (OSM) roads and settlement data, GlobeLand 30 2010 Land Cover data (class: artificial surfaces), US National Land Cover NLCD 2011 data for USA (classes: Developed, Low to High Intensity), Imperviousness Layer 2012 for the European EEA Countries (as part of the Copernicus Land Services).
 - Negative reference layers: wetlands and water from GlobeLand 30 Land Cover; relief masks derived from SRTM DEM data were used to exclude areas of high surface roughness and areas affected by high direct radar illumination.
- A rule-based approach was used for optimal GUF band selections.
- Partly, an interactive post-editing was additionally done by defining correction polygons.

Name Convention for the delivered tiles (5 degree by 5 degree) in both resolutions:

GUF[Nominal_resolution_in_tenth_arcsec]_[Producer]_[Version]_[Extent_ul-lon_in_degree]_[Extent_ul-lat_in_degree]_[Extent_lr-lon_in_degree]_[Extent_lr-lat_in_degree]_[De-facto-resolution_in_tenth_arcsec]

Example 1: GUF04_DLR_v01_w115_n60_w110_n55_OGR06

Example 2: GUF28_DLR_v01_w115_n60_w110_n55_OGR28

Please use the following citation when using the dataset:

Global Urban Footprint (GUF); DLR 2016.