

Description

travel_time_to_cities_x.tif (x has values from 1 to 12)

The value of each pixel is the estimated travel time in minutes to the nearest urban area in 2015. There are 12 data layers based on different sets of urban areas, defined by their population in year 2015.

x in filename	Population minimum (>=)	Population maximum (<)
1	5,000,000	50,000,000
2	1,000,000	5,000,000
3	500,000	1,000,000
4	200,000	500,000
5	100,000	200,000
6	50,000	100,000
7	20,000	50,000
8	10,000	20,000
9	5,000	10,000
10	20,000	110,000,000
11	50,000	50,000,000
12	5,000	110,000,000

Additional Information

Format

Raster Dataset, GeoTIFF, LZW compressed

Unit

Minutes

Data type

Byte (16 bit Unsigned Integer)

No data value

65535

Flags

None

Spatial resolution

30 arc seconds

Spatial extent

Upper left -180, 85
Lower left -180, -60
Upper right 180, 85
Lower right 180, -60

Spatial Reference System (SRS)

EPSG:4326 - WGS84 - Geographic Coordinate System (lat/long)

Temporal resolution

2015

Temporal extent

Updates may follow for future years, but these are dependent on the availability of updated inputs on travel times and city locations and populations.

Methodology

Travel time to the nearest city was estimated using an accumulated cost function (accCost) in the gdistance R package (van Etten, 2018). This function requires two input datasets: (i) a set of locations to estimate travel time to and (ii) a transition matrix that represents the cost or time to travel across a surface.

The set of locations were based on populated urban areas in the 2016 version of the Joint Research Centre's Global Human Settlement Layers (GHSL) datasets (Pesaresi and Freire, 2016) that represent low density (LDC) urban clusters and high density (HDC) urban areas (<https://ghsl.jrc.ec.europa.eu/datasets.php>). These urban areas were represented by points, spaced at 1km distance around the perimeter of each urban area.

The transition matrix was based on the friction surface (https://map.ox.ac.uk/research-project/accessibility_to_cities) from the 2015 global accessibility map (Weiss et al, 2018).

The R code used to generate the 12 travel time maps is included in the report "A suite of global accessibility indicators for sustainable rural development" (Nelson, 2019) that can be downloaded with these data layers.

References

Nelson, A. A suite of global accessibility indicators for sustainable rural development. (2019) A report prepared for the CGIAR Consortium for Spatial Information

Pesaresi, M. & Freire, S. GHS settlement grid, following the REGIO model 2014 in application to GHSL Landsat and CIESIN GPW v4-multitemporal (1975-1990-2000-2015). (2016)

Weiss, D. J. et al. A global map of travel time to cities to assess inequalities in accessibility in 2015. Nature (2018). doi:10.1038/nature25181

van Etten, J. gdistance: Distances and Routes on Geographical Grids. (2018). <https://cran.r-project.org/package=gdistance>