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DATA PAPER

Projected Population Proximity Indices (30km) for 2005, 2030 and 2050

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This data package includes nine population proximity index layers for 2005, 2030 and 2050, for rural, urban and total populations. The layers are distributed as 1km GeoTIFFs and GeoJPGss at 1km.

The aim of these layers is to describe the population which may be likely to visit a specific locality where access is determined by Euclidean distance. By using the layers alongside other geographic datasets relating to disease risk it may help identify where people may come into contact with a disease. Human population layers are often used in models to identify risk areas where humans and viruses interact, however most pathogens are not restricted to areas of human habitation: many are found in lesser populated areas such as forests. This dataset will help identify less populated areas that may well still receive high visitor numbers.

The layers have been projected to 2030 and 2050 to enable projections of human/disease interfaces in the medium-term which are required to inform policy makers at country and continental level.

Urban and rural populations have been separated into individual layers as in some cases it is useful to distinguish between the behaviour and associated risks attributed to the different population segments. There may be a different risk of contacting diseases in rural habitats for rural workers than for than urban visitors.

Keywords: population, proximity, distance-weighted, future, projections

Funding statement

The production of this dataset was jointly funded by: EU grant GOCE-2003-010284 EDENext (http://www.edenextdata.com) and is catalogued by the EDENext Steering Committee as EDENextD001 (http://www.edenext.eu). The contents of this publication are the sole responsibility of the authors and don't necessarily reflect the views of the European Commission. ECDC (European Centre for Disease Control) VIMAP project: Mapping European health vulnerabilities to climate change related to communicable disease Publication Reference: OJ/2010/07/09-PROC/2010/034.

(1) Overview

Context

Spatial coverage

Description: This dataset is clipped to the EDENext extent which covers the continent of Europe and parts of North Africa down to 34 degrees latitude. The projection is WGS84 (ESPG:4326).
Northern boundary: 71.2
Southern boundary: 34.0
Eastern boundary: -20.0
Western boundary: 45.0

Temporal coverage

01/01/2005 - 31/12/2050 (2005, 2030, 2050)

Species

homo sapiens

(2) Methods

Steps

The population proximity index value for each cell in the raster layer is calculated as follows: a linear-distance weighting is applied to the population number in the surrounding cells of each raster pixel. The current cell is multiplied by 1 and the cells >30km away are multiplied by 0. All cells in between are multiplied by a value ranging between 0 and 1 corresponding to this Euclidean distance relationship. All the resultant values within 30km are then summed to give the distance weighted population proximity index value for that cell. This analysis was performed using ESRI ArcGIS software and the Spatial Analyst Extension tool Focal Statistics, utilising the neighbourhood nbrweight function with a 30km kernel.

The population values used for this dataset are taken from the GRUMP[1] datasets, corrected by NUTS 2 area to match the polygon totals given in the STQ population projections from the ESPON2013 database[2]. For those countries where the ESPON figures were not available at NUTS2 figures from World Population Prospects, the 2010 Revision[3] were used.

Output Datasets

Each of the four population proximity layers have been provided as a quick look map in JPEG format to view from any image viewer. The data itself is distributed as GIS Raster data in two formats. GeoTIFFs which is a standard proprietary GIS raster format. GeoJP2 (JPEG 2000 format) which is a non-proprietary format. Please note that as the GeoJP2 format is an integer only format the values provided in the images in this format have been multiplied by 100 to minimise the loss of data.

To access and analyse the Raster data directly GeoTIFFs and GeoJPGs can be read by most GIS software and some other software packages. These formats are compatible with proprietary (ESRI ArcGIS) and open source (Quantum GIS (QGIS) or R-project raster package)

Folder Structure

- quicklooks - JPEG maps for viewing only
- tiff - GeoTIFF data 0.008333 degree (~1km) 32bit floating point
- geoJPG2k - GeoJPG 2000, 0.008333 degree (~1km) 16bit unsigned Integer data. This data has been multiplied by 100 to save as an integer value with minimum loss of data.

Sampling Strategy

~1km resolution (0.008333 degree)

Quality Control

Output data values were compared with the original input population layers to ensure there were no errors or anomalies generated during processing.

Constraints

There were no constraints involved in data production. However it should be noted that the weighting used for this layer is based simply on a linear relationship with Euclidean distance and does not take any account of accessibility, natural or political boundaries that could restrict human movement.

Privacy

The authors do not foresee any privacy issues concerning this dataset. All input data used in this model is freely available in the public domain. The data output is at ~1km scale so cannot be traced back to individual habitations.

(3) Dataset Description

Object Name

popproxv3.zip

Data Type

Processed data, interpretation of data

Format Names and Versions

JPG, TIF, TFW, XML

Creation Dates

10/05/2012, 16/05/2012

Dataset Creators

Neil S. Alexander and William Wint

Repository Location

http://dx.doi.org/10.5061/dryad.127

Publication Date

08/08/2013

language

English

License

CC0

(4) Reuse potential

These data could be used in any situation for which the proximity of human population to rural areas is of interest. Whilst originally created with for the analysis and modelling of disease, there numerous other fields where these data may be useful. These might include areas of natural hazard or risk analysis through to ecology, environmental land management, tourism impact etc.

The application of this method to a global dataset would be an obvious area for further work to this dataset allowing for a wider application of this data. The incorporation of road density or other accessibility data into the development of these data could also be a future improvement.

Acknowledgements

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References

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