Package: dengueriskcdmx (via r-universe)

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Type Package

Title Data, Rasters and Code for the Dengue Transmission Risk Map of the Mexico City Metropolitan Area

Version 0.1.0

Description Data, rasters and code supporting the dengue transmission risk map of the Mexico City Metropolitan Area. Includes the Aedes aegypti ovitrap presence and pseudo-absence data with nine environmental and socio-demographic predictors (2017-2024, with training and test partitions), the external validation data (2025), the study area, and the Quarto code of the machine-learning workflow (in the vignettes). Also provides, in 'inst/extdata', the rasters (about 500 m) of the probability of Aedes aegypti occurrence, the probability of confirmed imported dengue cases, and the five-level epidemiological risk map, all derived from the consensus (mean of the probabilities) of Random Forest, LightGBM and XGBoost models.

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Encoding UTF-8

LazyData true

Depends R (>= 4.1.0), sf

Suggests terra, quarto, bonsai, correlation, corrplot, dials, discrim, doParallel, dplyr, ggplot2, ggraph, gt, gtExtras, kknn, magrittr, mapgl, nnet, parsnip, purrr, recipes, rsample, scales, see, sessioninfo, skimr, spatialsample, themis, tibble, tictoc, tidymodels, tidyr, tidysdm, tidyverse, tune, workflows, workflowsets, yardstick, knitr, rmarkdown, rgeomex, viridis, tidyterra

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`ae_aegypti_2017_2024` *Aedes aegypti ovitrap data, 2017-2024 (full database)*

Description

Ovitrap presences and pseudo-absences used to fit the *Ae. aegypti* occurrence models (primary scenario: no environmental filter on pseudo-absences, 2 km buffer, no circular predictors). The `split` column records which rows belong to the training and to the test partition (see ae_aegypti_2017_2024_train and ae_aegypti_2017_2024_test).

Usage

```
ae_aegypti_2017_2024
```

Format

An `sf` object with one row per point and the columns:

class Factor: `presence` or `pseudoabs`.

built Built-up area probability (Dynamic World V1).

tree Tree-cover probability (Dynamic World V1).

ndvi NDVI (Sentinel-2, complemented with Landsat 8 for 2017).

prcp Annual precipitation (MexHiResClimDB).

ia CONAPO Accessibility Index, interpolated with SPDE-INLA.

ice CONAPO Environmental Quality Index, interpolated with SPDE-INLA.

im CONAPO Marginalization Index, interpolated with SPDE-INLA.

pop Population (LandScan Global).

hfp Human footprint.

split Partition: `train` or `test`.

geometry Point geometry (EPSG:4326).

Details

All predictors were harmonised to a common grid of about 500 m. The partition is 80/20, stratified by `class`, with `set.seed(12345)` (`rsample::initial_split(prop = 0.8, strata = class)`).

Source

Ovitrap surveillance of the Mexican Ministry of Health (CENAPRECE); predictors as listed above.

`ae_aegypti_2017_2024_test`

Aedes aegypti test partition, 2017-2024

Description

The 20% of ae_aegypti_2017_2024 held out to test the models.

Usage

```
ae_aegypti_2017_2024_test
```

Format

An `sf` object with the same columns as ae_aegypti_2017_2024_train.

Details

All predictors were harmonised to a common grid of about 500 m. The partition is 80/20, stratified by `class`, with `set.seed(12345)` (`rsample::initial_split(prop = 0.8, strata = class)`).

ae_aegypti_2017_2024_train

Aedes aegypti training partition, 2017-2024

Description

The 80% of ae_aegypti_2017_2024 used to train the models.

Usage

```
ae_aegypti_2017_2024_train
```

Format

An `sf` object with the same columns as ae_aegypti_2017_2024 (except `split`).

Details

All predictors were harmonised to a common grid of about 500 m. The partition is 80/20, stratified by `class`, with `set.seed(12345)` (`rsample::initial_split(prop = 0.8, strata = class)`).

ae_aegypti_2025

Aedes aegypti external validation data, 2025

Description

Ovitrap presences and pseudo-absences from 2025, not used to fit or tune the models. Used for the external validation. Temperature and elevation, which are not predictors of the primary scenario, are not included.

Usage

```
ae_aegypti_2025
```

Format

An `sf` object with the same columns as ae_aegypti_2017_2024_train.

ae_raster *Read a raster shipped with the package*

Description

Read a raster shipped with the package

Usage

```
ae_raster(layer = c("aedes", "dengue", "risk"))
```

Arguments

`layer`	One of `"aedes"` (probability of *Aedes aegypti* occurrence), `"dengue"` (probability of confirmed imported dengue cases) or `"risk"` (five-level epidemiological risk).

Value

A terra::SpatRaster of about 500 m. `"aedes"` and `"dengue"` hold the probability (0-1), the mean of the Random Forest, LightGBM and XGBoost models. `"risk"` has two layers: `cluster` (k-means cluster) and `risk` (the five-level epidemiological risk).

Examples

```
## Not run:
terra::plot(ae_raster("aedes"))

## End(Not run)
```

ae_raster_path *Path to a raster shipped with the package*

Description

Path to a raster shipped with the package

Usage

```
ae_raster_path(layer = c("aedes", "dengue", "risk"))
```

Arguments

`layer`	One of `"aedes"` (probability of *Aedes aegypti* occurrence), `"dengue"` (probability of confirmed imported dengue cases) or `"risk"` (five-level epidemiological risk).

Value

Character path to the GeoTIFF in `inst/extdata`.

Examples

```
ae_raster_path("risk")
```

`aoi` *Study area*

Description

Polygon of the study area (Mexico City Metropolitan Area) used to crop the predictors and the risk maps.

Usage

```
aoi
```

Format

An `sf` object with one feature (POLYGON, WGS 84) and the columns `id` and `geometry`.

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