Balboni, C.A., 2021. In harm's way? infrastructure investments and the persistence of coastal cities. (fig. 3: Vietnam's road infrastructure by road type)

Introduction

This document replicates Figure 3 from Balboni (2021), *"In Harm's Way? Infrastructure Investments and the Persistence of Coastal Cities"*.

Packages

Vietnam boundary

```
## Coordinate Reference System:
##   User input: WGS 84
##   wkt:
## GEOGCRS["WGS 84",
##     DATUM["World Geodetic System 1984",
##         ELLIPSOID["WGS 84",6378137,298.257223563,
##             LENGTHUNIT["metre",1]]],
##     PRIMEM["Greenwich",0,
##         ANGLEUNIT["degree",0.0174532925199433]],
##     CS[ellipsoidal,2],
##         AXIS["latitude",north,
##             ORDER[1],
##             ANGLEUNIT["degree",0.0174532925199433]],
##         AXIS["longitude",east,
##             ORDER[2],
##             ANGLEUNIT["degree",0.0174532925199433]],
##     ID["EPSG",4326]]
```

2000 map

Road Data (Natural Earth)

Clip to Vietnam

Road Type Classification

Road layers 2000

map 2000 approximation

2010 map

Load OSM roads

```
## Reading layer 'gis_osm_roads_free_1' from data source
##   '/Users/yaz/Desktop/BSE/Term 2/Geospatial DS/figure_Vietnam/vietnam-260126-free.shp/gis_osm_roads_
##   using driver 'ESRI Shapefile'
## Simple feature collection with 3086863 features and 10 fields
## Geometry type: LINESTRING
## Dimension:     XY
## Bounding box:  xmin: 102.1097 ymin: 8.42197 xmax: 114.3563 ymax: 23.39969
## Geodetic CRS:  WGS 84
```

```
##
##       bridleway          busway        cycleway         footway  living_street
##               4              21             856          137664           5080
##         motorway   motorway_link            path      pedestrian         primary
##            5951            2687           64008            2632           20000
##     primary_link     residential       secondary  secondary_link         service
##            5117         1655194           29054            3823          846426
##           steps         tertiary   tertiary_link           track    track_grade1
##            2420           50565            2523          144687            1266
##     track_grade2    track_grade3    track_grade4    track_grade5           trunk
##             506             798            1093            2901           20417
##      trunk_link    unclassified         unknown
##            4917           75807             446
```

Clip to Vietnam

Road classification

```
##
## Dual carriageway         Freeways      Major roads      Minor roads
##            38981             5750            27816            48612
##      Other roads
##          2887320
```

Select roads to display

Road layers 2010

[1] 5750

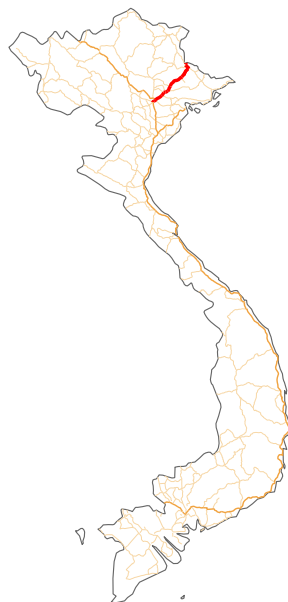## [1] 38981

[1] 27816

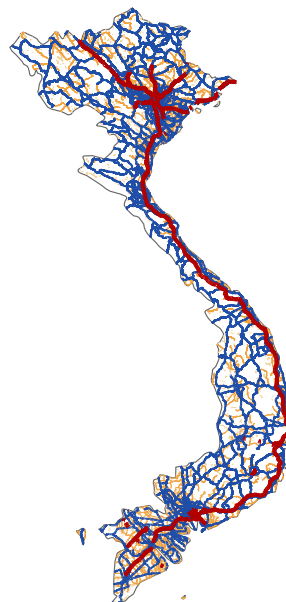## [1] 14583

simplify geometries

map 2010

Final figure

Road map 2000   Road map 2010

Road types ── Freeways ── Dual carriageway ── Major roads ── Minor roads