

Gridded GDP projections compatible with the five SSPs

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# Downscaling GDP

Estimated GDPs by 1/12-degree grids during 1850—2100 by 10 year intervals. In the estimation, national GDP data (past data until 2010; future projection under SSPs after 2020) is downscaled considering spatial and economic interactions among cities, urban growth patterns compatible with SSPs, and other auxiliary geographic data (land cover, road network, etc.). Methods which we used are detailedly described in our forthcoming paper and data: **Murakami, Yoshida, and Yamagata (202X)**.

## PhantomJS not found. You can install it with webshot::install\_phantomjs(). If it is installed, please make

Figure: Interactive 3D globe map on downscaled GDP of SSP2-2100. You can pan and zoom the globe by mouse-over.

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## Data download

The GDPs for SSP 1–5 between 2010 and 2100 by 10 years are estimated by 2160 x 4320 grids, each of which are 1/12-degree grids, covering the globe. The GDP estimates in each year in each SSP are recorded as a GeoTIFF image with resolution of 2160 x 4320. GeoTIFF is a Tiff image with spatial coordinates for each grid cell; the coordinates are given by longitude and latitude measured by World Geodetic System 1984 (WGS84).

**GeoTIFF:** [please click here \(PANGAEA\)](#) (please wait a moment. Now, we are uploading the data)

And also, you can download 3D globemap html files on the five SSPs (2010-2100) from the link below.

**3D globemaps:** [please click here](#) (please wait a moment.)

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## Code for visualization

We used **R** for the 3D globe visualization.

```
library(colorRamps)
library(data.table)
library(dplyr)
library(htmlwidgets)
library(threejs)
library(tidyr)

setwd(****) # please set a directory including the file
dat <- data.table::fread(****) # please wait a moment!
# dat[1:3,]
#   longitude latitude gdp
```

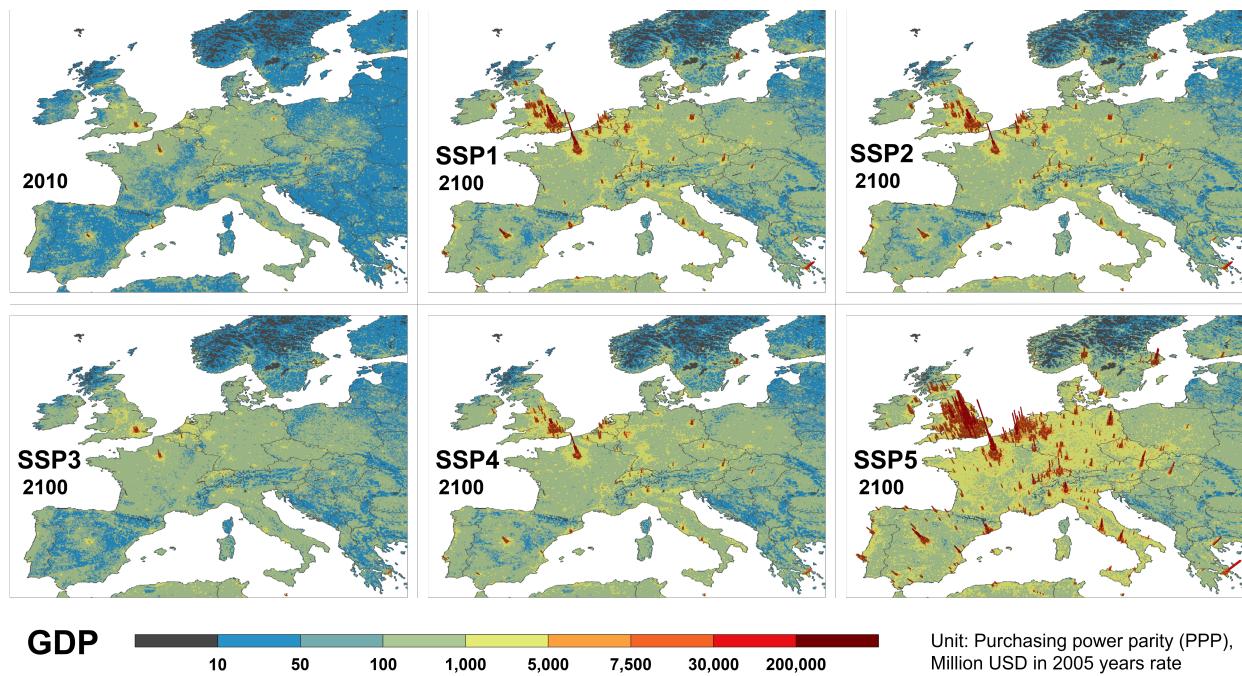


Figure 1: Figure: Europe in 2D

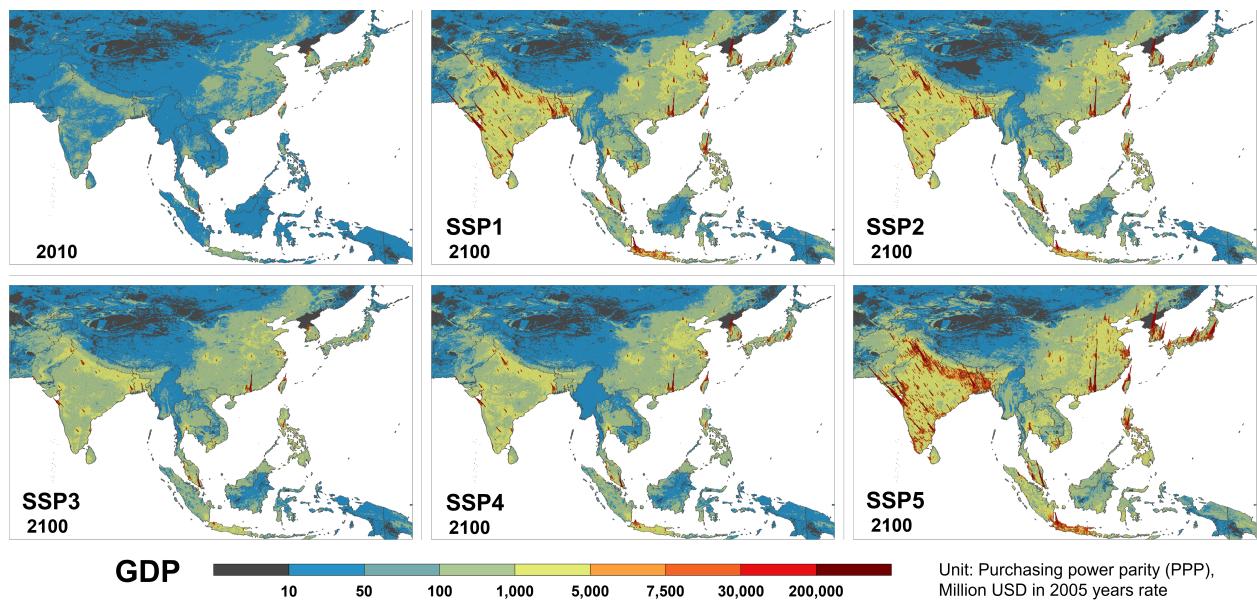


Figure 2: Figure: Asia in 2D

```

# 1: -36.54172  83.5416   *
# 2: -36.45839  83.5416   *
# 3: -36.37506  83.5416   *

dat <- dat %>%
  dplyr::mutate(gdp=if_else(gdp>0,gdp,0)) %>%
  dplyr::filter(gdp>0) %>%
  dplyr::mutate(gdp.cut=as.numeric(cut(gdp,
    breaks=c(0,10^4,10^5,10^6,2.5*10^6,5.0*10^6,
    10^7,2.5*10^7,5.0*10^7,10^8,10^9,max(gdp)),
    include.lowest=TRUE))) %>%
  dplyr::mutate(pid=as.numeric(rownames(.))%%10) %>% # to avoid heavy calculation.
  dplyr::filter(pid==0)
3Dglobe <- threejs::globejs(lat=dat$latitude, long=dat$longitude,
  val=dat$gdp/10^7, # to adjust bar height
  color=colorRamps::matlab.like(11)[dat$gdp.cut],
  pointsize=1.6,
  atmosphere=F)
3Dglobe

```

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## References

- Daisuke Murakami, Takahiro Yoshida, Yoshiki Yamagata (202X) **Gridded GDP projections compatible with the five SSPs (Shared Socioeconomic Pathways)**. Submitted to *a journal*.