



# CRS & Projections: How to choose a CRS



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This video gets into the technical details of finding a **suitable** projected CRS.

This is only a concern for geocomputations and GIS analysis - for straightforward mapping you can use our magic CRS - 4326.





# There are no all-purpose CRS

“There exist no all-purpose projections, all involve distortion when far from the center of the specified frame” (Bivand, Pebesma, and Gómez-Rubio 2013)



# National Mapping Agencies to the rescue

If your data lie within country borders then you can take advantage of CRS specifically designed by *National Mapping Agencies*.

These agencies create nation-level CRS that allow precision...

- ... national infrastructure planning.
- ... cellular network coverage.
- ... coastal erosion monitoring.
- ... weather forecasting.
- ... maps for civilian, government and military uses.



# Governments usually supply data in national CRS

GIS datasets obtained from government data portals are usually provided in the national CRS - for instance [geoportal.statistics.gov.uk](https://geoportal.statistics.gov.uk).

We can then use `st_crs()` and `st_transform()` to project other datasets into the national CRS.

```
national_gis_dataset <- read_sf("data/shapefiles")
your_own_data <- read_sf("data/points")

your_own_data %>%
  st_transform(st_crs(national_gis_dataset))
```



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# Hunting for national CRS

There isn't a perfect process for finding national CRS and many countries just don't have one.

The first place I recommend searching is [EPSG.io](https://epsg.io)





# When National CRS won't cut it



# Oceanographic CRS

There are Oceanographic CRS for entire oceans and small regions.

Small region oceanographic CRS are usually designed for oil exploration/extraction.

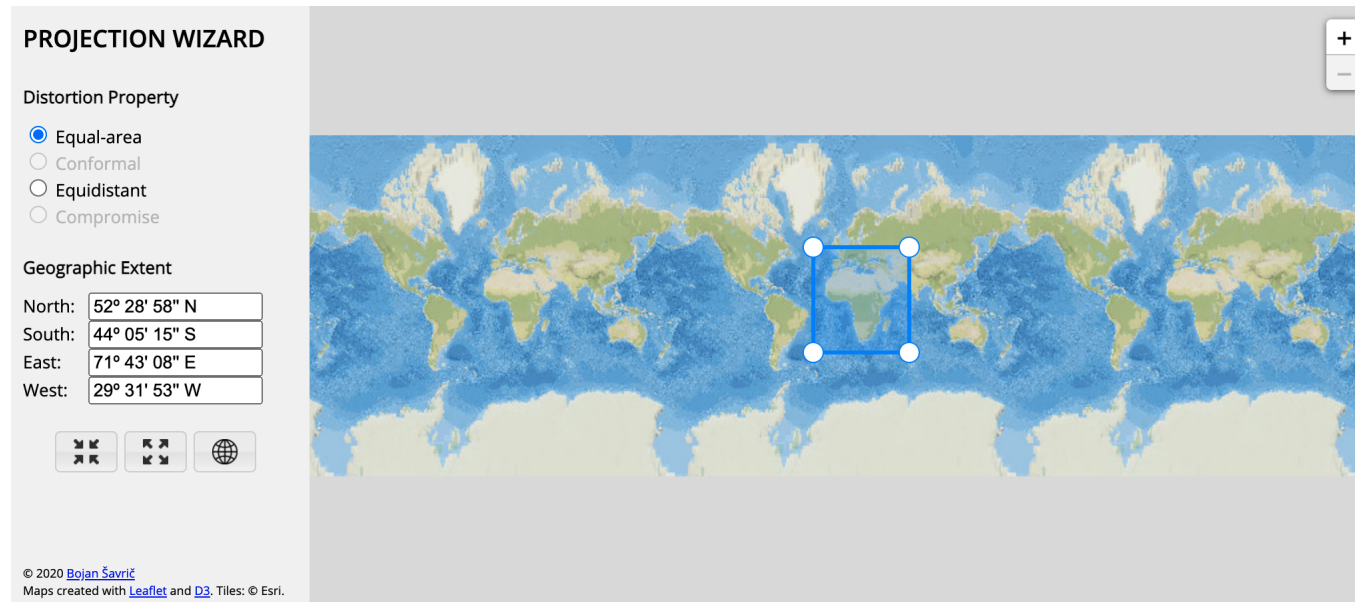
I recommend using [EPSG.io](https://epsg.io) to search for appropriate CRS for your data.





# Projection Wizard

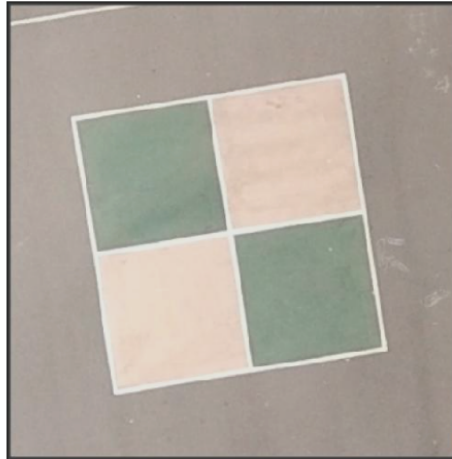
[projectionwizard.org](https://projectionwizard.org) is a free interactive tool for creating custom CRS.



... but to use it you need to decide what type of projected CRS you need.



# Projected CRS Types



Type of projection:	Conformal	Equal Area	Equidistant
Maintains shape?	✓	✓	✗
Maintains rotation?	✓	✗	✓
Maintains area?	✗	✓	✓

Source: [ihatecoordinatesystems.com/](http://ihatecoordinatesystems.com/)



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