



Developing R Tools for Health Risk for Ozone data

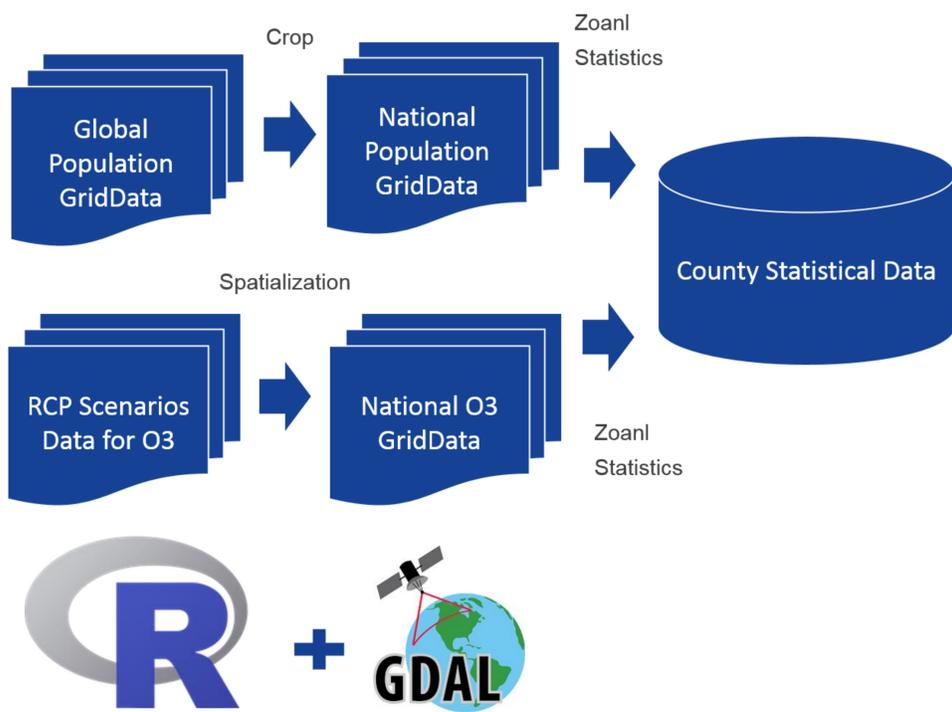
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Introduction

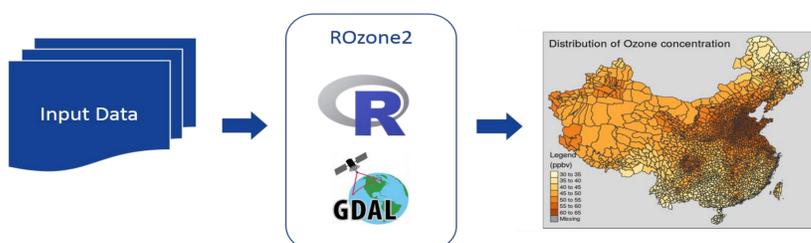
Ozone pollution is becoming increasingly severe in China which cause many health problem of people.

Motivation



- In order to analyze future health risk under the RCP and SSP scenarios, research presented here applies data spatialization, data extraction from global datasets, zonal statistics and field calculation on massive datasets.
- R can make the whole data processing more easily and elegantly.

Our Approaches



- ROzone2 can automate install and setup for GDAL binary tools and warp some GDAL utilities, provide similar functions with raster package.

- And there is also parallel computation in ROzone2 to reduce time cost of a large amount of raster.

Our current tools include:

- A package, ROzone2, which crop and rasterize raw data, and compute zonal statistics within the zones of a polygon in batch.
- A mapping app that allows user to visualize spatial distribution of the mean value of Ozone in the whole year.

Zonal Statistics

High Performance Zonal Statistics in ROzone2

(inspired by <http://www.guru-gis.net/efficient-zonal-statistics-using-r-and-gdal>)

```
zonalStat<-function(x,zonal.ras,stat='mean',digits=0,na.rm=T,prefix='zonal',...){
  library(data.table)
  library(raster)
  fun <- match.fun(stat)
  vals <- getValues(x)
  zones <- round(getValues(zonal.ras), digits = digits)
  rDT <- data.table(vals, z=zones)
  setkey(rDT, z)
  Zstat<-data.frame(rDT[, lapply(.SD, fun,na.rm=na.rm,...), by=z])
  colnames(Zstat)[2:length(Zstat)]<-paste(prefix,stat,sep="_")
  return (Zstat)
}
```

Future works

- More functions to process factors
- A fancy Shiny app to demonstrate the entire work
- User-friendly function
- Develop a new package to warp all gdal functions

Conclusion

- R can do everything, but not good at everything.
- GDAL is great for large amount of raster process.
- R is open. We can make R more powerful with out codes or any other libraries!
- R will be good at everything in the future.

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