

LST-R-Projection

Aji John

8/28/2017

Load the required

```
library(sp)
library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
## 
##     filter, lag

## The following objects are masked from 'package:base':
## 
##     intersect, setdiff, setequal, union
```

R Markdown

Get the latest imagery

#link to the latest satellite imagery

latest <- 'http://thredds.ucar.edu/thredds/dodsC/satellite/SFC-T/SUPER-NATIONAL_1km/current/SUPER-NATIONA

Including Plots

Open the gini as netCDF

```
## File http://thredds.ucar.edu/thredds/dodsC/satellite/SFC-T/SUPER-NATIONAL_1km/current/SUPER-NATIONAL
##
##      2 variables (excluding dimension variables):
##          char Stereographic[maxStrlen64]
##              grid_mapping_name: stereographic
##              longitude_of_projection_origin: -105
##              latitude_of_projection_origin: 90
##              scale_factor_at_projection_origin: 0.93301269409307
##              earth_radius: 6371229
##                  _CoordinateTransformType: Projection
##                  _CoordinateAxes: x y
##          byte SFC_T[x,y,time]
##              _Unsigned: true
##              long_name: Surface Skin Temperature
##              units: N/A
##              scale_factor: 1
##              add_offset: 0
##                  _CoordinateAxes: x y time
## 
##      4 dimensions:
```

```

##      maxStrlen64  Size:64
##      time  Size:1
##          long_name: time since base date
##          _CoordinateAxisType: Time
##          units: msecs since 1970-01-01T00:00:00Z
##      x  Size:1536
##          long_name: projection x coordinate
##          units: km
##          _CoordinateAxisType: GeoX
##      y  Size:1008
##          long_name: projection y coordinate
##          units: km
##          _CoordinateAxisType: GeoY
##
##      32 global attributes:
##          Conventions: _Coordinates
##          source_id: 1
##          entity_id: 6
##          sector_id: 9
##          phys_elem: 18
##          time_coverage_start: 2017-08-25T19:00:00
##          time_coverage_end: 2017-08-25T19:00:00
##          ProjIndex: 5
##          ProjName: POLARSTEREOGRAPHIC
##          NX: 1536
##          NY: 1008
##          Lov: -105
##          DxKm: 7.9465
##          DyKm: 7.9465
##          ProjCenter: 1
##          Latin: 0
##          title: Composite
##          summary: Sounder Based Derived Surface Skin Temperature
##          id: Supernational
##          keywords_vocabulary: SFC_T
##          cdm_data_type: GRID
##          featureType: GRID
##          standard_name_vocabulary: Surface Skin Temperature
##          creator_name: UNIDATA
##          creator_url: http://www.unidata.ucar.edu/
##          naming_authority: UCAR/UCP
##          geospatial_lat_min: 7.8381
##          geospatial_lat_max: 79.7608530109653
##          geospatial_lon_min: -141.0274
##          geospatial_lon_max: -32.4176812650196
##          imageResolution: 1
##          compressionFlag: 0

get projection info

## [1] "ncvar_get: entering for read from file http://thredds.ucar.edu/thredds/dodsC/satellite/SFC-T/SU
## [1] "vobjtovarid4: entering"
## [1] "Variable named Stereographic found in file with varid= 65536 3"
## [1] "ncvar_get: passed object is NOT a dimvar"
## [1] "ncvar_get: getting add offset and scale fact"

```

```

## [1] "ncvar_get: netcdf file index of var on list: 1"
## [1] "ncvar_get: here is var object:"
## $id
## $id
## [1] 3
##
## $group_index
## [1] -1
##
## $group_id
## [1] 65536
##
## $list_index
## [1] 1
##
## $isdimvar
## [1] FALSE
##
## attr(),"class")
## [1] "ncid4"
##
## $name
## [1] "Stereographic"
##
## $ndims
## [1] 1
##
## $natts
## [1] 7
##
## $size
## [1] 64
##
## $dimids
## [1] 0
##
## $prec
## [1] "char"
##
## $units
## [1] ""
##
## $longname
## [1] "Stereographic"
##
## $group_index
## [1] 1
##
## $chunksizes
## [1] NA
##
## $storage
## [1] 1
##

```

```

## $shuffle
## [1] FALSE
##
## $compression
## [1] NA
##
## $dims
## list()
##
## $dim
## $dim[[1]]
## $name
## [1] "maxStrlen64"
##
## $len
## [1] 64
##
## $unlim
## [1] FALSE
##
## $group_index
## [1] 1
##
## $group_id
## [1] 65536
##
## $id
## [1] 0
##
## $dimvarid
## $id
## [1] -1
##
## $group_index
## [1] 1
##
## $group_id
## [1] 65536
##
## $list_index
## [1] -1
##
## $isdimvar
## [1] TRUE
##
## attr(,"class")
## [1] "ncid4"
##
## $vals
## [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
## [24] 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46
## [47] 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
##
## $units

```

```

## [1] ""
##
## $create_dimvar
## [1] FALSE
##
## attr(,"class")
## [1] "ncdim4"
##
##
## $varsizes
## [1] 64
##
## $unlim
## [1] FALSE
##
## $make_missing_value
## [1] FALSE
##
## $missval
## [1] NA
##
## $hasAddOffset
## [1] FALSE
##
## $hasScaleFact
## [1] FALSE
##
## attr(,"class")
## [1] "ncvar4"
## [1] "ncvar_get: ncid2use= 65536 varid2use= 3 missval= NA"
## [1] "ncvar_get_inner: entering with (C-STYLE INTEGER ONLY) ncid= 65536 varid= 3"
## [1] "ncvar_get_inner: following line is collapse_degen:"
## [1] TRUE
## [1] "ndims: 1"
## [1] "ncvar_get: varsizes:"
## [1] 64
## [1] "ncvar_get: start:"
## [1] 1
## [1] "ncvar_get: count:"
## [1] 64
## [1] "ncvar_get: totvarsizes: 64"
## [1] "ncvar_get_inner: getting var of type char id= 5"
## [1] "ndims: 1 strndims: 0 strlen: 65 nstr: 1"
## [1] "length of stor string: 64"
## [1] "ncvar_get_inner: C call returned 0"
## [1] "ncvar_get_inner: dim of directly returned array:"
## [1] 1
## [1] "count.nodegen: 64      Length of data: 1"
## [1] "ncvar_get: final dims of returned array:"
## [1] 1

get the surface temperature variable

## [1] 1536 1008

```

sfct is a two dimensional array

```
## [1] 1536
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## -6096.000 -3047.000     2.907     2.907  3052.000  6102.000
## [1] 1008
##      Min.   1st Qu.    Median      Mean 3rd Qu.      Max.
## -8382.0 -6382.0 -4381.0 -4381.0 -2380.0 -379.9
```

Time is only for onetimestamp

```
## [1] 1536 1008
## [1] 1.503688e+12
## [1] "1503687600000"
```

Assuming that this timestamp is in milliseconds: GMT: Friday, August 25, 2017 7:00:00 PM

Our goal is to create spatial points dataframe

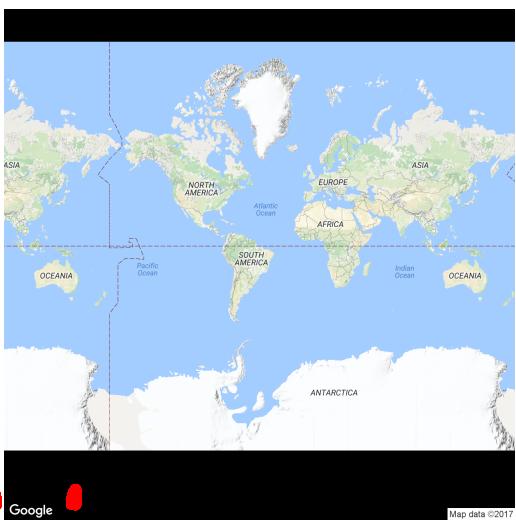
Now, we created the spatial points dataframe and existing points are Sterographic , and the units are in km
next, we transform it to lat/long

Verify the bounding box

```
## Object of class SpatialPointsDataFrame
## Coordinates:
##      min      max
## Var1 -179.9999 179.99991
## Var2   11.7333  86.58449
## Is projected: FALSE
## proj4string :
## [+proj=longlat +datum=WGS84 +ellps=WGS84 +towgs84=0,0,0]
## Number of points: 1548288
## Data attributes:
##      sfct
##  Min.   : 0.00
##  1st Qu.: 0.00
##  Median : 0.00
##  Mean   : 31.65
##  3rd Qu.: 0.00
##  Max.   :245.00
##      min      max
## Var1 -179.9999 179.99991
## Var2   11.7333  86.58449
```

Lets try to plot it

```
## Loading required package: ggplot2
## Google Maps API Terms of Service: http://developers.google.com/maps/terms.
## Please cite ggmap if you use it: see citation("ggmap") for details.
## Warning: bounding box given to google - spatial extent only approximate.
## converting bounding box to center/zoom specification. (experimental)
## Source : https://maps.googleapis.com/maps/api/staticmap?center=49.158898,1.9e-05&zoom=1&size=640x640
```



Google

Map data ©2017