LST-R-Projection

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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 <-'SUPER-NATIONAL_1km_SFC-T_20170828_2000.gini.nc'
```

Including Plots

Open the gini as netCDF

```
## File SUPER-NATIONAL_1km_SFC-T_20170828_2000.gini.nc (NC_FORMAT_CLASSIC):
##
##      2 variables (excluding dimension variables):
##         byte SFC_T[x,y,time]
##             long_name: Surface Skin Temperature
##             units: N/A
##             _Unsigned: true
##             scale_factor: 1
##             add_offset: 0
##             _CoordinateAxes: x y time
##             coordinates: time y x
##             grid_mapping: Stereographic
##         char Stereographic[]
##             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
```

```
##
##      3 dimensions:
##         time  Size:1
##             long_name: time since base date
##             _CoordinateAxisType: Time
##             units: msecs since 1970-01-01T00:00:00Z
##         y  Size:1008
##             long_name: projection y coordinate
##             units: km
##             _CoordinateAxisType: GeoY
##             standard_name: projection_y_coordinate
##         x  Size:1536
##             long_name: projection x coordinate
##             units: km
##             _CoordinateAxisType: GeoX
##             standard_name: projection_x_coordinate
##
##     33 global attributes:
##         Conventions: CF-1.0
##         source_id: 1
##         entity_id: 6
##         sector_id: 9
##         phys_elem: 18
##         time_coverage_start: 2017-08-28T20:00:00
##         time_coverage_end: 2017-08-28T20:00:00
##         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: 7.78898592077309
##         geospatial_lat_max: 35.5883624882841
##         geospatial_lon_min: -141.032242028194
##         geospatial_lon_max: -18.5232659108977
##         imageResolution: 1
##         compressionFlag: 0
##         History: Translated to CF-1.0 Conventions by Netcdf-Java CDM (CFGridWriter2)
## Original Dataset = /data/ldm/pub/native/satellite/SFC-T/SUPER-NATIONAL_1km/current/SUPER-NATIONAL_1k
```

get the surface temperature variable

```
## [1] 1536 1008
```

sfct is a two dimenional 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] 1.50395e+12
```

```
## [1] "1503950400000"
```

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 -179.99987 179.9999
## Var2   89.90718  89.9966
## Is projected: FALSE
## proj4string : [+proj=longlat +ellps=WGS84]
## Number of points: 1548288
## Data attributes:
##       sfct
##  Min.   :-124.000
##  1st Qu.:   0.000
##  Median :   0.000
##  Mean   :   2.104
##  3rd Qu.:   0.000
##  Max.   : 126.000
```

```
##             min      max
## Var1 -179.99987 179.9999
## Var2   89.90718  89.9966
```

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=89.951888,1.9e-05&zoom=3&size=640x640
```

Map is focusing on South America, means, transform didn't work