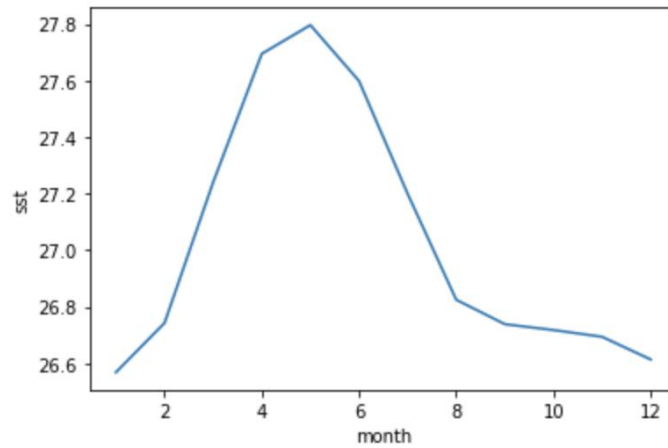


Homework3 Report
Name: 徐荣苗 / Rongmiao Xu **SID:**12132227

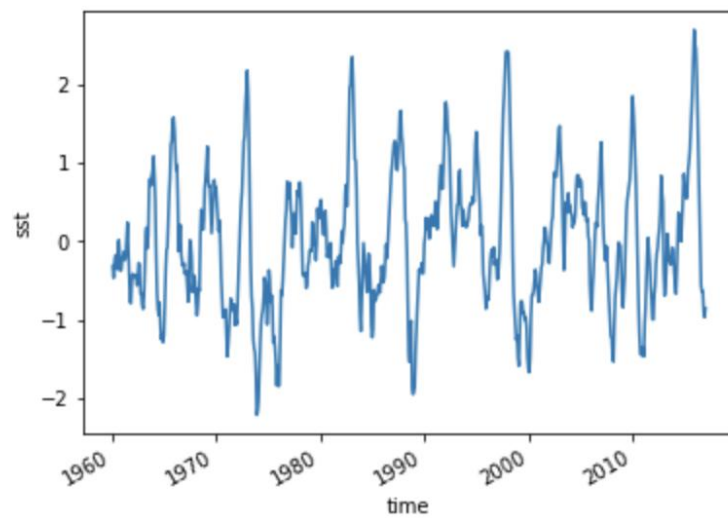
Q1

1.1 Compute monthly climatology for SST from Niño 3.4 region

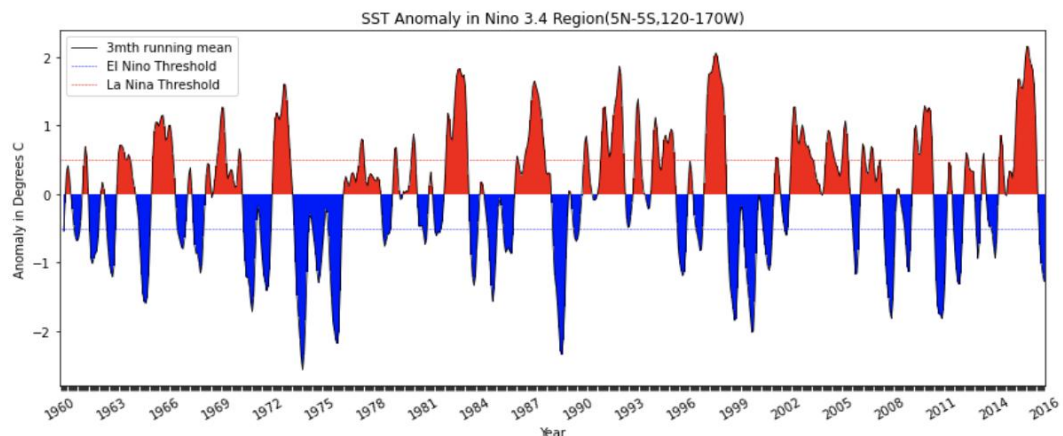


and subtract climatology from SST time series to obtain anomalies.

Out[34]: [`<matplotlib.lines.Line2D at 0x7fac0552edf0>`]

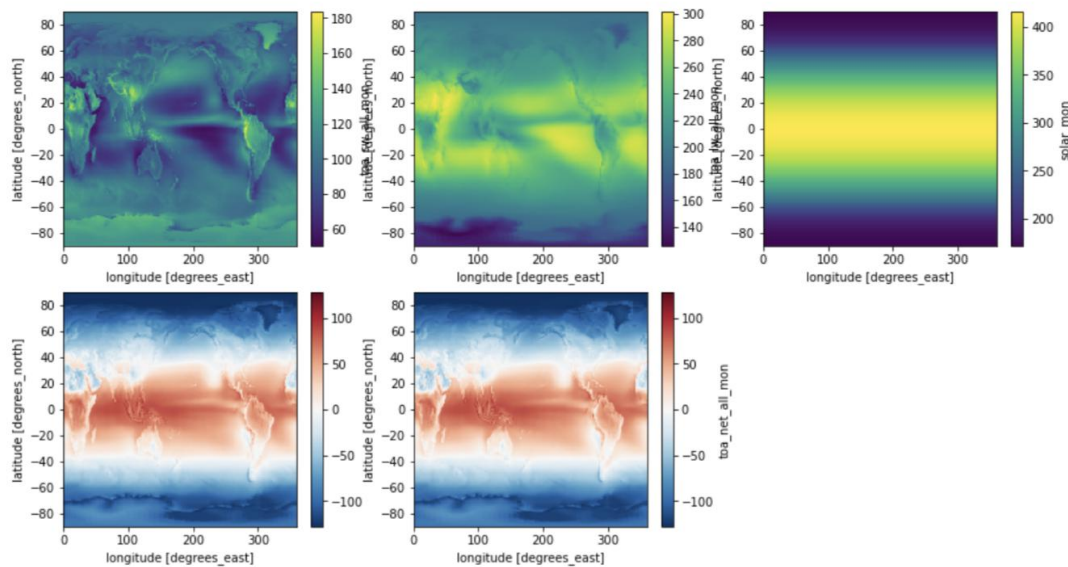


1.2 Visualize the computed Niño 3.4



Q2

2.1 a 2D plot of the time-mean TOA longwave, shortwave, and solar radiation for all-sky conditions.



2.2

Calculate the TOA incoming solar:

```
Solar_Weighted = ds.solar_mon.weighted(weights)
Solar_Weighted.mean(dim=('lat', 'lon', 'time'))
```

```
xarray.DataArray 'solar_mon'
```

```
array(340.28326598)
```

outgoing longwave:

```
TOA_LW_Weighted = ds.toa_lw_all_mon.weighted(weights)
TOA_LW_Weighted.mean(dim=('lat', 'lon', 'time'))
```

```
xarray.DataArray 'toa_lw_all_mon'
```

```
array(240.26693375)
```

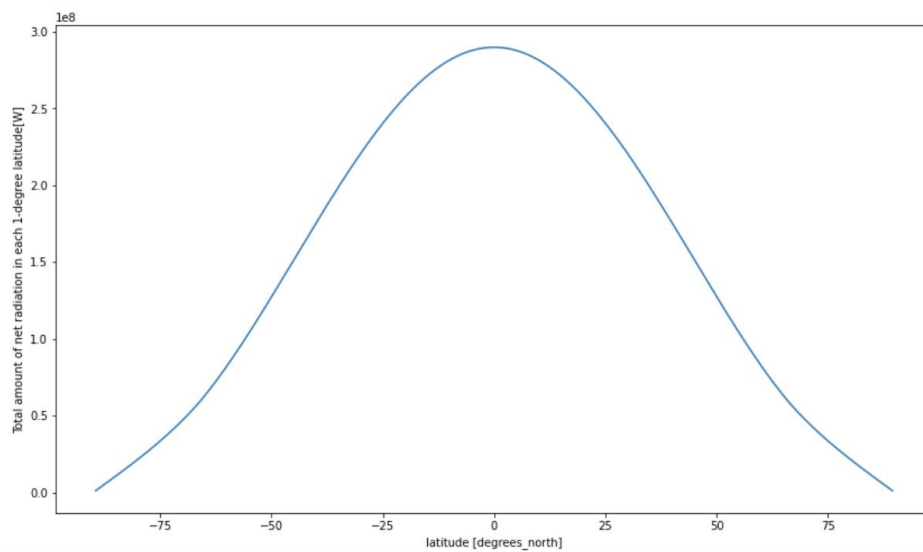
Outgoing shortwave :

```
weights = np.cos(np.deg2rad(ds.lat))
TOA_SW_Weighted = ds.toa_sw_all_mon.weighted(weights)
TOA_SW_Weighted.mean(dim=('lat', 'lon', 'time'))
```

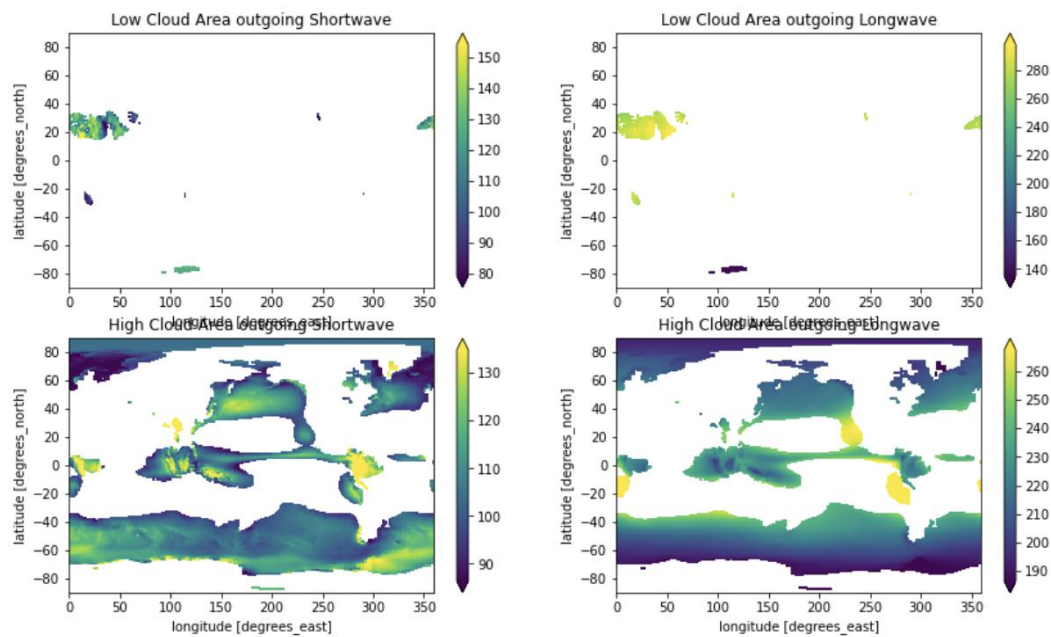
```
xarray.DataArray 'toa_sw_all_mon'
```

```
array(99.13805277)
```

3 the total amount of net radiation in each 1-degree latitude band



4 composites of time-mean outgoing shortwave and longwave radiation for low and high cloud area regions.



5 Global Mean of Low Cloud Area ShortWave:122.65

Global Mean of Low Cloud Area LongWave: 270.1

Global Mean of High Cloud Area ShortWave:108.09

Global Mean of High Cloud Area LongWave:216.55

Clouds affect long-wave radiation more than short-wave radiation , Low clouds have better radiation effects than high clouds

```
array(122.65546, dtype=float32)
```

 array(270.10367, dtype=float32)

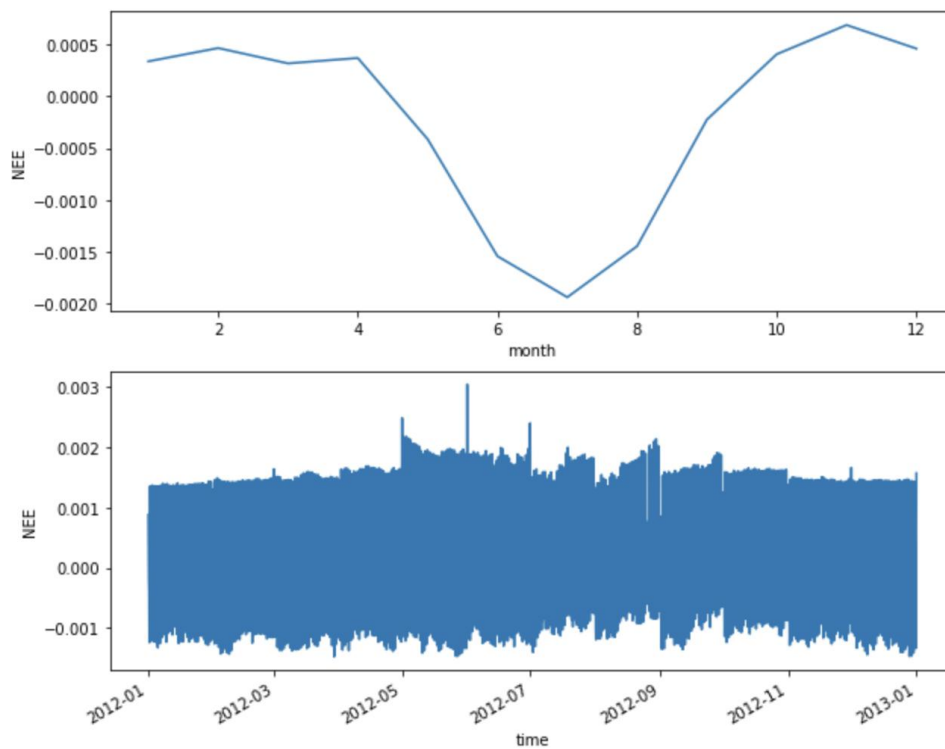
 array(108.09777, dtype=float32)

 array(216.55675, dtype=float32)

Q3

3.1

[<matplotlib.lines.Line2D at 0x7f8c15c76340>]



3.2 5 different plots

