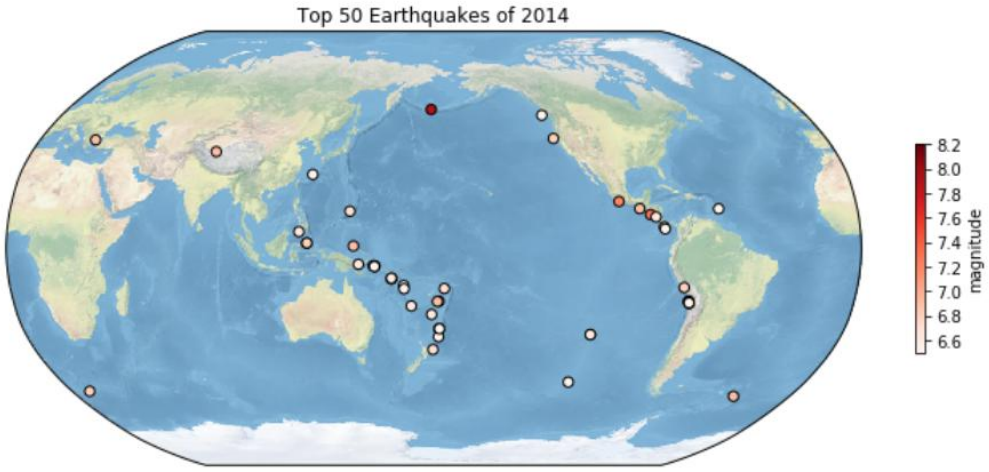
#HOMEWORK4

1. Global Earthquakes

In this problem set, we will use this file from the USGS Earthquakes Database. The dataset is similar to the one you use in Assignment 02. Use the file provided (`usgs_earthquakes.csv`) to recreate the following map. Use the `mag` column for magnitude. **[10 points]**



思路：

1. 先导入数据分析、绘图和地理投影的工具库，读取地震数据文件；筛选出震级前 50 的地震数据，删掉震级、经纬度有缺失的无效数据。
2. 创建指定大小的绘图画布，设置罗宾逊地理投影的坐标轴，加载全球地形底图并添加图表标题。
3. 用经纬度定位，在地图上画散点表示地震位置，用红色系颜色深浅体现震级高低，优化散点样式让画面更清晰。
4. 添加颜色条，调整其大小、位置和刻度，标注“震级”说明颜色对应的数值，最后展示完整的地震分布地图。

2. Explore a `netCDF` dataset

Browse the NASA's Goddard Earth Sciences Data and Information Services Center (GES DISC) website. Search and download a dataset you are interested in. You are also welcome to use data from your group in this problem set. But the dataset should be in `netCDF` format. For this problem set, you are welcome to use the same dataset you used in Assignment 03.

2.1 [10 points] Make a global map of a certain variable. Your figure should contain: a project, x label and ticks, y label and ticks, title, gridlines, legend, colorbar, masks or features, annotations, and text box (**1 point each**).

2.2 [10 points] Make a regional map of the same variable. Your figure should contain: a different project, x label and ticks, y label and ticks, title, gridlines, legend, colorbar, masks or features, annotations, and text box (**1 point each**).

思路：

1. 首先读取海表温度 netCDF 数据，提取 SST 变量。再计算 2000 年全球年平均海温，用罗宾逊投影绘制全球海温分布图，优化配色和样式，标注热带太平洋、南大洋区域，展示图表。
2. 筛选热带太平洋区域海温数据，计算 2000 年年均值，墨卡托投影绘制区

域海温图，标注尼诺 3.4 区，优化样式并展示。