

Earth Sciences Summer Student Program 2023

Tracking Weather and Climate Extreme Events from Observations and Climate Model Simulations

追蹤觀測與氣候模式模擬的極端天氣與氣候事件

Supervisor:

Primary supervisor: Prof. Cheng-Ta Chen (NTNU, Department of Earth Sciences)

Project description:

Weather and climate extremes are the major contributors to the huge economic lost and casualty due to natural disasters. Traditionally extreme indices are developed to analyze the observed trend and variability in weather and climate extremes. Nevertheless, these distributions of indices are calculated locally at stations or data grids and do not consider the connection to neighboring stations or grids. We had developed an algorithm to search and define extreme events from a alternative view. The uniqueness of the research work is on search of events by spatial and temporal connected extremes occurrences. The extremes can be heavy rainfall, heat waves, and drought, etc. The severity of events can be used as a threshold to test the sensitivity of methodology in determining the event duration, affected area, magnitude, and integrated severity of event. The concurrent weather systems and environment conditions associated with the extreme events can also be traced. The outcome can be compared and ranked through record history and with different regions. The total magnitude of unsegregated extreme events should link more directly to the potential damages of natural disasters. The joint events from different extremes that lead to compound hazard can be further explored.

Preferred background of student candidates:

- Senior or Junior students with good English skills are welcome.
- Strong knowledge/experience in computer (linux system) is essential.
- Good programming skills (NCL, python, C/Fortran) would be a plus.

Stipend during the research period (summer 2023) would be NT\$ 16,000 per month for July and August.