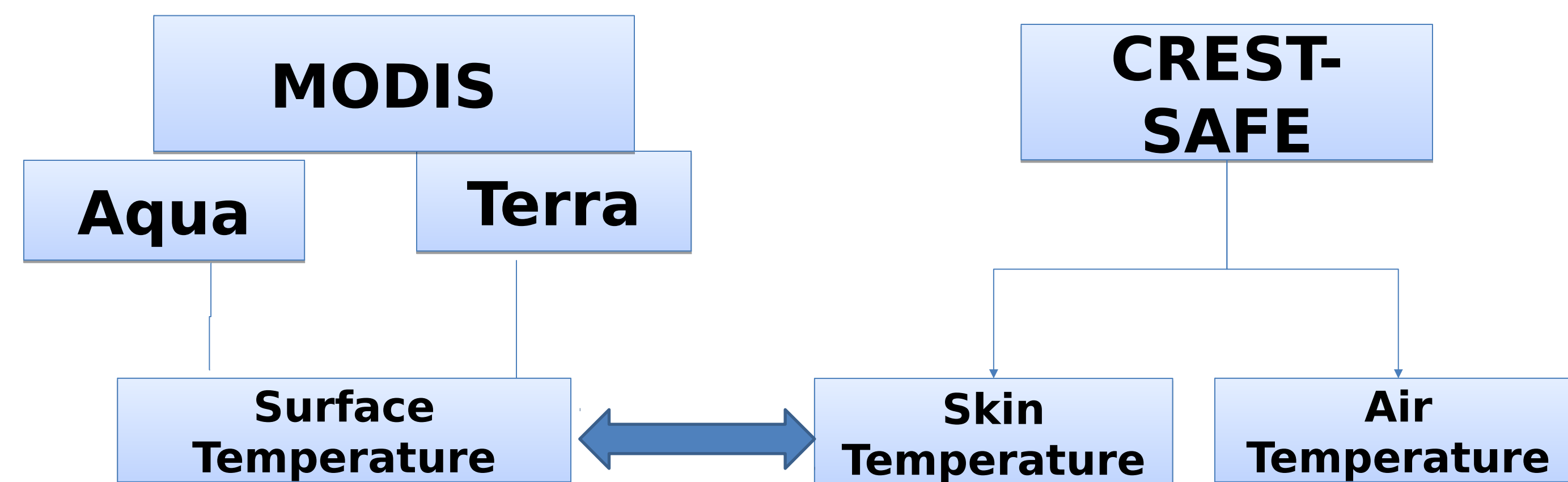


Abstract

Land Surface Temperature (LST) is an important component for the energy and water exchange between the earth's surface and the atmosphere and, therefore, its validation is required for the proper use in many environmental models where LST is a critical parameter. Satellite LST validation has been carried out by comparing satellite-derived LST to ground-based estimates. No algorithm or product would be accepted without performing calibration and validation. The objective of this research is to assess the correlation between Moderate resolution Imaging Spectroradiometer (MODIS) Land Surface Temperature Data

with observed temperature readings from a ground-based instrument installed in the National Weather Service Station at Caribou, ME. The NOAA-CREST Multi-Frequency Microwave Radiometer for snow cover measurements is located at the National Weather Service Office at Caribou, Maine. This office serves as the primary means of gathering weather data in the northeast region of the U.S. The Caribou site has a humid continental climate and offers the ideal conditions for snow studies. The normal seasonal snowfall for Caribou is approximately 116 inches (2.9 m). The record snowfall for Caribou is 197.8 inches (5.02 m) set in the winter of 2007-2008.

Methodology



- MODIS Land Surface Temperature (LST) data for Aqua and Terra was downloaded for January to mid-April (2013) from the U.S. Geological Survey Database (www.usgs.gov).
- In-situ Skin and Air Temperature was obtained from the CR3000 logger for 2013 installed at the CREST-SAFE site at Caribou, Maine.
- MODIS Land Surface Temperature data with 5.6 km pixel resolution was compared to in-situ skin and air temperature measured at CREST-SAFE site.
- Matlab was used for processing and analyzing all the parameters required for the comparison.

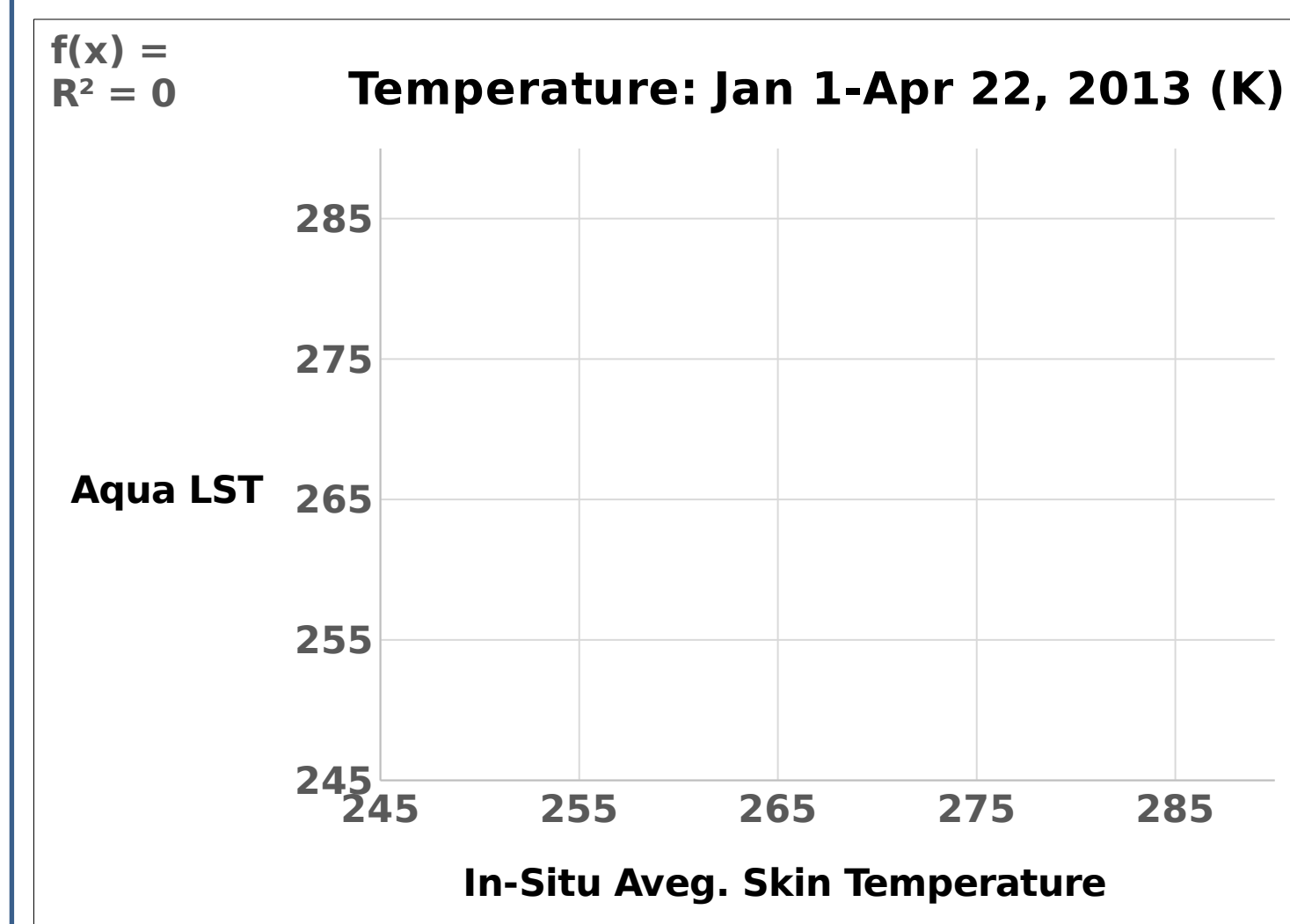
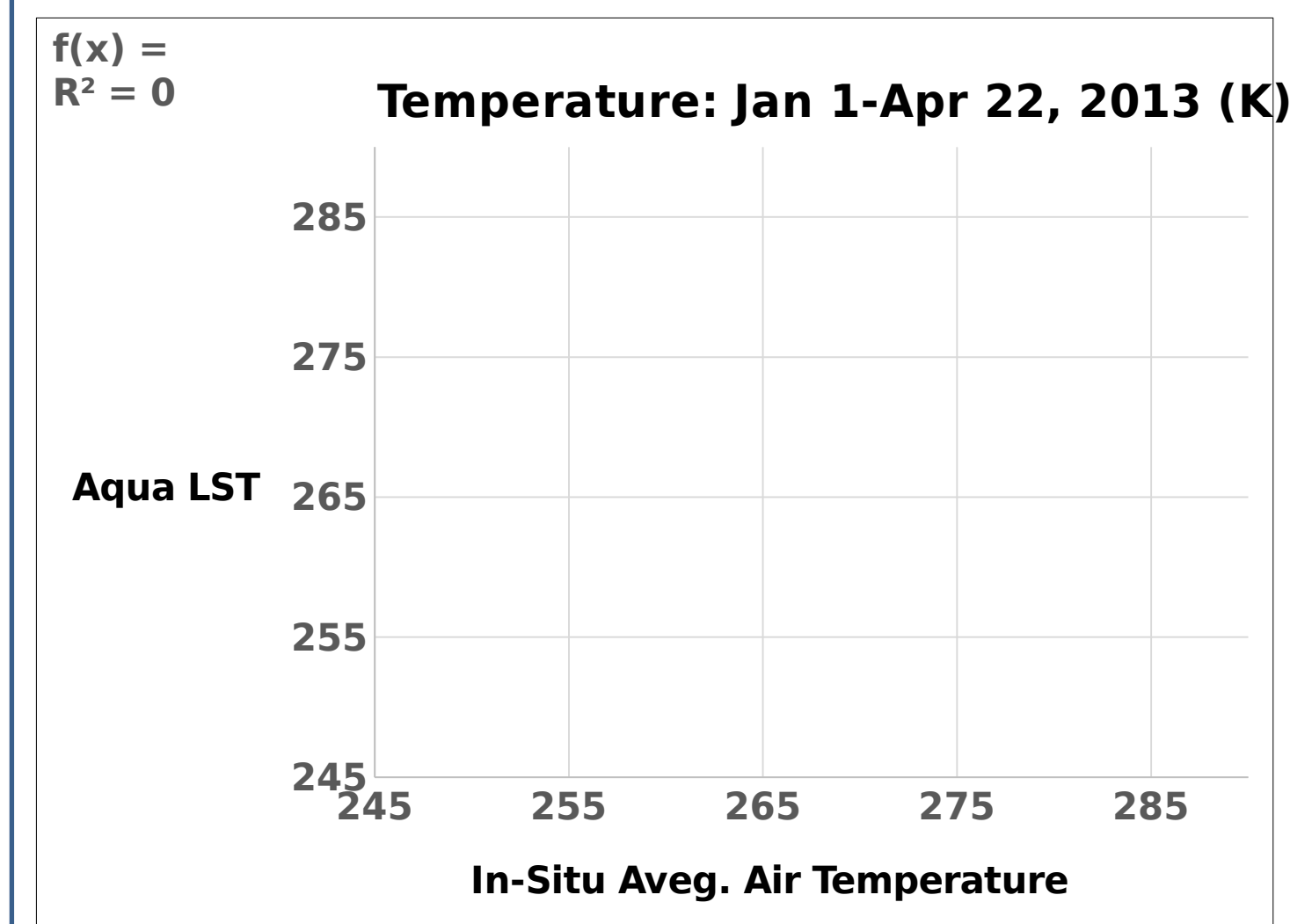
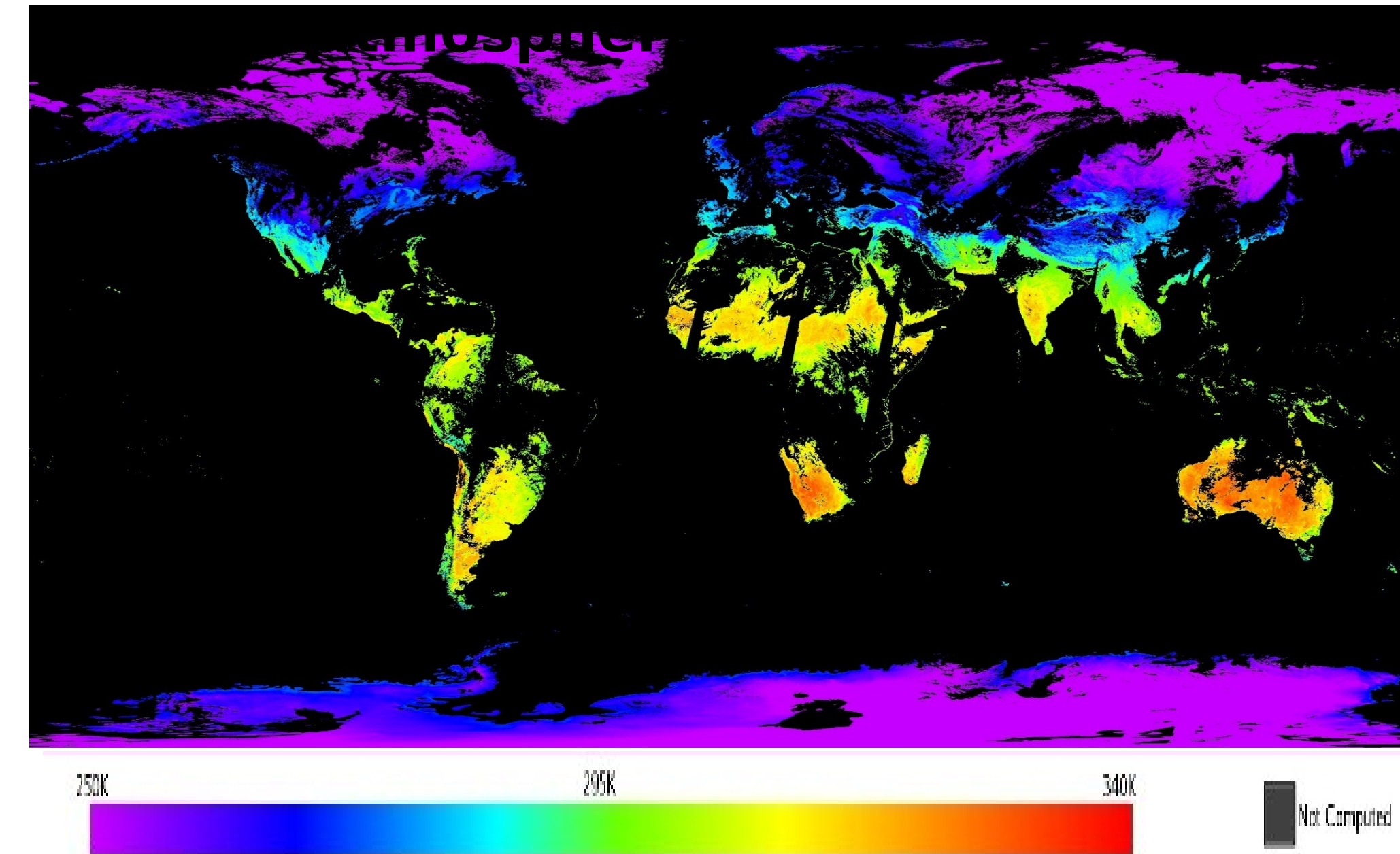
Acknowledgement

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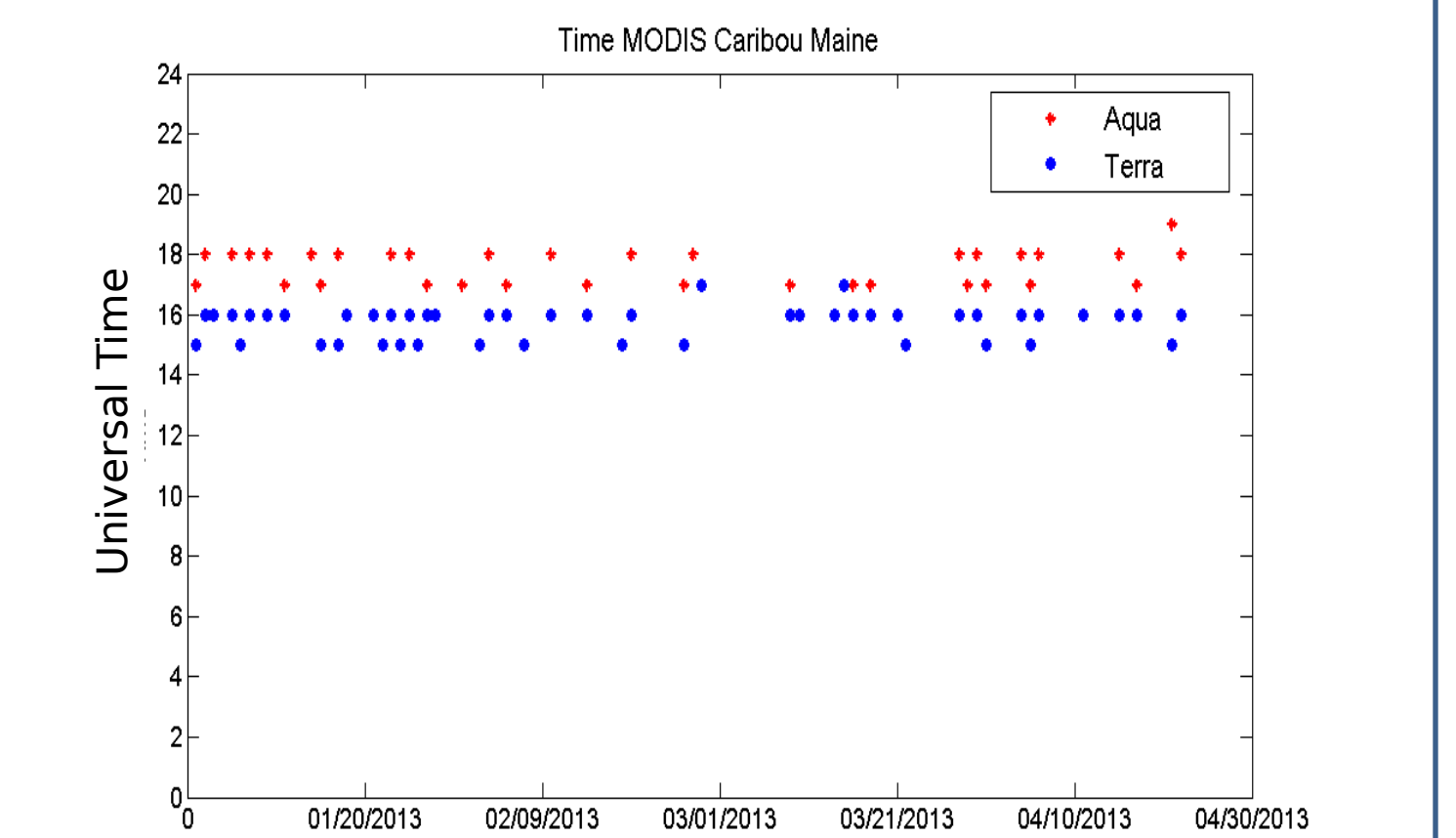
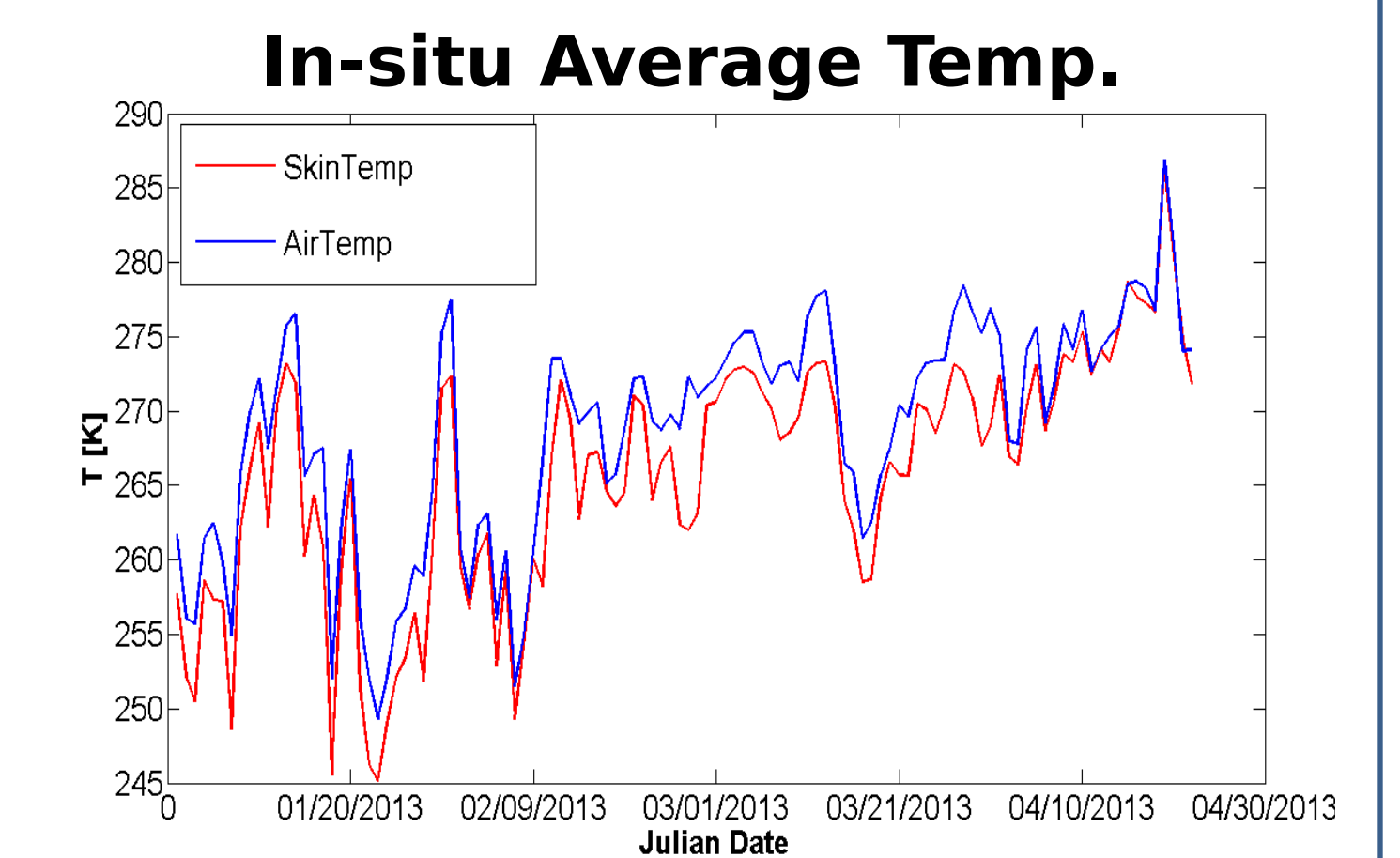
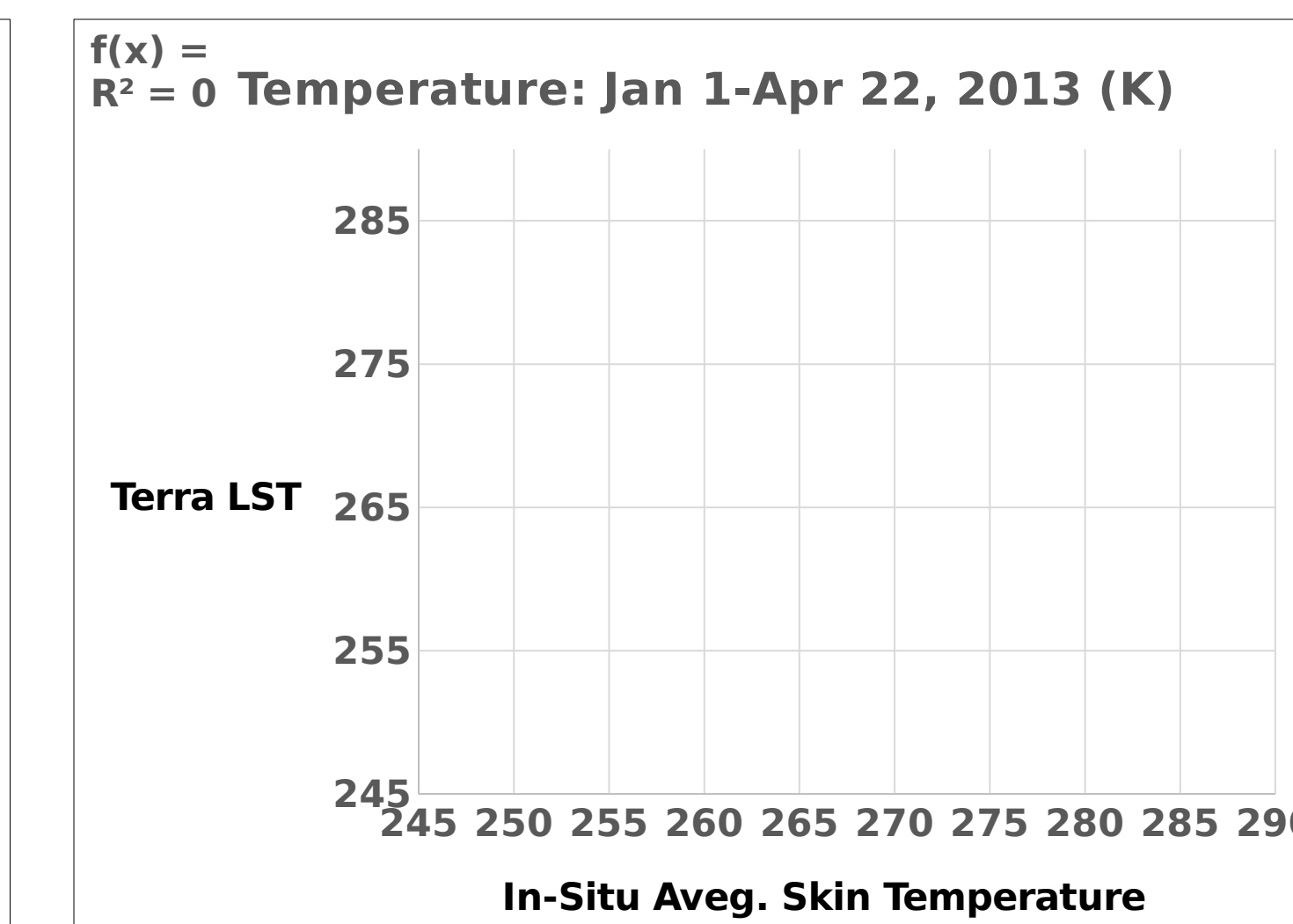
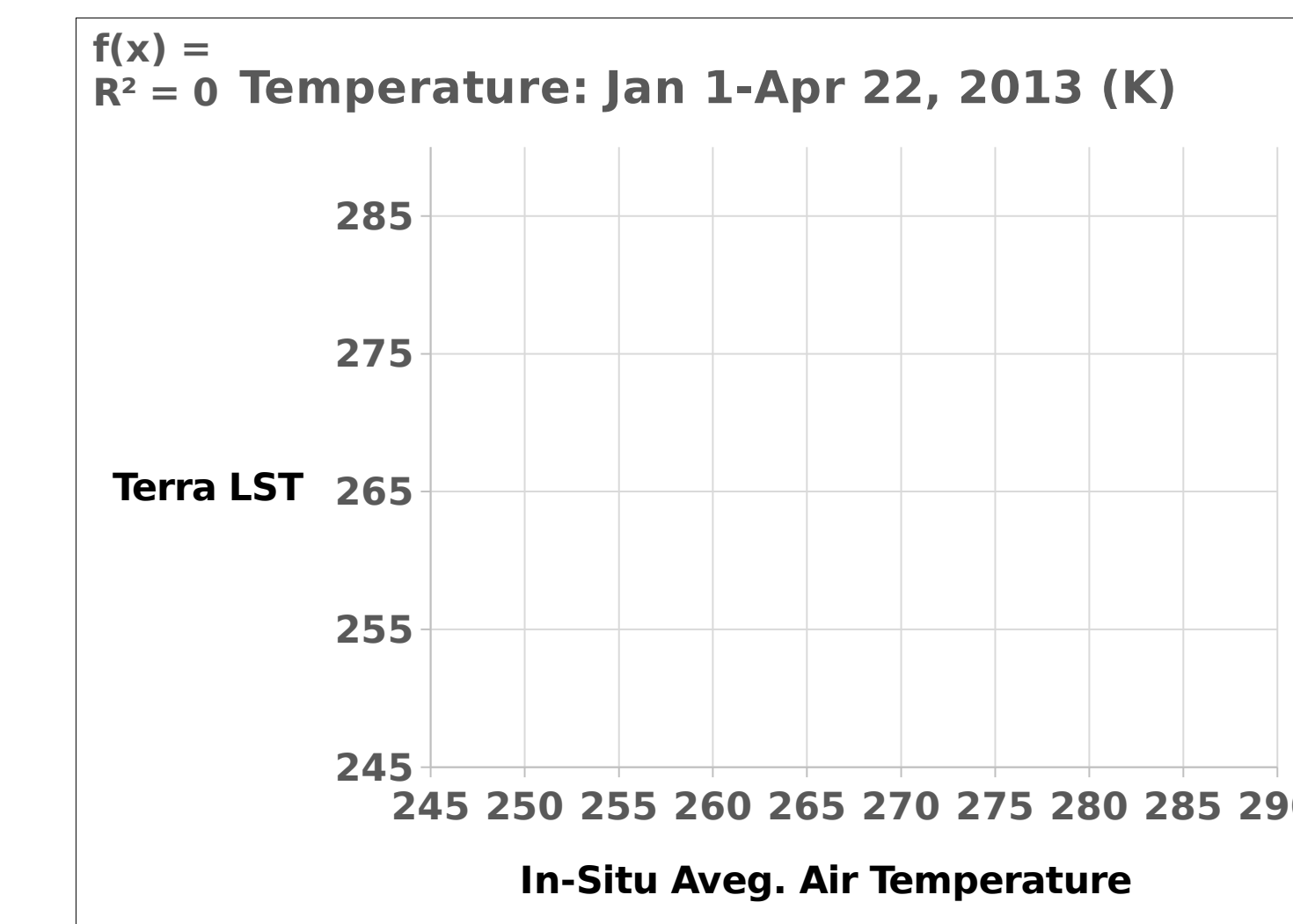
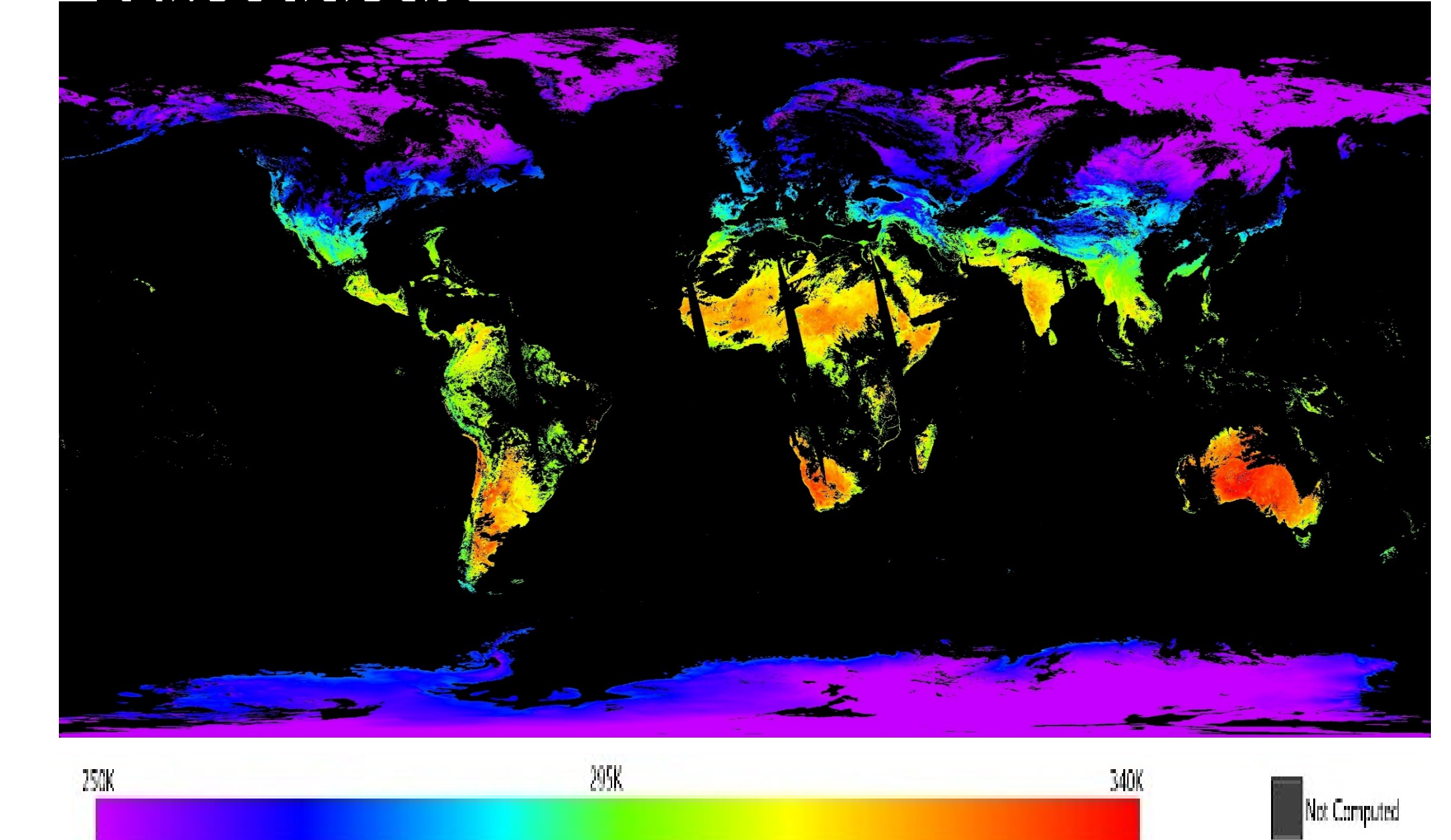
Aqua

The Aqua satellite is used to measure and study the surface of Earth's water



Terra

The Terra satellite is used to monitor and observe any changes in Earth's atmosphere



Results and Discussions

Comparison of Temperature	Terra Land Surface Temperature		Aqua Land Surface Temperature	
	RMSE	R ²	RMSE	R ²
In-Situ Skin Temperature	3.263	0.8634	3.479	0.8282
In-Situ Air Temperature	2.775	0.9115	3.503	0.8425

- The results show that Aqua and Terra land surface temperature data highly correlated with in-situ air temperature compared to skin temperature measured at CREST-SAFE field experiment site.
- When comparing in-situ skin temperature and air temperature, the highest difference in temperature is found during colder periods (January and March), while during the early spring, no significant difference was found between skin temperature and air temperature.