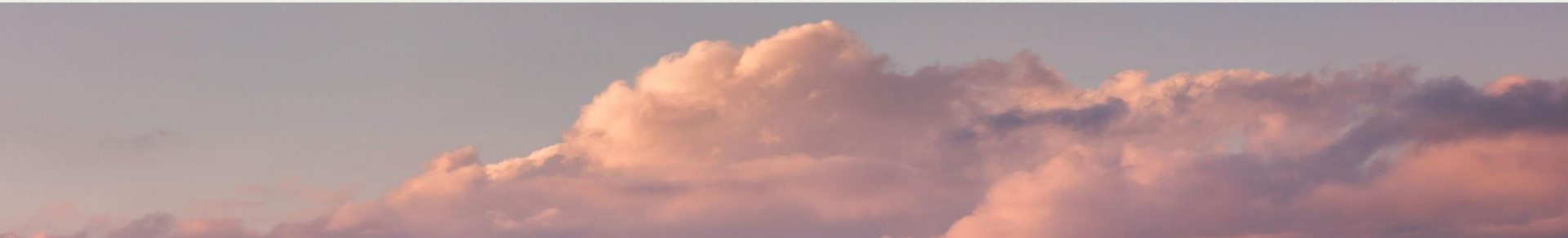


Mapping and Identifying Urban Heat Island Hotspots in Thailand

School of Science, Walailak University
Math and AI in Nature Camp (MCNC) 2024

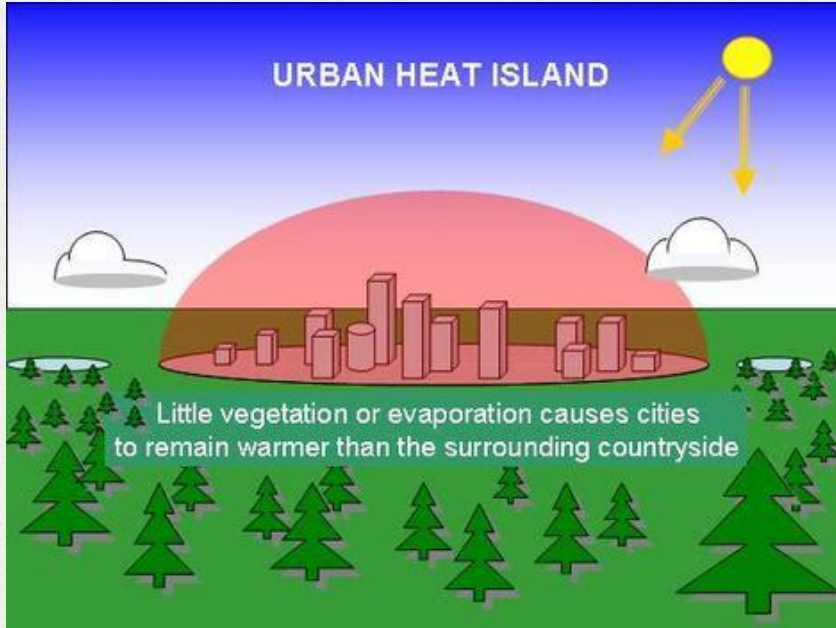
Group 1 Members:
Tonny and Dr. Wacharapong

Table of Contents

- 1. Introduction to Heat Islands**
 - 1.1 What are heat islands?
 - 1.2 Impacts of Island Heat Effect?
 - 1.3 Why does Nasa track them?
 - 2. Surface Temperature Measurement Principles**
 - 2.1 What are infrared thermometers?
 - 2.2 How are they used?
 - 2.3 Experiment with ice, hot water and stainless-steel.
 - 3. Data Collection with Infrared Thermometers**
 - 3.1 Using Globe protocol to measure surface temperatures.
 - 3.2 Uploading data through Globe app
 - 4. Satellite Temperature Measurement**
 - 4.1 Satellite-based temperature measurement
 - 4.2 Satellite science basics and relevant satellite types
 - 5. Data Retrieval and Analysis from NASA**
 - 5.1 Downloading data from NASA appears platform
 - 5.2 Analysing the data
 - 6. Research on Heat Islands in Thailand**
 - 6.1 Downloading data for key Thai cities.
 - 6.2 Comparative analysis of urban and rural areas.
 - 6.3 Brainstorming
 - 7. Data Analysis and Research Documentation**
 - 7.1 Conclusion of analysis and results presentation using PPTs.
 - 8. English Video Presentation**
 - 8.1 Video recording of research summary in english
 - 9. Resource Preparation in Google Classroom**
- 

1.0 Introduction to Heat Islands

1.1 What are heat islands?



Causes:

1. Human activities such as high population concentration, vehicles and industries
2. Infrastructure such as buildings, roads and railways
3. Reduced greenery or deforestation

1.0 Introduction to Heat Islands

1.2 Impacts of Island Heat Effect?

- ❑ Increased energy demands (cooling) that strains energy resources
- ❑ Health risks due heat waves and reduced air quality contributing to air pollution
- ❑ Increasing water demand due to cooling that strains water resources



1.0 Introduction to Heat Islands

1.3 Why does NASA track urban Island Heat effects?

- ❑ To understand how cities contribute to climate change and to help cities develop strategies to mitigate their impact



2. Surface Temperature Measurement Principles

What are Infrared Thermometers?

Also known as thermal guns or laser thermometers, these are non-contact devices that measure the temperature of an object by detecting the infrared radiation it emits.

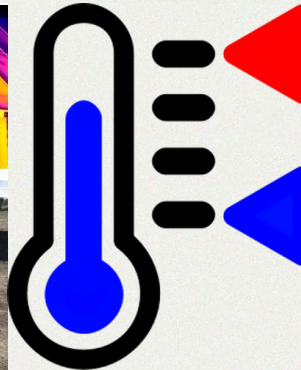
How do we use infrared thermometers?

Pointed directly at the target object and reading off the value displayed on the lcd display of the thermometer.

Experiment

Requirements

Ice, hot water and Stainless steel



3. Globe Protocol: Data Collection with Infrared Thermometers

Globe protocol?

Standardized method for collecting surface temperature data using infrared thermometers

How?

Measuring the temperature of various surfaces, such as asphalt, concrete, grass and water, and recording the data along with other environmental factors like cloud cover and wind speed

Experiment

1. Download Globe observer app from Playstore or Appstore
2. Upload the collected data through the Globe app



THE **GLOBE** PROGRAM



GLOBE
Observer

 [Sign In](#)

[Forgot/Change Password](#)

[Get the App](#)

[Do GLOBE Observer](#)

[Lead a Program](#)

[Get Data](#)

[News, Events, and People](#)

[Publications](#)

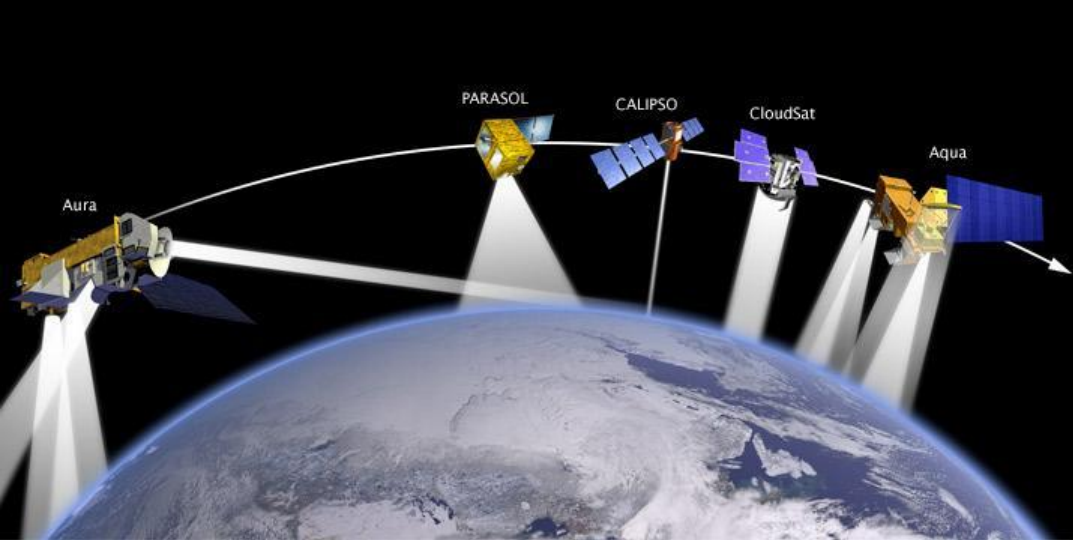
[About](#)

[Search](#)



4. Satellite Temperature Measurement

- ❑ Satellite is any object (man-made or natural) that orbits a larger object.
- ❑ Two main types satellite orbits are used for temperature measurement (Polar Orbits and Geostationary orbits)
- ❑ Satellites measure Earth's temperature by detecting the infrared radiation emitted by the planet's surface and atmosphere. They have built-in instruments like radiometers that can detect infrared radiation emitted by Earth's surface and atmosphere.



5. Data Retrieval and Analysis from NASA AppEARS platform

Download instructions link?

<https://docs.google.com/presentation/d/1AVV-Q63uW1LJw4V8OhbO-Wet2ATr27nwzgnVBnLvaD0/edit#slide=id.p>



Extract ▾ Explore Help ▾

tbadi ▾

Welcome to AppEARS!

Application for **Extracting** and **Exploring Analysis Ready Samples (AppEARS)**

The Application for Extracting and Exploring Analysis Ready Samples (**AppEARS**) offers a simple and efficient way to access and transform geospatial data from a variety of federal data archives. **AppEARS** enables users to subset **geospatial datasets** using spatial, temporal, and band/layer parameters. Two types of sample requests are available: **point samples** for geographic coordinates and **area samples** for spatial areas via vector polygons. Sample requests submitted to **AppEARS** provide users not only with data values, but also associated quality data values. Interactive visualizations with summary statistics are provided for each sample within the application, which allow users to preview and interact with their samples before downloading their data. Get started with a sample request using the Extract option above, or visit the **Help page** to learn more.