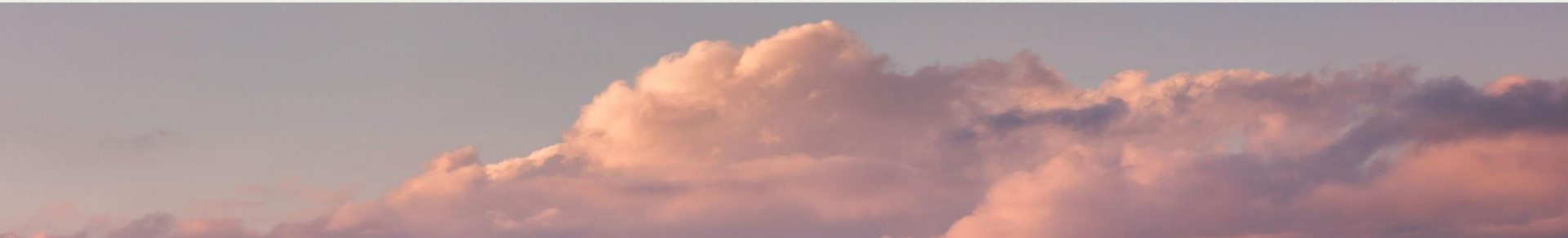# Mapping and Identifying Urban Heat Island Hotspots in Thailand

School of Science, Walailak University
Math and AI in Nature Camp (MCNC) 2024
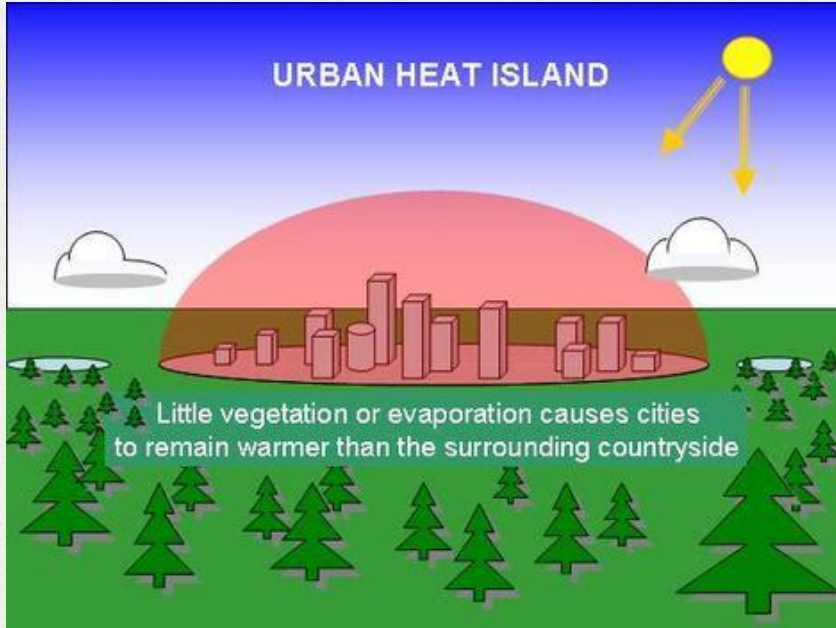
Group 1 Members:
Tonny and Dr. Wacharapong

Table of Contents

1.0 Introduction to Heat Islands

1.1 What are heat islands?

URBAN HEAT ISLAND

Little vegetation or evaporation causes cities to remain warmer than the surrounding countryside

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

Flooding   Economic Loss   Drought   Rising Sea Levels

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.
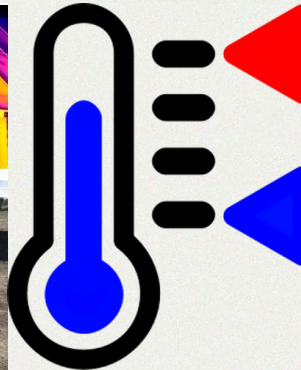
How do we use infrared thermometers?

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

Get the App   Do GLOBE Observer   Lead a Program   Get Data   News, Events, and People   Publications   About   Search
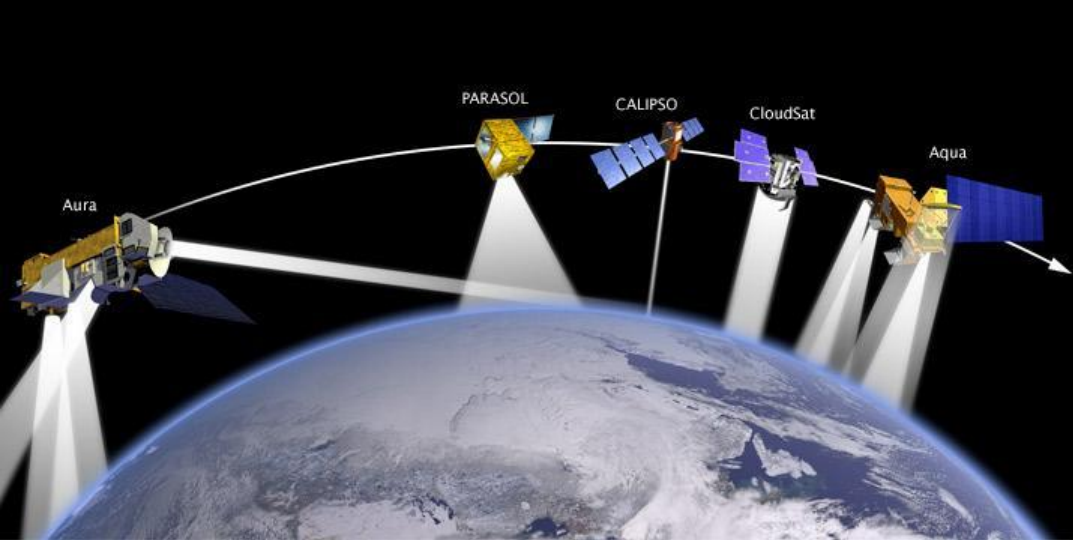
4. Satellite Temperature Measurement

❏ 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