Introductory Webinar: Satellite Remote Sensing for Urban Heat Islands

Tuesdays, November 10 - November 24, 2020

10:00-11:30 EST (Session A) or 16:00-17:30 EST (Session B)

Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas. These pockets of heat are referred to as "heat islands." Heat islands are usually measured by the temperature difference between cities relative to the surrounding areas. Temperature can also vary inside a city. Some areas are hotter than others due to the uneven distribution of heat-absorbing buildings and pavements, while other spaces remain cooler as a result of trees and greenery. The rapid growth of urban population, the urban heat island effect, and a potential increase in the frequency and duration of heat waves due to climate change, raise a series of issues about the increased health risks of sensitive urban populations to extreme heat and the effective means of mitigating impacts of heat waves. According to the US EPA, urban heat islands affect energy consumption, elevate greenhouse gas emissions, and impair water quality by increasing temperature of urban water runoff.

Part 1: Land Surface Temperature-Based Urban Heat Island Mapping

- Overview of ARSET, background on urban heat islands (UHI), satellites & sensors for monitoring UHI, limitations of satellite data, demonstration of converting Landsat 4-8 thermal data to land surface temperature (LST), and Q&A session

Part 2: Integrating In-Situ Observations with Satellite Imagery

- Review previous session and introduce guest speaker, background with case studies integrating in situ observations with satellite imagery in select US cities, and Q&A session

Part 3: Mitigating UHI via Long-Term Urban Climate Monitoring

- Review previous sessions and introduce guest speakers, USGS/NOAA case studies using Landsat ARD-LST to assess UHI in select US cities and diurnal effects of UHI using GOES LST with land cover, DEVELOP case study of UHI and land cover in Huntsville, AL, and Q&A session

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