PCW 7
Scaling Up Spatial Analyses: Using Google Earth Engine for Satellite Imagery Retrieval, Processing, and Analysis

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Duration: Half Day

Environmental epidemiologists often use spatiotemporal data for exposure assessment (e.g. air pollution, temperature, greenness). Faced with the challenge of processing large datasets, often from different sources, traditional workflows using desktop applications are limited by computational power and memory. Participants will learn to address these analytical bottlenecks using Google Earth Engine, a publicly available cloud-based tool for spatiotemporal data collection, linkage, and analysis. This tool is free, requires only an internet connection and a browser, and makes collaboration and reproducibility convenient. This workshop aligns with the conference theme of “Advancing Environmental Health in a Changing World”. In the half-day interactive workshop, participants will learn to: * Interact with different modules in Google Earth Engine (30 minutes) * Browse decades’ worth of satellite images that capture environmental exposures across the planet. For example, the Normalized Difference Vegetation Index can be ascertained with different satellite products including Landsat (since 1972, bimonthly, 30m^2 resolution) and MODIS (since 2000, 16-day, 250m^2) (1 hour) * Calculate area-level statistics for satellite-derived environmental measures within a given geographic boundary. We will show participants how to apply these computationally-intensive steps in Earth Engine with varying buffer sizes, and
how to export these data for offline curation (1 hour) * Discuss implications of using Google Earth Engine for data management and collaboration for epidemiologic analyses, as well as ethical / privacy concerns (30 minutes)
Workshop participants will bring their own laptops and be guided through exercises using the Normalized Difference Vegetation Index (MODIS) as the primary example. Instructors will also provide code examples using other satellite-derived exposures including Light at Night (DMSP/VIIRS), temperature (MODIS), and air pollution (Sentinel