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Abstract

Title: Using NASA Environmental Data to Enhance Public Health Decision Making

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The Universities Space Research Association at the NASA Marshall Space Flight Center is collaborating with the University of Alabama at Birmingham (UAB) School of Public Health and the Centers for Disease Control and Prevention (CDC) to address issues of environmental health and enhance public health decision making by utilizing NASA remotely sensed data and products. The objectives of this collaboration are to develop high-quality spatial data sets of environmental variables, and deliver the data sets and associated analyses to local, state and federal end-user groups. These data can be linked spatially and temporally to public health data, such as mortality and disease morbidity, for further analysis and decision making. Three daily environmental data sets have been developed for the conterminous U.S. on different spatial resolutions for the time period 2003-2008: (1) spatial surfaces of estimated fine particulate matter (PM_{2.5}) exposures on a 10-km grid utilizing the US Environmental Protection Agency (EPA) ground observations and NASA's MODerate-resolution Imaging Spectroradiometer (MODIS) data; (2) a 1-km grid of Land Surface Temperature (LST) using MODIS data; and (3) a 12-km grid of daily Solar Insolation (SI) and maximum and minimum air temperature using the North American Land Data Assimilation System (NLDAS) forcing data. These environmental data sets will be linked with public health data from the UAB REasons for Geographic And Racial Differences in Stroke (REGARDS) national cohort study to determine whether exposures to these environmental risk factors are related to cognitive decline and other health outcomes. These environmental datasets and public health linkage analyses will be made available to public health professionals, researchers and the general public through the CDC Wide-ranging Online Data for Epidemiologic Research (WONDER) system and through peer reviewed publications. To date, two of the data sets have been released to the public in CDC WONDER, Daily Air Temperature and Heat Index for years 1979-2010, and Daily Fine Particulate Matter (PM_{2.5}) air quality measures for years 2003-2008. These data in CDC WONDER can be aggregated to the county-level, state-level, or regional-level as per users' need and downloaded in tabular, graphical, and map formats. The summary statistical output are available to web and app developers via the WONDER Application Programming Interface (API). The linkage of these data with the CDC WONDER system provides a significant addition to CDC WONDER, allowing public health researchers and policy makers to better include environmental exposure data in the context of other health data available in CDC WONDER online system. It also substantially expands public access to NASA environmental data, making their use by a wide range of decision makers feasible.