Use of Satellite Remote Sensing to Build Health Resilience

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Background/Objectives. The use of satellite data for gathering evidence of climate change and its associated hazards, such as sea level rise, increases in atmospheric temperature, or extreme weather events, is well established. But geospatial data derived from satellites can also play an important role in climate resilience and adaptation planning. Hundreds of instruments aboard satellites provide consistent observations of land, ocean, and atmospheric processes at regional to global scales that span years to decades. These space-based observations can complement existing environmental and socioeconomic data to help communities and policy makers better adapt to the impacts of climate change. Moreover, understanding future climate scenarios is a critical aspect of resilience planning, and many global forecast models utilize satellite data to improve their estimates of the future climate. Integrating these satellite resources into resilience decision-making is a complex collaborative endeavor to identify the demand or decision-making needs, the supply or satellite resources potentially suitable to meet those needs, and then building the capacity of communities to integrate the information into their planning and management processes. Our objective is to present illustrative case studies in current use of satellite imagery for health resilience, and to offer a set of recommendations for potential growth that could be adopted by policy makers now and in the near future.

Approach/Activities. We examined regional and global satellite datasets that are well suited to planning for and adapting to 1) worsening air pollution and 2) increased heat stress due to climate change. We choose these two topics, as they are relatively mature, and there is a wealth of available data. Our approach is based on identifying both current uses of satellite assets, as well as untapped opportunities. While satellite-based measurements lack the precision of in situ observations, they can help fill in the spatial and temporal gaps in existing observational networks and support health policy formulation and implementation. For example, satellite data and model predictions of atmospheric pollutants can be used to identify communities at risk of air quality impacts and/or inform the placement of ground-based instrumentation to help track exposure to pollutants, understand inequities in environmental exposure, and ultimately mitigate risks.

Results/Lessons Learned. We will present a summary of some of the commonly used satellite assets for building resilience to air pollution and heat, followed by a discussion of additional opportunities for use of these assets. We also provide recommendations for additional satellite datasets or contexts to which satellite resources could be applied to mitigate health risks; novel approaches for applying existing satellite measurements to air quality planning and vulnerability assessments; and a review of near future Space Agency satellites that will enable a better quantification of health impacts due to climate change, at improved temporal and spatial scales.