

Poster

Accessing and Utilizing Remote Sensing Data For Vectorborne Infectious Diseases Surveillance and Modeling

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Background

The transmission of vectorborne infectious diseases is often influenced by environmental, meteorological and climatic parameters, because the vector life cycle depends on these factors. For example, the geophysical parameters relevant to malaria transmission include precipitation, surface temperature, humidity, elevation, and vegetation type. Because these parameters are routinely measured by satellites, remote sensing is an important technologic tool for predicting, preventing, and containing a number of vectorborne infectious diseases, such as malaria, dengue, West Nile virus, etc.

Methods

A variety of NASA remote sensing data can be used for modeling vectorborne infectious disease transmission. We will discuss both the well known and less known remote sensing data, including Landsat, AVHRR (Advanced Very High Resolution Radiometer), MODIS (Moderate Resolution Imaging Spectroradiometer), TRMM (Tropical Rainfall Measuring Mission), ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer), EO-1 (Earth Observing One) ALI (Advanced Land Imager), and SIESIP (Seasonal to Interannual Earth Science Information Partner) dataset. Giovanni is a Web-based application developed by the NASA Goddard Earth Sciences Data and Information Services Center. It provides a simple and intuitive way to visualize, analyze, and access vast amounts of Earth science remote sensing data. After remote sensing data is obtained, a variety of techniques, including generalized linear models and artificial intelligence oriented methods, can be used to model the dependency of disease transmission on these parameters.

Results

The processes of accessing, visualizing and utilizing precipitation data using Giovanni, and acquiring other data at additional websites are illustrated. Malaria incidence time series for some parts of Thailand and Indonesia are used to demonstrate that malaria incidences are reasonably well modeled with generalized linear models and artificial intelligence based techniques.

Conclusions

Remote sensing data relevant to the transmission of vectorborne infectious diseases can be conveniently accessed at NASA and some other websites. These data are useful for vectorborne infectious disease surveillance and modeling.

