Geophysical Research Abstracts
Vol. 14, EGU2012-4156, 2012
EGU General Assembly 2012

Potential of Sentinel Satellites for Schistosomiasis Monitoring

C.-R. Li (1), L.-L. Tang (1), H.-B. Niu (1), X.-N. Zhou (2), Z.-Y. Liu (1,3), L.-L. Ma (1), and Y.-S. Zhou (1)

(1) Academy of Opto-Electronics, Chinese Academy of Sciences, Beijing, China, (2) National Institute of Parasitic Diseases, Chinese Center for Diseases Control and Prevention, Shanghai, China, (3) Graduate University of Chinese Academy of Sciences, Beijing, China

Schistosomiasis is a parasitic disease that menaces human health. In terms of impact this disease is second only to malaria as the most devastating parasitic disease. Oncomelania hupensis is the unique intermediate host of Schistosoma, and hence monitoring and controlling of the number of oncomelania is key to reduce the risk of schistosomiasis transmission. Remote sensing technology can real-timely access the large-scale environmental factors related to oncomelania breeding and reproduction, such as temperature, moisture, vegetation, soil, and rainfall, and can also provide the efficient information to determine the location, area, and spread tendency of oncomelania. Many studies show that the correlation coefficient between oncomelania densities and remote sensing environmental factors depends largely on suitable and high quality remote sensing data used in retrieve environmental factors.

Research achievements on retrieving environmental factors (which are related to the living, multiplying and transmission of oncomelania) by multi-source remote data are shown firstly, including: (a) Vegetation information (e.g., Modified Soil-Adjusted Vegetation Index, Normalized Difference Moisture Index, Fractional Vegetation Cover) extracted from optical remote sensing data, such as Landsat TM, HJ-1A/HSI image; (b) Surface temperature retrieval from Thermal Infrared (TIR) and passive-microwave remote sensing data; (c) Water region, soil moisture, forest height retrieval from synthetic aperture radar data, such as Envisat SAR, DLR's ESAR image. Base on which, the requirements of environmental factor accuracy for schistosomiasis monitoring will be analyzed and summarized.

Our work on applying remote sensing technique to schistosomiasis monitoring is then presented. The fuzzy information theory is employed to analyze the sensitivity and feasibility relation between oncomelania densities and environmental factors. Then a mechanism model of predicting oncomelania distribution and densities is developed. The new model is validated with field data of Dongting Lake and the dynamic monitoring of schistosomiasis breeding in Dongting Lake region is presented.

Finally, emphasis are placed on analyzing the potential of Sentinel satellites for schistosomiasis monitoring. The requirements of optical high resolution data on spectral resolution, spatial resolution, radiometric resolution/accuracy, as well as the requirements of synthetic aperture radar data on operation frequency, spatial resolution, polarization, radiometric accuracy, repeat cycle are presented and then compared with the parameters of Sentinel satellites. The parameters of Sentinel satellites are also compared with those of available remote satellites, such as Envisat, Landsat, whose data are being used for schistosomiasis monitoring. The application potential of Sentinel satellites for the schistosomiasis monitoring will be concluded in the end, which will benefit for the mission operation, model development, etc.