Tele-epidemiology: which contribution for Earth Observation satellite data?

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Public health authorities worldwide have to respond to the emergence and spread of various infectious diseases at the local, regional and global levels. Half the world’s population is subject to the risk of emerging or re-emerging of such diseases that are responsible for 14 million deaths every year.

Most such diseases arise from the interaction of humans with animals and their environment, and considerable attention is now given to global factors affecting their incidence and transmission. The context of this situation is a world in transition where rapid environmental changes (climate change, population growth, deforestation and urbanization, agricultural intensification, globalization and increased trade) fosters pathogens and their dispersal, thereby contributing to endemic and emerging diseases in humans, wild or domestic animals and plants.

In addition, non-communicable diseases are responsible for a growing number of deaths worldwide according to the WHO, and can be caused by organic or inorganic elements in the environment.

Faced with these challenges, an integrated multidisciplinary research is growing, called tele-epidemiology, especially around the concepts of “One Health” and “EcoHealth”. It consists in studying the links between the environment, ecosystems and etiological agents responsible for diseases in human, animal and plant populations, based on space products truly adapted to the needs of health actors. It combines the physical, biological, social sciences and humanities and aims to understand the mechanisms involved and identify the factors that affect the spread of these pathologies. These factors can be environmental, climatic, demographic, socio-economic and/or behavioral. Some can be identified from space, which requires the development of effective methods to use remote sensing for risk factor characterization, mapping and monitoring. Data from Earth observation satellites do not directly concern the pathogens causing the disease, but their environment – they will therefore be used to measure these favorable factors. The objective is to provide public health stakeholders, tools adapted to monitor factors favorable to the emergence of these diseases in order to:

- prevent and evaluate the risks of dissemination,
- strengthen the control
- inform and mobilize the population and health professionals