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MAPPING HABITATS FOR VECTORS OF INFECTIOUS DISEASE: VECMAP

Abstract

Vector-borne diseases such as Malaria, Chikungunya, Dengue and West Nile are a persistent public health concern. International exchanges and changing climate conditions set a favourable ground for foreign species to colonize new environments world-wide. VECMAP is a project of the European Space Agency's Integrated Application Promotion program (IAP). Its focus so far has been on mosquitoes, although other vectors such as ticks, midges and rodents are now being considered. Based on needs expressed by national public health agencies and regional mosquito controllers a consortium led by Avia-GIS is developing a service for predicting mosquito-related health risks (early warning) and for reducing nuisance (targeted control effort). VECMAP enhances and simplifies traditional mathematical distribution modelling, field and laboratory work with the help of satellite navigation and Earth Observation.

Prediction of vector distributions and associated risks is a challenge. It requires elaborate numerical simulations to be steadily fed with observations. To this end mosquito vectors are first sampled to make preliminary maps of vector presence. Using geo-referencing techniques and mobile communication technologies, the field data are automatically fed into the VECMAP distribution modelling tools, which use space imagery (processed to extract vegetation, weather data, proximity of water bodies, land use) to predict the presence of the vector throughout a project area, which may then be related to health risk or nuisance levels..

The VECMAP system optimises the sampling regime, ensures that state of the art modelling tools are used, and provides updated EO imagery to support the modelling. The system also provides assistance to clients where needed and acts as a secure data archive for the inputs and outputs. Using VECMAP's integrated systems and services significantly reduces the resources needed to implement existing programmes, and with its automated methodologies and comprehensive supporting services makes advanced techniques more widely available than has hitherto been the case..

The results of the VECMAP feasibility study and prototype demonstration indicate that the amount of field work can be greatly reduced by exploiting capabilities of satellites. A pre-operational service will therefore now be implemented.