CASE STUDY 4D

MALARIA SENSITIVITY TO CLIMATE IN COLOMBIA: THE IMPORTANCE OF DATA AVAILABILITY, QUALITY AND FORMAT

Author: L. López Álvarez (Instituto de Hidrología, Meteorología y Estudios Ambientales - IDEAM, Bogotà, D.C. Colombia).

Research

CONTEXT

This study is part of the global Integrated National Adaptation Project (INAP) and focuses on numerical-statistical modelling, with the aim of obtaining a methodology that assesses the probability of malaria occurrence in Colombia. The ultimate goal is to develop an early warning system, based on average temperature and rainfall and their correlation with the number of malaria cases, particularly in five locations with evidence of endemic malaria (Puerto Libertador, Montelíbano, San José del Guaviare, Tumaco y Buenaventura).

Weather and climate data and malaria data were provided by the Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM) and the Instituto Nacional de Salud (INS) respectively, and processed with the aim of updating the existing database.

NEW APPROACHES

The first activity was to transform asynchronous climatological and epidemiological years to epidemiological weeks.

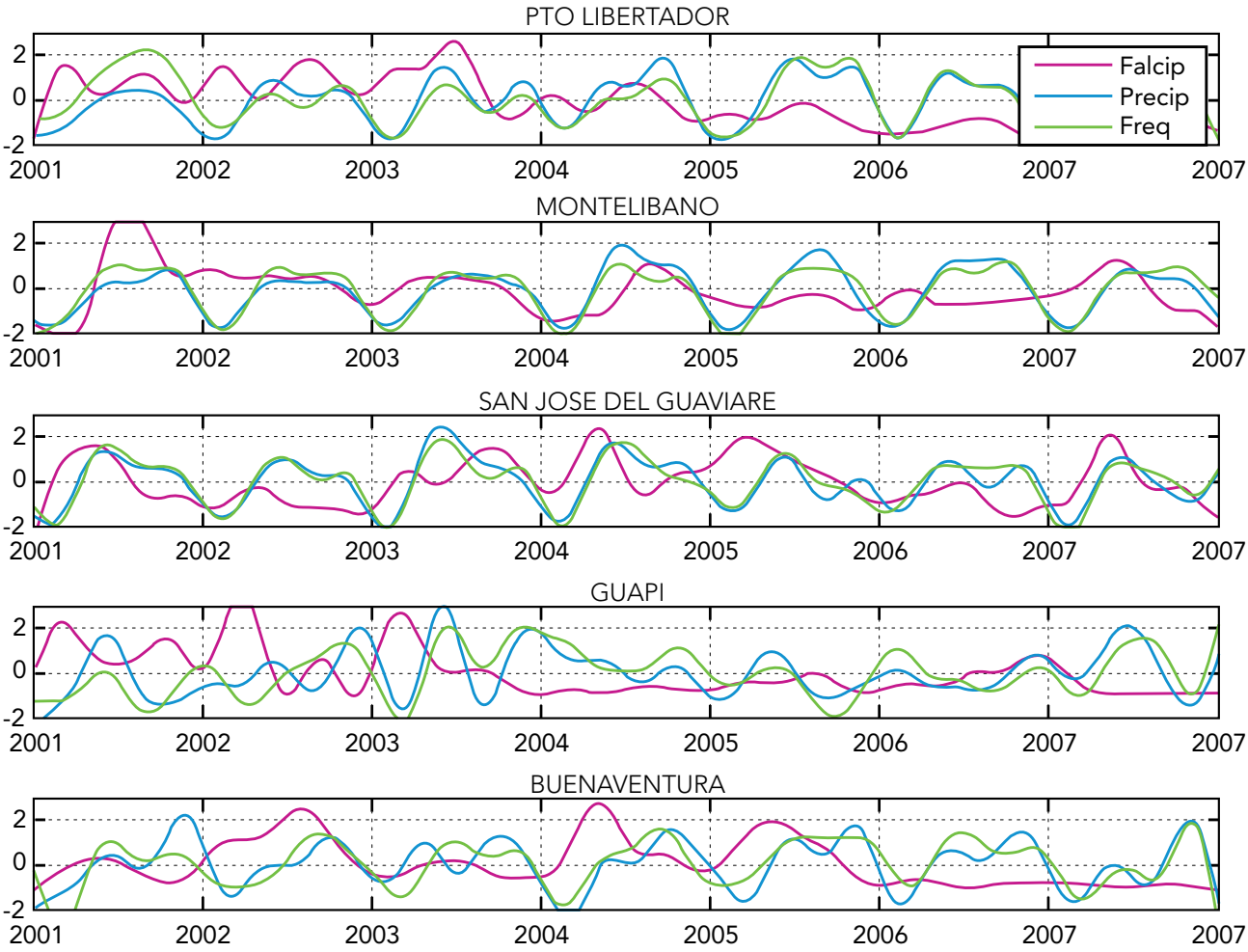
Interdisciplinary meetings between climatologists and medical doctors were held to unify criteria regarding the type of information required, and to estimate the dynamics of disease transmission (such as parasite and vector lifespans). This allowed identification of the seasons (rain or dry) that have a direct impact on the number of vectors and therefore help to define a seasonal malaria prevention system.

Various groups were convened to review work and evaluate progress in the first phase of the model development. Exploratory research was also undertaken to understand the status of technological and scientific tools in the field of malaria globally (such as databases, specialized software, and transmission models) to complement the work that was being conducted.

Results were reviewed by the INS. It was observed that climate has varied impacts on vector multiplication rates and on the general health of the population in the different regions. Given the range of variables and effects, it was concluded that development of a climate–health model, specific for each population, was essential *(9)*.

The variable effects can be seen in Figure 4.6, depicting rainfall and the number of malaria cases in each local population. While the number of cases increases with rainfall in San José de Guaviare, the opposite is observed in Buenaventura.

Figure 4.7 Comparison between the series of *Plasmodium falciparum* and standardized rainfall (2001 to 2008).



BENEFITS AND LESSONS

Available health time series data in Colombia are very short, preventing robust statistical analysis from being conducted. As a result, it is difficult to determine the disease seasonality, epidemic behaviour or correlation with climate data series.

Similarly, the study showed that the format of climate information is not the most appropriate for such analysis. In some cases it is in text format, while in others in numerical format, which makes cleaning and processing a cumbersome process. The health information on malaria cases is also often incomplete or inadequate for optimal analysis.

Even though an extensive and complete exploratory analysis of the variables was conducted, which is a fundamental first step in the development of an adequate model, the study was interrupted mid-way because of the overall project completion, and staff turnover prevented continuation. The initial climate and malaria/dengue model was not used due to lack of institutional capacity *(10)*.

ACKNOWLEDGEMENTS

The authors acknowledge the support of staff at the IDEAM and International Research Institute for Climate and Society at Columbia University for the implementation of this project.