

ENAC-SIE, Master Project	Start: Feb 2019
30 ECTS credits	End: Jul 2019

Title Identification and modeling of the link between climatic and hydrologic drivers and the epidemiology of diarrheal diseases in the Amazon

Supervisors Dr. Javier Perez-Saez, Prof. Andrea Rinaldo. In collaboration with Dr. Johanna Gonçalves Martin.

Objective Investigate the link between climatic and hydrological factors and the seasonality of diarrheal cases in urban and peri-urban areas in the Amazon through exploratory statistical analysis and mathematical modeling.

Abstract Diarrhea is one of the leading causes of child under 5 years mortality, causing 700'000 deaths per year worldwide. In the Amazon it represents a major public health issue where it is among the leading causes of child mortality. Diarrhea can be caused by a number of waterborne pathogens, and the role of climatic and hydrological drivers is poorly understood, in particular in tropical areas such as the Amazon. Within the framework of a multi-disciplinary project with the Institute of Global Health (UNIGE) and the College des Humanités (EPFL) in Switzerland, and the Universidad Nacional de Colombia (UNAL), we here focus on the epidemiology of diarrhea in the urban area of Leticia (Colombia) located on the shores of the Amazon river and its peri-urban surrounding which are inhabited by different indigenous groups. Counting on a 20-year long timeseries of field hydrological and climatic data on one hand, and epidemiological data from Leticia's health surveillance system, the aim is to use quantitative methods (statistics and modeling) to uncover the associations between environmental factors and disease transmission across different levels of urbanization, modulated by distinct cultural practices across indigenous groups.

Task description

- Statistical analysis of epidemiological and environmental data
- Integration of extracted information into a mathematical model of disease transmission and inference of parameter values from data

Required skills	• Skills in statistical data analysis with R/Matlab/Python • Solid knowledge in probabilities/statistics
Additional remarks	The project may be followed by a 3-week fieldwork in Leticia during the summer within a multi-disciplinary team of students.
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