Assessment of mosquito borne disease hazards using hyper resolution hydrological modeling

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Project description

An important factor for establishment and spreading of mosquito borne disease is the occurrence of surface water as breeding areas. Climate change will affect the spatio-temporal dynamics of such water bodies, e.g. due to changes in precipitation pattern, and other factors relevant for vectors such as temperature and humidity. This may result in a shift of mosquito borne disease spatial distribution, e.g. to higher altitudes and from the Global South to higher latitudes (due to warming climate). Yet, currently existing mosquito-borne disease models do not properly represent mechanisms relating surface water and disease outbreaks. They currently still focus mainly on precipitation or use limited/coarse resolution surface water data, e.g. at > 10 km (which is insufficient for representing dispersal of vectors between water patches).

Addressing this research gap, we would like to use hydrological modeling at very high spatial resolution, e.g. at 30m-1km resolution. We envision incorporating such high-resolution hydrological model outputs, such as its surface water or soil moisture products, will enhance current studies on mosquito-borne diseases. Our focus will be on malaria and dengue, the two world most dangerous mosquito-borne diseases in the world.

The project is mainly study desk for doing computer modeling. In the first part of the project, there will be weekly regular meetings (in person or online), and this frequency may reduce as you become more independent in this project. You will be involved in writing scientific publications resulting from this work. We will also explore the opportunity for you to present this work at conferences (subject to funding).

Job requirements

We are looking for a student that knows scientific programming (e.g. Python, R or Matlab).