

HYDROLOGICAL ASPECTS OF AN AGENT-BASED MODEL FOR MALARIA TRANSMISSION

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Malaria is a mosquito-borne illness with one of the largest annual global disease burdens. It is transmitted between hosts by anopheline mosquitoes. The transmission rate is considered to be directly proportional to the number of mosquitoes in an environment and the mosquito count can be estimated by the amount of aquatic habitats in a given region.

We present a rainfall-aware agent-based model that captures many population, behavioral and life-stage characteristics of a malaria vector, *Anopheles gambiae*. Virtual mosquito agents interact with an environment whose surface water is determined by a discrete hydrological model. In this scheme, landscapes respond to water influxes (generally assumed to be rainfall) and temporarily hold that water after an instant loss.

We show this model can characterize highland and lowland mosquito population profiles and show that the virtual mosquito population is very responsive to this change. We also show that the age composite of a mosquito population is very dependent on the changing abundance of surface water.