VECTRI: "VECtor borne disease community model of ICTP, Trieste"

VECTRI is a mathematical model for malaria transmission that accounts for the impact of temperature and rainfall variability on the development cycles of the malaria vector in its larval and adult stage, and also of the parasite itself. The majority of the relationships are taken from the literature for the *Anopheles gambiae* vector and the *Plasmodium Faciparum* species of the parasite. Temperature affects the sporogonic and gonotrophic cycle development rates, as well as the mortality rates for adult vectors. Water temperature, closely related to air temperature impacts both the growth rate and mortality of larvae. Rainfall impacts transmission through a simple but physically-based model of surface pool hydrology, with high rain-rates increasing early stage larvae through flushing effects (Paaijmans et al. 2007). The model is designed to run over regional to continental scales at high spatial resolutions of up to around 5-10km using a daily timestep for the integration.

One unique element for a regional scale model is that it accounts for population density in the calculation of biting rates, such that the model is able to reproduce the observed reduction in Entomological inoculation rates (EIR) with increasing population density (e.g. KellyHope et al. 2009). For full details of the models mathematical framework and its evaluation, see Tompkins and Ermert, 2012: *A regional-scale, high resolution dynamical malaria model that accounts for population density, climate and surface hydrology*, submitted to Malaria Journal, and the VECTRI webpage at **http://www.ictp.it/~tompkins/vectri**