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(yixiang.wu@vanderbilt.edu). *Spatial Models of Vector-Host Epidemics with Directed Movement of Vectors Over Long Distances.*

We investigate a time-dependent spatial vector-host epidemic model with non-coincident domains for the vector and host populations. The host population resides in small non-overlapping sub-regions, while the vector population resides throughout a much larger region. The dynamics of the populations are modeled by a reaction-diffusion-advection compartmental system of partial differential equations. The disease is transmitted through vector and host populations in criss-cross fashion. We establish global well-posedness and uniform a priori bounds as well as the long-term behavior. The model is applied to simulate the outbreak of bluetongue disease in sheep transmitted by midges infected with bluetongue virus. We show that the long-range directed movement of the midge population, due to wind-aided movement, enhances the transmission of the disease to sheep in distant sites. (Received September 23, 2018)