days without rain are necessary to trigger hatching), the dynamical spatio-temporal distribution of *Aedes vexans* density was based on the daily rainfall amount and associated ponds dynamics. Detailed ZPOM mapping was obtained on a daily basis and combined with aggressiveness temporal profiles. Risks zones, i.e. zones where hazards and vulnerability are combined, are expressed by the percentages of parks where animals are potentially exposed to mosquito bites. This new conceptual approach, using precise remote-sensing techniques, simply relies upon rainfall distribution also evaluated from space. It is meant to contribute to the implementation of operational Early Warning Systems for RVF based on environmental risks linked to climatic and environmental changing conditions: natural and anthropogenic. In addition, future developments of the system will be tackled in the framework of the 'AdaptFVR' project of the research program 'Management and Impacts of Climate Change' or 'Gestion et Impacts du Changement Climatique (GICC)' in French, managed by the Ministry of Ecology, Energy, Sustainable Development and Sea (Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer, MEEDDM, in French).

A diffusion model to predict spatial and temporal population dynamics of Rift Valley fever vectors in Northern Senegal

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We have developed an explicit spatial and temporal model to predict the population dynamics and dispersal of the two main mosquito vector species (*Aedes vexans* and *Culex poicilipes*) involved in Rift Valley fever virus (RVFV) transmission in Senegal (western Africa). Covering an area of 11x10 km around the village of Barkedji, and located in the Ferlo valley (Northern Senegal), the study area is characterized by a complex and dense network of water bodies and ponds that are filled by rainfall during the rainy season (from July to mid-October). These water bodies are known to be the principal mosquito breeding sites in the area.

A spatial diffusion model (Raffy and Tran, 2005) is applied in combination with a vector population dynamic model (Soti et al., 2009), and which takes into account the hydrological conditions of the system (Soti et al., submitted). The vector population dynamic model has been more specifically derived from Porphyre et al. (2005). Daily mosquito abundance for each pond was fed into the spatial diffusion model to simulate the spread of vector populations around their breeding sites, taking into account the spatial distribution of night camps of the sensitive hosts (essentially small ruminants such as sheep) and the influence of the landscape variables (vegetation type and density) extracted from a Quickbird satellite image. We have validated the simulation results using apparent mosquito-abundance data collected during the 2002 and 2003 rainy seasons, using sheep-baited traps located at different distances from the ponds (Chevalier et al., 2004). This original approach will allow predicting how mosquitoes move and disperse spatially and temporally, such information being useful for orienting health protection measures towards areas of higher risk for RVF.

From high-spatial resolution remote sensing to modeling the dynamics of habitats of mosquito vectors of Rift Valley Fever vs rainfall in Barkedji area, Senegal

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