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# Regional and seasonal variations in the impacts of large-scale teleconnections of the European-North Atlantic region on mosquito abundance in Germany

## Inhalt

Several parameters have been used in recent modelling studies to predict the distribution and abundance of arthropod vectors of medical importance. These include several climatological, meteorological and anthropogenic parameters which influence the lifecycle, traits, and flight activities of mosquito vectors. However, the impact of large-scale atmospheric teleconnection patterns in the European-North Atlantic (EUNA) region on mosquito populations is yet to be examined. This study therefore evaluates the potential of EUNA teleconnection patterns such as the North Atlantic Oscillation (NAO), Arctic Oscillation (AO), the Summer East Atlantic (SEA) pattern, East Atlantic Western Russia (EAWR) pattern and the Scandinavian (SCAND) pattern on mosquito abundance in Germany. Using a long-term German-wide mosquito surveillance dataset, time-series regression and temporal-mode principal component analysis (T-mode PCA), we investigated regional and seasonal-specific relationships between EUNA teleconnections and mosquito abundance and diversity in Germany. We found that the EAWR and SEA play a major role in the regional and seasonal variations of mosquito abundance in Germany. Using distributed lag nonlinear models (DLNMs), we found that the strength and mode of the main EUNA teleconnections in the hibernation seasons (winter: lag of 90 days) determine mosquito abundance in the emergence and activity seasons of mosquitoes (e.g., spring and summer). Mosquitoes are highly abundant in the warmest, driest and lowland regions of Germany. These findings contribute to the state-of-the-art on the impacts of natural climate variability on mosquito populations and serves as basis to advance and expand monitoring and forecasting tools of mosquito vectors –an important step to combat the recent surge of mosquito-borne diseases (MBDs) in Germany.

## Keywords

natural climate variability, European-North Atlantic teleconnections, West Nile, dengue, chikungunya, Germany

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## Professional Status of the Speaker

PhD Student

## Junior Scientist Status

Yes, I am a Junior Scientist.

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