1 **Title**. Long-Lasting Insecticidal Nets provide only protection against malaria for a single year

2 in Burundi, an African highland setting with marked malaria seasonality.

3

4 **Authors**. Wim Van Bortel*+, Joachim Marien*, Bart K.M. Jacobs, Denis Sinzinkayo, Pierre

5 Sinarinzi, Emmanuel Lampaert, Rob D'hondt, Jean-Marie Mafuko, Anja De Weggheleire,

6 Florian Vogt, Neil Alexander, William Wint, Peter Maes, Veerle Vanlerberghe, Corey LeClair

7

8 **Supplementary material 1**
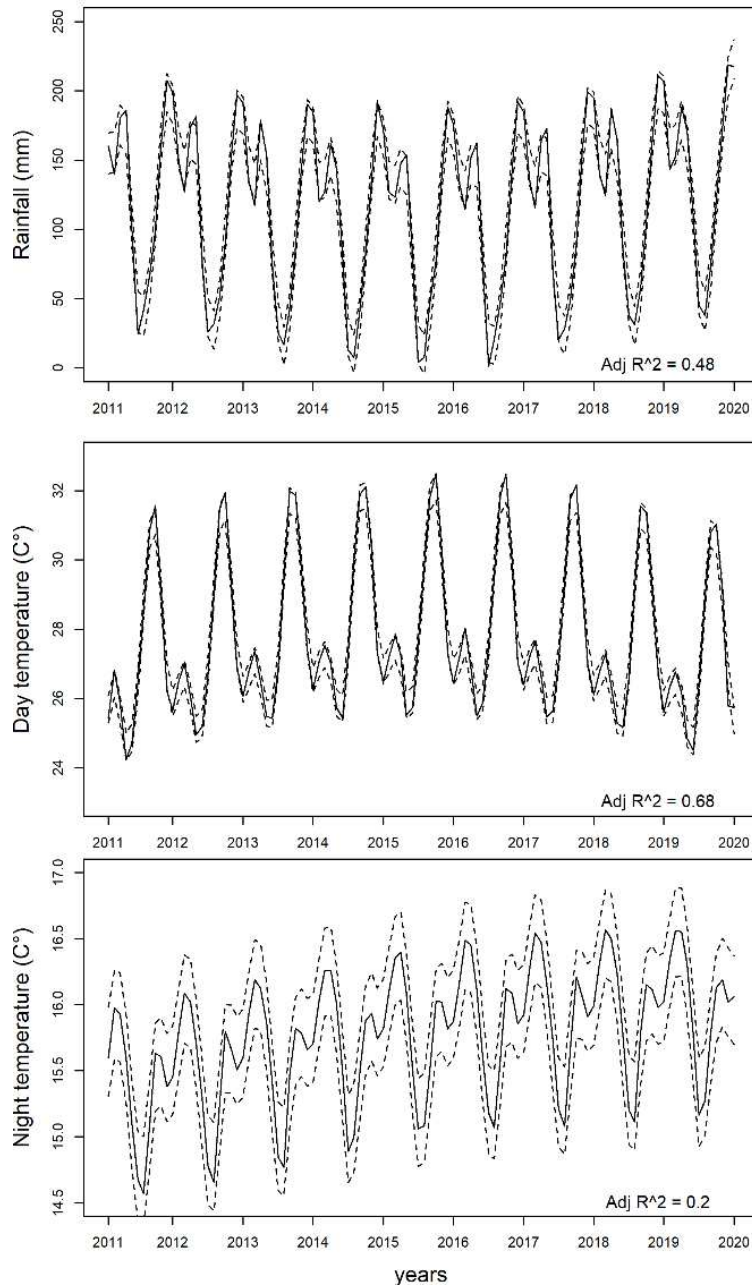
9 *Diagnostic plots*

10 **Figure S1.** Different diagnostic plots to assess the deviations against the model assumptions

11 for the malaria incidence GAMM. Although no major deviations against the functional form

12 or dependencies in the residual data were observed, the plots suggest some remaining

13 heteroscedasticity in the residual data. Because there is no obvious non-parametric

14 alternative and classical solutions for heteroscedasticity (e.g. weighted least squares) are not

15 implemented for GAMMs, we consider this the best model fit possible. Furthermore, given

16 the clear effects of the explanatory variables in this model, it is unlikely that small deviations

17 against the model assumptions would impact the final conclusions of the analysis.
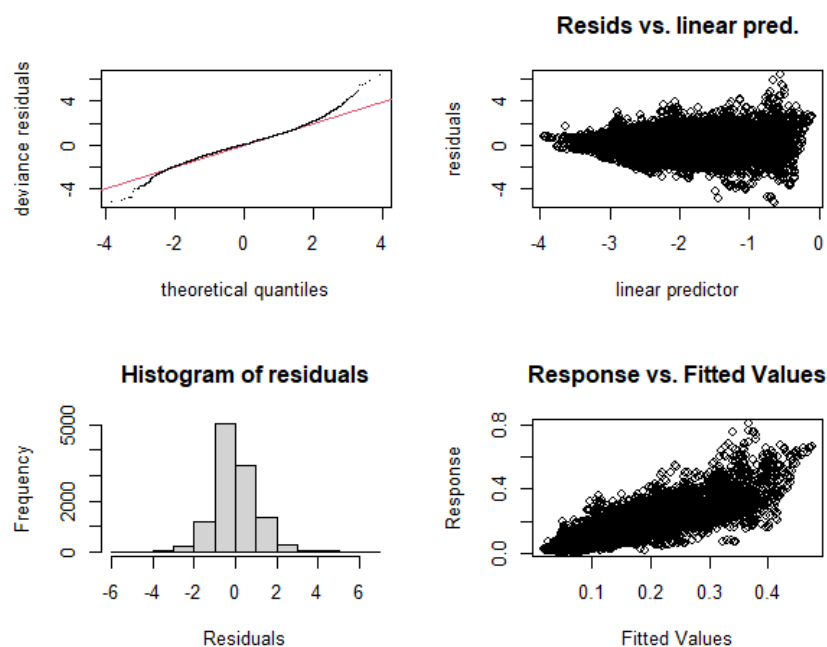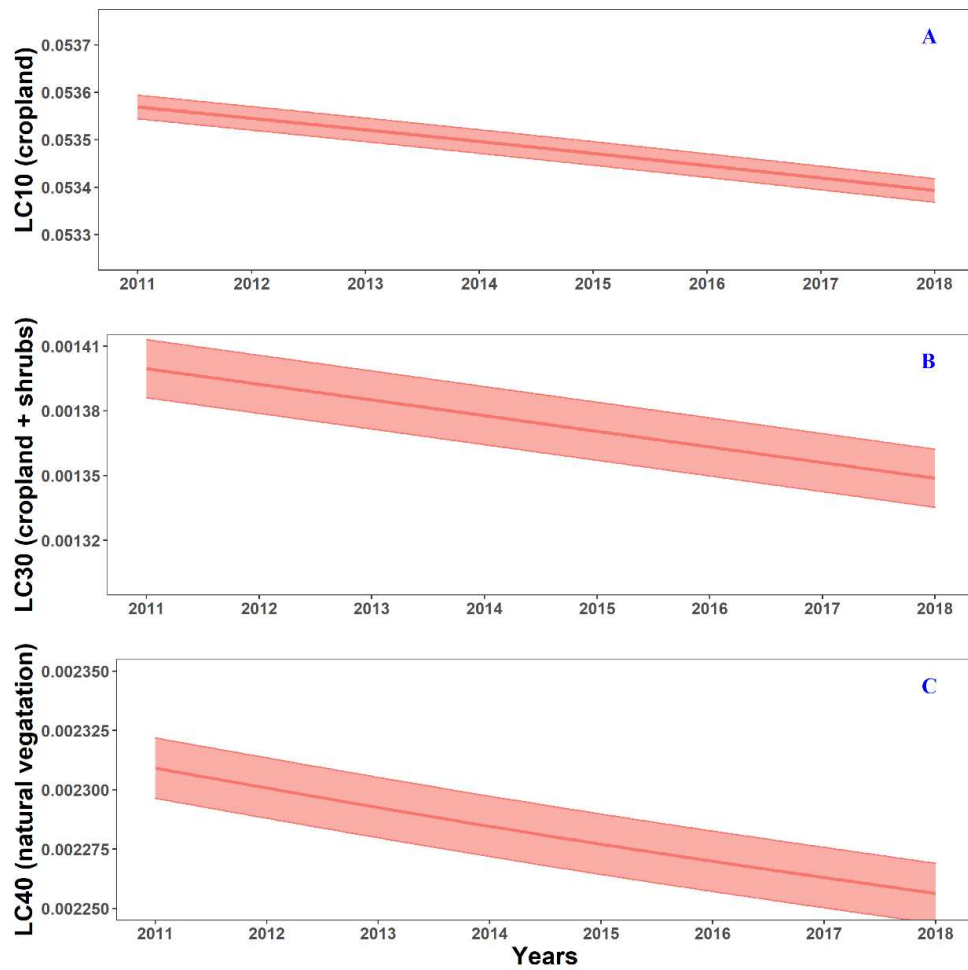

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19 ***Trends in climate variables and land use***

20 ***Figure S2:*** Mean climate variables (rainfall, day/night temperatures) for endemic highland

21 health districts in Burundi in function of time as estimated by a generalized additive mixed

22 model. Estimates for the full model (seasonal + continuous time) + 95 % confidence intervals

23 .

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Supplemental material

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25 ***Figure S3***: Estimated mean land cover (LC) variables as function of continuous time as

26 predicted by generalized additive mixed models for the endemic highland health districts in

27 Burundi. The red envelope represents the 95% confidence interval on the average LC

28 estimated over health districts included in this study.

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30