Supplementary materials
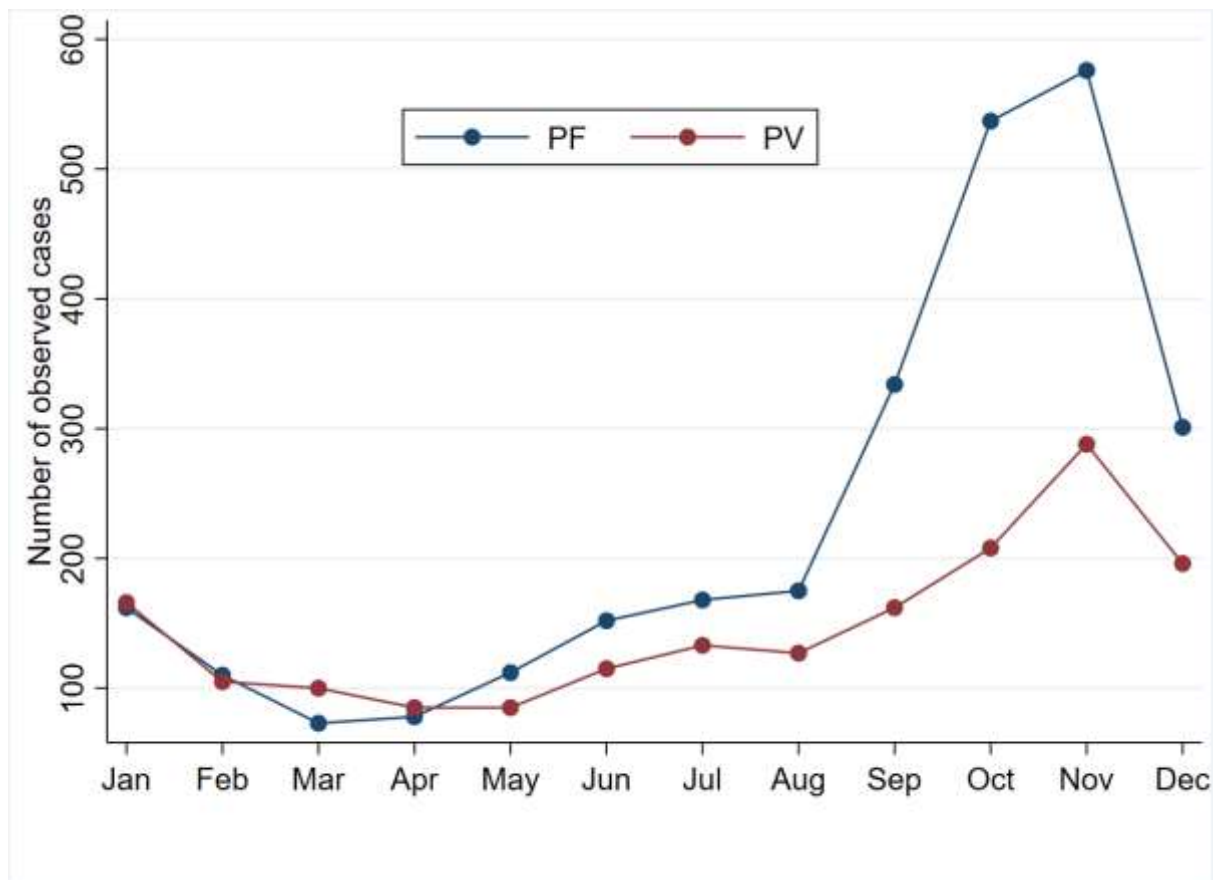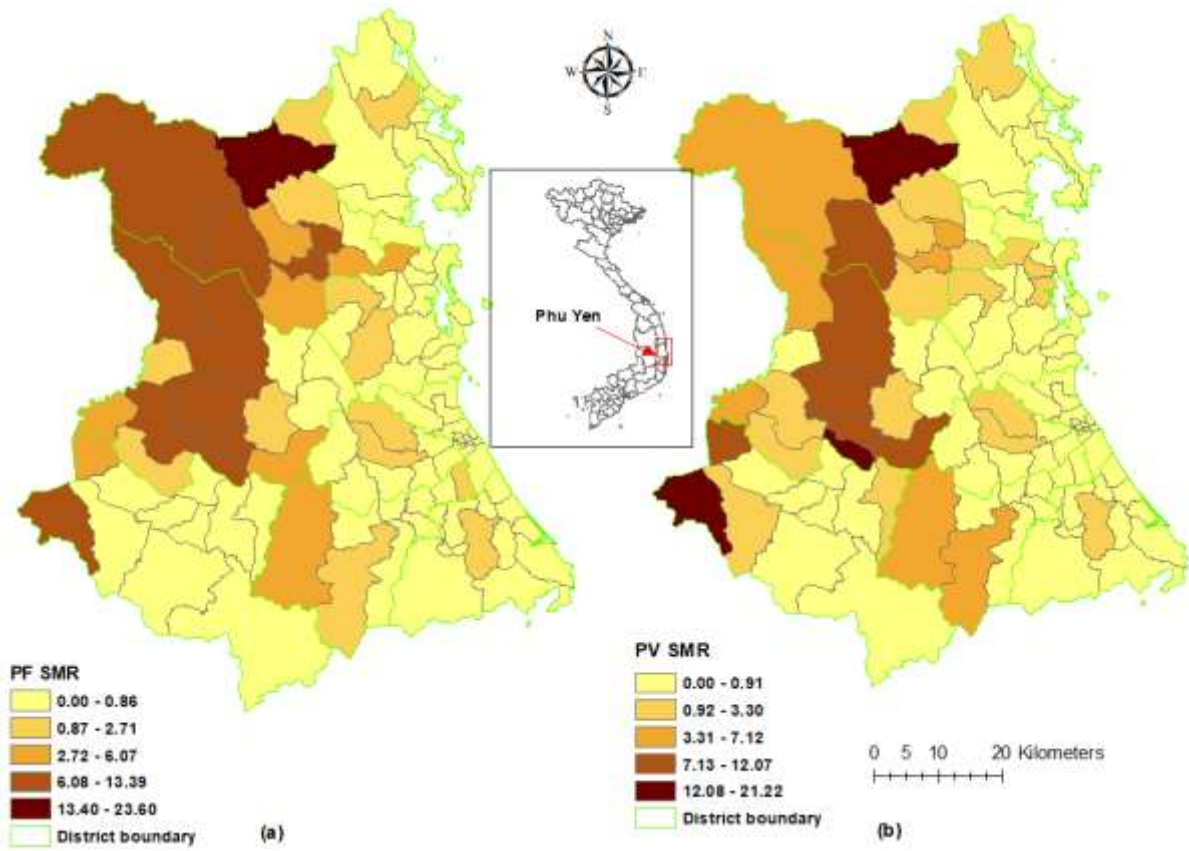
Supplementary Figure 1 Time series of numbers of reported cases of malaria due to Plasmodium falciparum and Plasmodium vivax, Phu Yen, 2005-2016.

Supplementary Figure 2 Crude standardized morbidity ratios (SMR) of (a) *Plasmodium falciparum* **(b)** *Plasmodium vivax* **by communes of Phu Yen Province, Viet Nam, 2005-2016.**
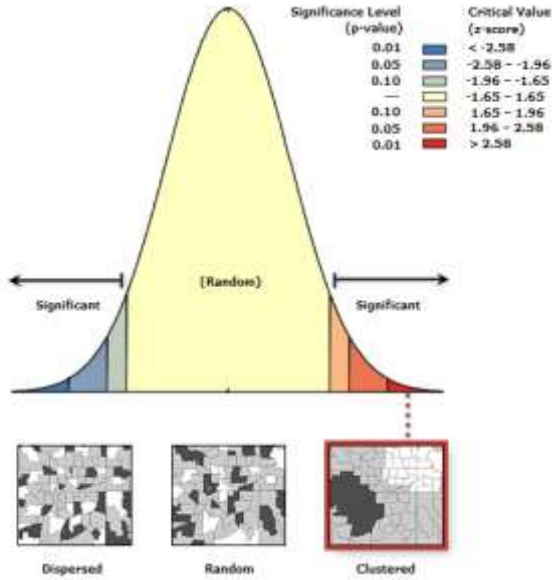
Supplementary Figure 3 Spatial Autocorrelation Report for *Plasmodium falciparum*

Moran's Index: 0.209888

     z-score: 9.296555 ▭

     p-value: 0.000000

Given the z-score of 9.296555, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

Global Moran's I Summary

Moran's Index:	0.209888
Expected Index:	-0.009709
Variance:	0.000558
z-score:	9.296555
p-value:	0.000000

Dataset Information

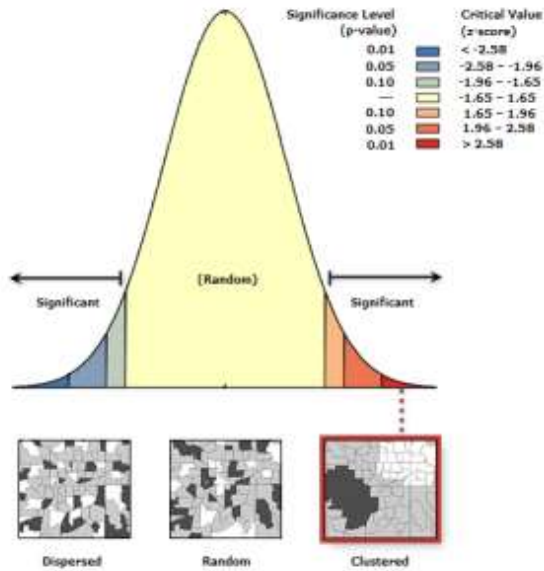|	
Input Feature Class:	Phu_yen_commune
Input Field:	PF_CASES.CSV.INC
Conceptualization:	INVERSE_DISTANCE
Distance Method:	EUCLIDEAN
Row Standardization:	False
Distance Threshold:	17931.5800 Meters
Weights Matrix File:	None
Selection Set:	False

Supplementary Figure 4 Spatial Autocorrelation Report for *Plasmodium vivax*

Moran's Index: 0.131331

z-score: 5.936701 ▬

p-value: 0.000000

Given the z-score of 5.936701, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

Global Moran's I Summary

Moran's Index: 0.1331331

Expected Index: -0.009709

Variance: 0.000564

z-score: 5.936701

p-value: 0.000000

Dataset Information

Input Feature Class: Phu_yen_commune

Input Field: PV_CASES_NEW.CSV.INCIDENCE

Conceptualization: FIXED_DISTANCE
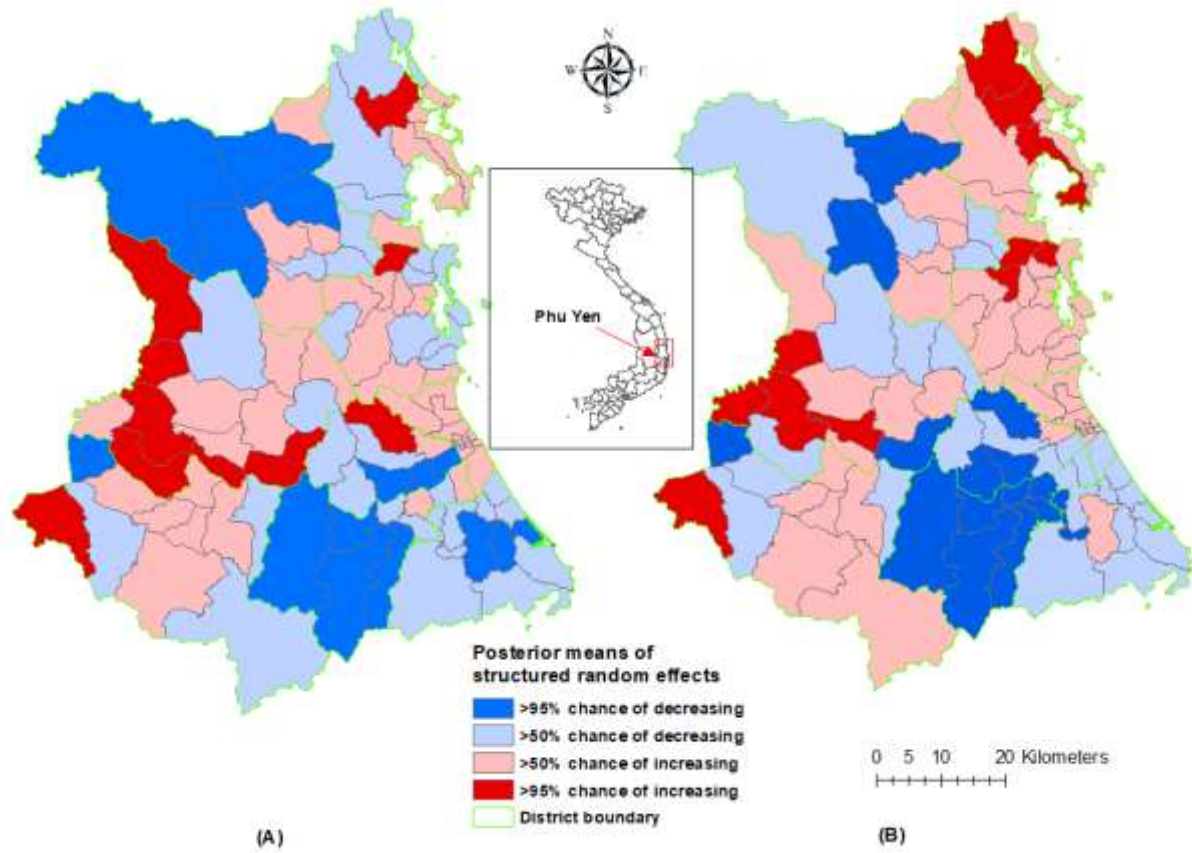
Distance Method: EUCLIDEAN

Row Standardization: False

Distance Threshold: 17931.5800 Meters

Weights Matrix File: None

Selection Set: False

Supplementary Figure 5 Trend analysis of (A) *Plasmodium falciparum* and (B) *Plasmodium vivax* by communes of Phu Yen Province, Viet Nam, 2005-2016.

Supplementary Table 1 Independent climatic variable selection

A) Climatic variables without lag.

Variables	IRR (95% CI)	P value	AIC
Precipitation	1.004 (1.0038, 1.0044)	<0.0001	16579*
Temp max	0.88 (0.868, 0.894)	<0.0001	17110.58
Temp min	0.88 (0.863, 0.894)	<0.0001	17195.15*

* Lowest AIC, selected variable.

B) Climatic variables with one-month lag.

Variables	IRR (95% CI)	P value	AIC
Precipitation	1.004 (1.0035, 1.004)	<0.0001	16702.47
Temp max	0.998 (0.868, 0.894)	0.666	17387.48
Temp min	0.99 (0.97, 1.007)	0.231	468977.7

C) Climatic variables with two-month lag.

Variables	IRR (95% CI)	P value	AIC
Precipitation	1.002 (1.0015, 1.0021)	0.133	17245.36
Temp max	1.11 (1.096, 1.131)	<0.0001	17196.76
Temp min	1.08 (1.063, 1.105)	<0.0001	17321.29

D) Climatic variables with three-month lag.

Variables	IRR (95% CI)	P value	AIC
Precipitation	0.999 (0.9991, 0.9998)	0.002	17376.79
Temp max	1.19 (1.17, 1.21)	<0.0001	16915.03*
Temp min	1.132 (1.11, 1.155)	<0.0001	17233.34

* Lowest AIC, selected variable.

Supplementary Table 2 Tests of collinearity in the final model

Variables	VIF	1/VIF
Minimum temperature	1.01	0.994
Precipitation	1.01	0.995
Population protected	1.00	0.999
Mean VIF	1.00	

Supplementary Table 3 Model selection

A) Model comparison using Akaike's information criterion and Bayesian information criterion

Models	Observations	AIC	BIC
Poisson	14,772	23540.65	23571.05
ZIP	14,772	19573.69	19611.7

B) Results of Vuong test

Cases	Coefficient	SE	P value	95% CI
Proportion of population protected	0.002	0.001	<0.0001	0.0012, 0.0037
Minimum temperature	0.003	0.0001	<0.0001	0.0028, 0.0033
Precipitation	-0.150	0.0095	<0.0001	-0.169, -0.132
Vuong test of ZIP vs standard Poisson:			**Z= 16.8**	**Pr > z = 0.0000**