1. **Landscape-based model selection**

The significant multivariate landscape-based models included two explanatory variables. The first (LAND\_1) included built surface and PAFRAC index. The second (LAND\_2) included built surface and dense forest surface. These two models showed close predictive properties. The AUC of the LAND\_1 (LAND\_2) model were of 0.63 (0.63), 0.50 (0.49) and 0.63 (0.65) for the low, medium and high *An. darlingi* density classes, respectively. The random effects variance (RE) was slightly minimized in LAND\_1 (2.97 versus 3.18), as well as for the AIC (332.14 versus 337.46). Ultimately, given these similar performances, the choice of the final landscape-based model was done following entomological expertise. The integration of the *PAFRAC* variable in LAND\_1 was criticized. *PAFRAC* reflects the complexity of the landscape and from the results of the present study a decreasing PAFRAC index was associated with an increasing of *An. darlingi* densities. This relationship was questionable in some cases. For example, low PAFRAC index, and as a result high *An. darlingi* densities were predicted in the city center of Saint-Georges de l’Oyapock. However, given the entomological expertise in the study area, this place is not subject to high *An. darlingi* densities. Conversely, the variables included in LAND\_2 (built surface and dense forest surface) successfully passed the entomological expertise and were more easily interpretable from an ecological point of view. LAND\_2 model was therefore selected (Table A).

**Table A. Parameters of the predictive landscape-based CLMM of *An. darlingi* densities during the malaria transmission period (i.e., the September–November dry season) in Saint-Georges de l’Oyapock, French Guiana.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Coefficients | Standard errors | P-value |
| Thresholds |  |  |  |
| Low | Medium | -1.35 | 0.98 |  |
| Medium | High | 0.53 | 0.97 |  |
| Slopes |  |  |  |
| *AREA\_BUILT* |  |  |  |
| By one hectare increase | -4.06 | 1.73 | 0.02 |
| *AREA\_DENSFOREST* |  |  |  |
| By one hectare increase | 0.82 | 0.36 | 0.02 |
| Random effects |  |  |  |
| Trap | 0.31 |  |  |
| Week | 2.87 |  |  |

1. **Meteorology-based model selection**

Among the five best meteorology-based models, two included four predictors and three included three predictors. As for the landscape-based models, they showed similar predictive values. The AUC were almost the same for the five models, with a maximum difference of 0.04 observed for the low *An. darlingi* densities class between METEO\_5 and METEO\_3. METEO\_4 and METEO\_5, both composed of three predictors, tended to minimize the RE (1.25 and 1.28, respectively). METEO\_1 and METEO\_2 were considered as well with high interest as they showed the lowest AIC values of 297.11 and 298.72, respectively, despite including four predictors. As the five models showed close statistical performances, the decision on the final meteorology-based model was highly oriented by entomological expertise. METEO\_1 (Table B) was finally preferred because it had the advantage of including rainfall patterns explicitly. Moreover, METEO\_1 showed the best AIC value despite including four predictors, discarding the overfitting hypothesis.

**Table B. Parameters of the predictive meteorology-based CLMM of *An. darlingi* densities during the malaria transmission period (i.e., the September–November dry season) in Saint-Georges de l’Oyapock, French Guiana.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Coefficients | Standard errors | P-value |
| Thresholds |  |  |  |
| Low | Medium | -20.91 | 5.26 |  |
| Medium | High | -18.94 | 5.20 |  |
| Slopes |  |  |  |
| *ETP\_max\_28-0* |  |  |  |
| By one mm increase | -3.41 | 0.92 | < 0.01 |
| *MaxNbConsecutiveDaysNoRain\_49-0* |  |  |  |
| By one day increase | -0.47 | 0.16 | < 0.01 |
| *TN\_MaxNbConsecutiveDays\_56-0\_<22.5* |  |  |  |
| By one day increase | 0.09 | 0.03 | <0.01 |
| *TX\_MaxNbConsecutiveDays\_63-57\_>33.2* |  |  |  |
| By one day increase | -0.22 | 0.09 | 0.02 |
| Random effects |  |  |  |
| Trap | 1.91 |  |  |
| Week | < 0.01 |  |  |