In order to model the spatial effect, we assume an analogous linear variance model of spatial similarity and modify the method of contrasts to account for additional processes (see Garland et al. (1992) for an earlier discussion of the idea of modifying contrasts).

**Table S1. Phylogenetic Generalized Least Squares (PGLS).**

Phylogenetic Generalized Least Squares (PGLS) models of global geographic variation in odonate hind wing lengths. Five models of the relationship between hind wing length and geographic position were compared. All models corrected for phylogenetic non-independence using the corBrownian function in ape (Paradis et al. 2004), using the same phylogenetic tree (N = 674) and species set for structuring the covariance matrix. The best performing model (Model 4) is show in bold. The intercept term is not presented for simplicity. All spatial variables were scaled to have mean 0 and variance of 1, so as to be comparable to each other.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **Variable** | **Est** | **SE** | **N** | **AIC** | **Rank** |
| 1 | Temperature |  | 0.159 | 674 | 4157.17 | 3 |
|  |  |  |  |  |  |  |
| 2 | Temperature |  | 0.179 | 674 | 4157.21 | 4 |
| 2 | Precipitation |  | 0.200 |  |  |  |
|  |  |  |  |  |  |  |
| 3 | Temperature |  | 0.181 | 674 | 4159.82 | 5 |
| 3 | Precipitation |  | 0.203 |  |  |  |
| 3 | Tree Cover |  | 0.204 |  |  |  |
|  |  |  |  |  |  |  |
| **4** | **Temperature** |  | **0.191** | **674** | **4136.57** | **1** |
| **4** | **Precipitation** |  | **0.201** |  |  |  |
| **4** | **Tree Cover** |  | **0.212** |  |  |  |
| **4** | **Avian Diversity** | **-1.421** | **0.276** |  |  |  |
|  |  |  |  |  |  |  |
| 5 | Temperature | -0.451 | 0.192 | 674 | 4138.09 | 2 |
| 5 | Precipitation | -0.237 | 0.203 |  |  |  |
| 5 | Tree Cover | 0.166 | 0.215 |  |  |  |
| 5 | Avian Diversity | -1.597 | 0.411 |  |  |  |
| 5 | Mammal Diversity | 0.248 | 0.428 |  |  |  |
|  |  |  |  |  |  |  |