Supplementary 1. Biodiversity indicators data, predictor and models

1. Predictors' ranges

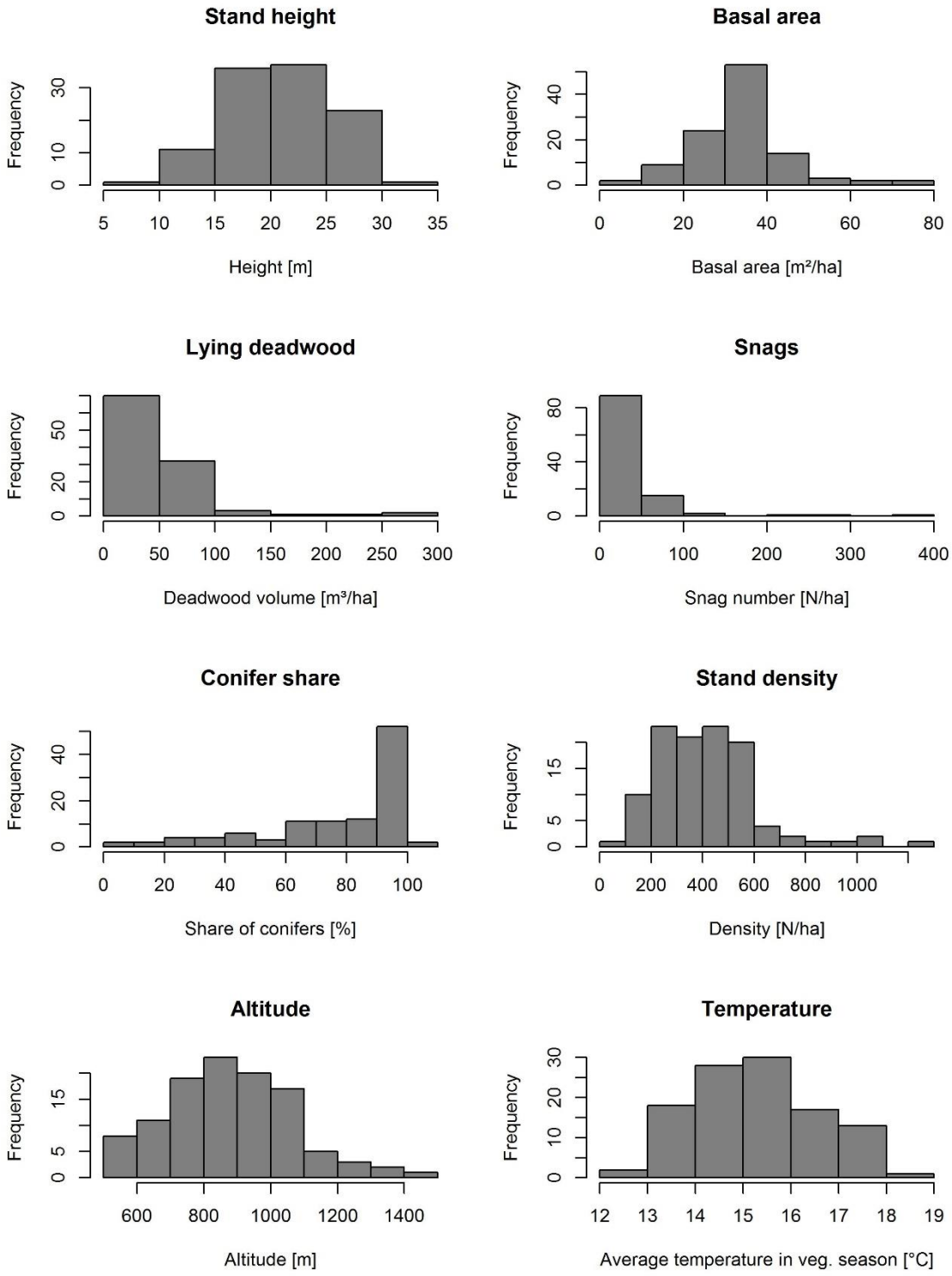

Figure S1. Predictors' ranges.

2. Biodiversity indicators' survey

Birds

The bird survey was conducted three times during the spring of 2017. The bird data collection was performed in 4 x 5 minute blocks, where every bird seen or heard was recorded. The length of the bird point counts was extended to 20 minutes, compared to traditional 10-minutes counts (e.g. Fuller and Langslow, 1984), since the survey was carried out in a single season.

Bats

The bat survey was conducted in the summer of 2016 and 2017 by using automatic stationary ultrasonic sound recorders (Batloggers, Elekon AG, Luzern, Switzerland). To cover the range in vegetation on each plot, two recorders where installed with the microphone at approximately 1.7m height. Detection probability varies as loudness, frequency and call shape of echolocating bats depend on species and environment. However, this error remains the same on all plots during the study period and is therefore neglected in the further analyses. After recording the calls were analyzed an identified to species or species groups by using the software BatScope 3. Thereafter, if needed, manual verified and additional visual checks were conducted by a trained bat worker using Raven Pro 1.5.0.

Flying insects

For the flying insect responses, we used the data from Knuff et al. (2019). Flying insects were captured with two modified window traps mounted in each plot, with a 100m spacing between them. In total, 270 traps were monitored between March and August 2017, with collections every month (for details see Knuff et al. 2019).

Tree microhabitats

The empirical data for modeling TreM richness in living trees was collected in the same plots (Asbeck et al. 2019). In total, 2621 living trees were inventoried in the field for TreMs, DBH, location and tree species. The DBH ranged from 20 cm up to more than 100 cm. The TreM survey encompassed several species but Norway spruce (*Picea abies*), European beech (*Fagus sylvatica*) and silver fir (*Abies alba*) accounted for more than 80% of the habitat trees dataset. We used a detailed catalogue for TreMs classification by Larrieu et al. (2018).

3. Model diagnostics

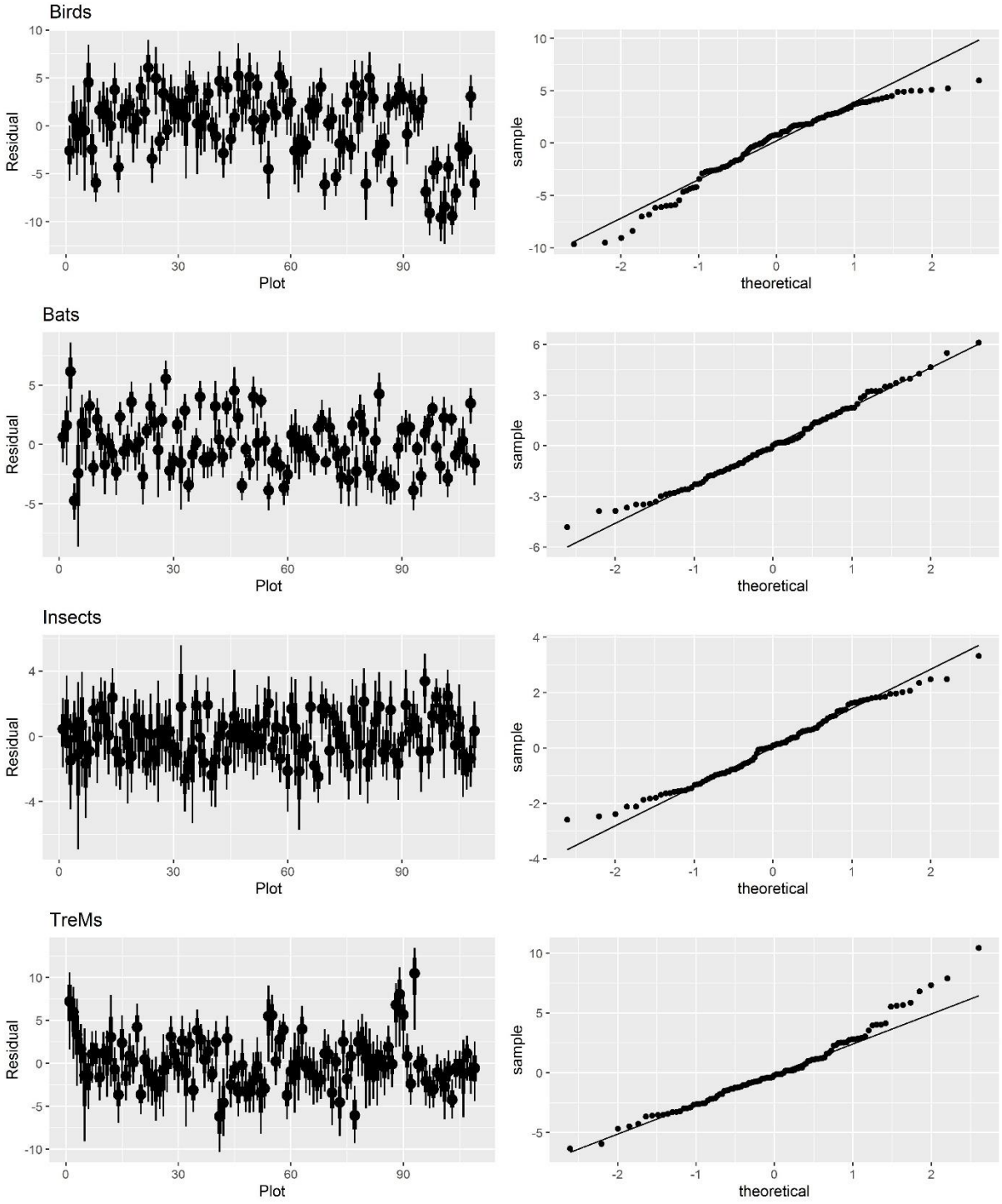

Figure S2. Residuals (left column) and QQ plots (right columns) for the fitted models for species/TreM type richness.

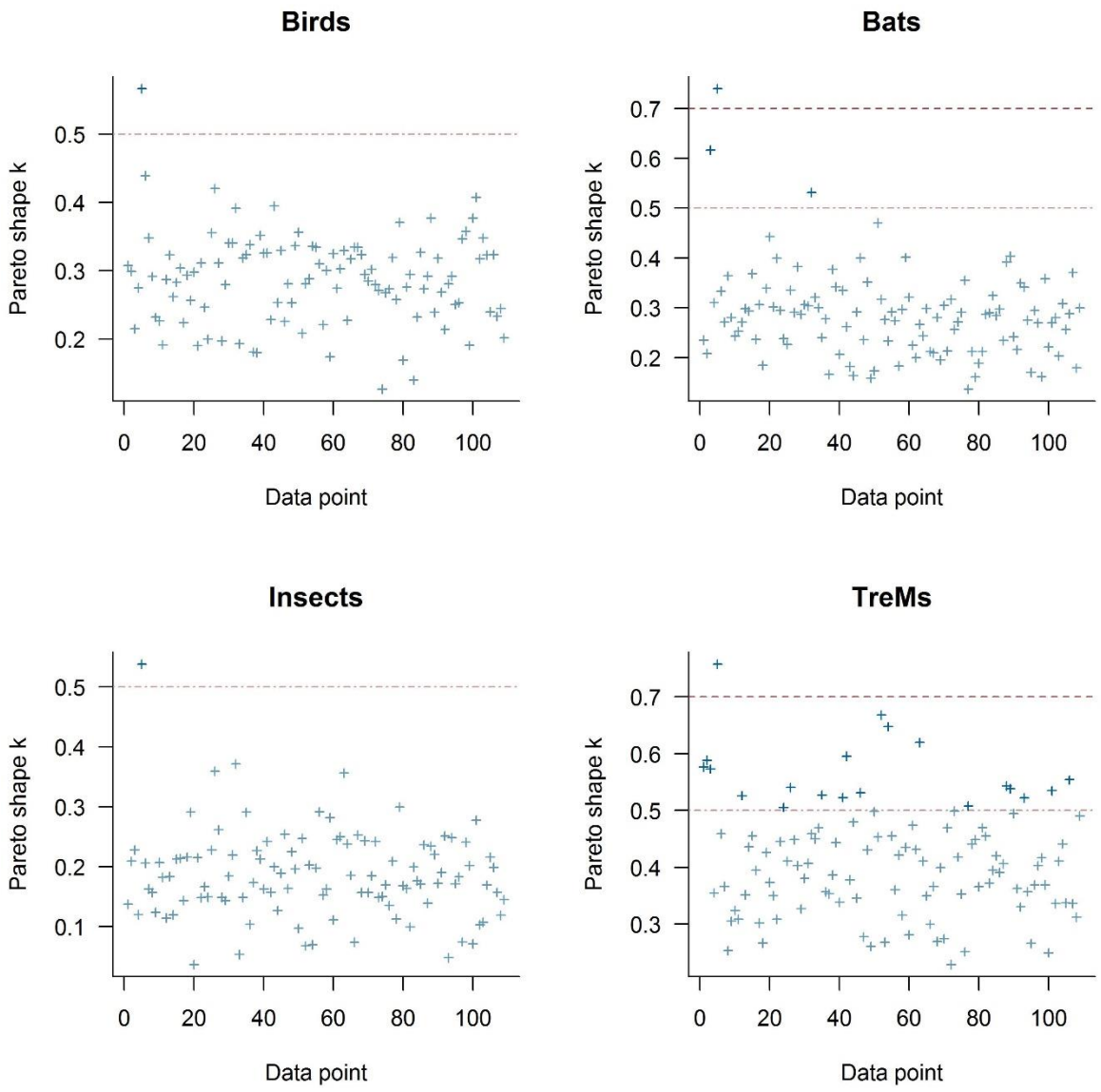

Figure S3. Pareto k diagnostics.

Table S1. Models' performance. NRMSE stands for normalize mean square error.

Model	NRMSE [%]	Bayesian R^2
Birds	21	0.19
Bats	34	0.27
Insects	11	0.34
TreMs	37	0.48

References

Asbeck, T., Pyttel, P., Frey, J., & Bauhus, J. (2019). Predicting abundance and diversity of tree-related microhabitats in Central European montane forests from common forest attributes. Forest ecology and management, 432, 400-408.

Fuller, R. J., Langslow, D. R., 1984. Estimating numbers of birds by point counts: how long should counts last?. Bird Study 31, 195-202.

Knuff, A. K., Winiger, N., Klein, A. M., Segelbacher, G., & Staab, M. Optimizing sampling of flying insects using a modified window trap. Methods in Ecology and Evolution.

Larrieu, L., Bouget, C., Cabanettes, A., & Courbaud, B. (2018). Tree-related microhabitats (TreMs) as key elements for forest biodiversity.