

Appendix S2

Journal: Ecosphere

Plant species richness across the Himalaya driven by evolutionary history and current climate

Suresh K. Rana, Trevor D. Price, Hong Qian

Table S1. Correlation matrix of climate, species richness and phylogenetic measures.

Fig. S1. Precipitation and temperature maps.

Fig. S2. Mean family age (MFA) and phylogenetic diversity index (PDI) maps.

Fig. S3. NRI evaluated against Jammu & Kashmir along elevational gradients.

Fig. S4. PDI evaluated against Jammu & Kashmir along elevational gradients.

Fig. S5. NRI scattered against species richness for 5 regions combined (excluding Arunachal Pradesh).

Fig. S6. Species richness along elevational gradients for the three lifeforms

Fig. S7. NRI along elevational gradients for the three lifeforms

Fig. S8. Species:genus ratio of trees, shrubs and herbs in 100-m elevational bands along six elevational gradients across the Himalaya.

Fig. S9. Species and genus richness and NRI for three different lifeforms in Jammu & Kashmir and the Bhutan region.

Fig. S10. Structural equation models, as in Fig. 2 of the text, based on the Worldclim dataset.

Fig. S11. Structural equation models, as in Fig. 4 of the text, based on the Worldclim dataset.

Fig. S12. Structural equation models, as in Fig. 5 of the text, based on the Worldclim dataset.

Table S1. Correlation matrix of species richness of **(a)** all angiosperms (N=247) **(b)** trees (N = 180), shrubs (N = 228), and herbs (N = 247) with their phylogenetic metrics and climate along five elevational gradients in the Himalaya. **Abbreviations:** PDI; Phylogenetic diversity index, NRI; Net relatedness index, MFA; Mean family age, BIO1; Annual mean temperature, BIO12; Annual precipitation. (Correlation values with X are not significant at $p=0.01$).

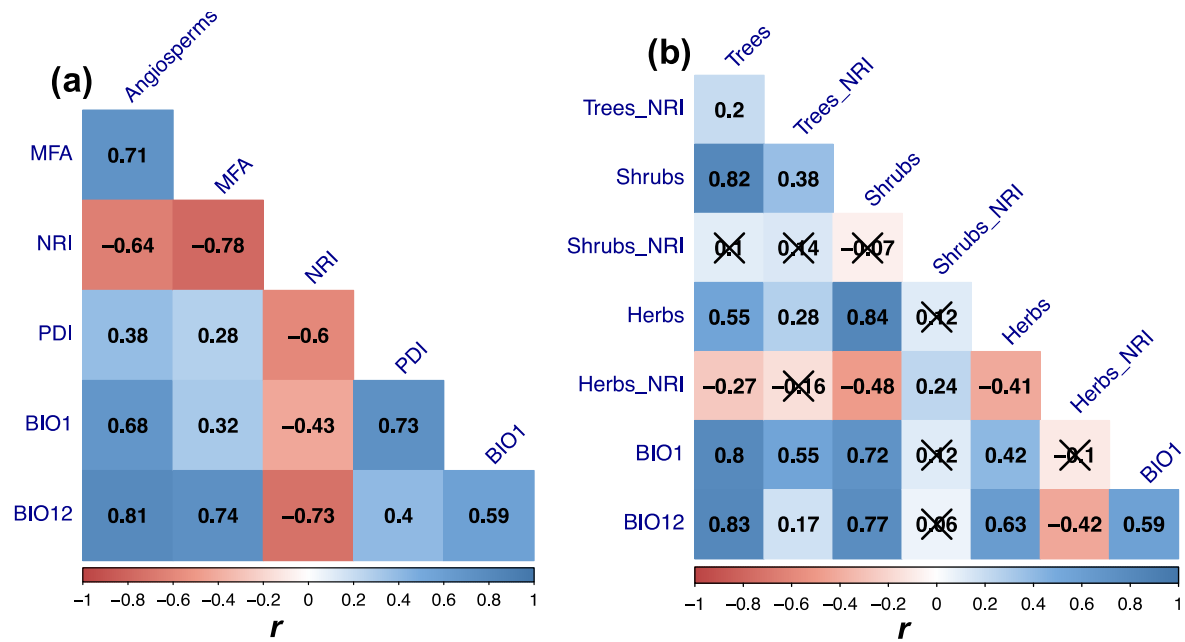


Fig. S1. (a) Annual precipitation map. (b) Annual mean temperature map. (c) Elevational patterns of annual mean temperature (d) Annual temperature range map and (e) Elevational patterns of annual temperature range along six elevational gradients in the Himalaya (Karger et al. 2017).

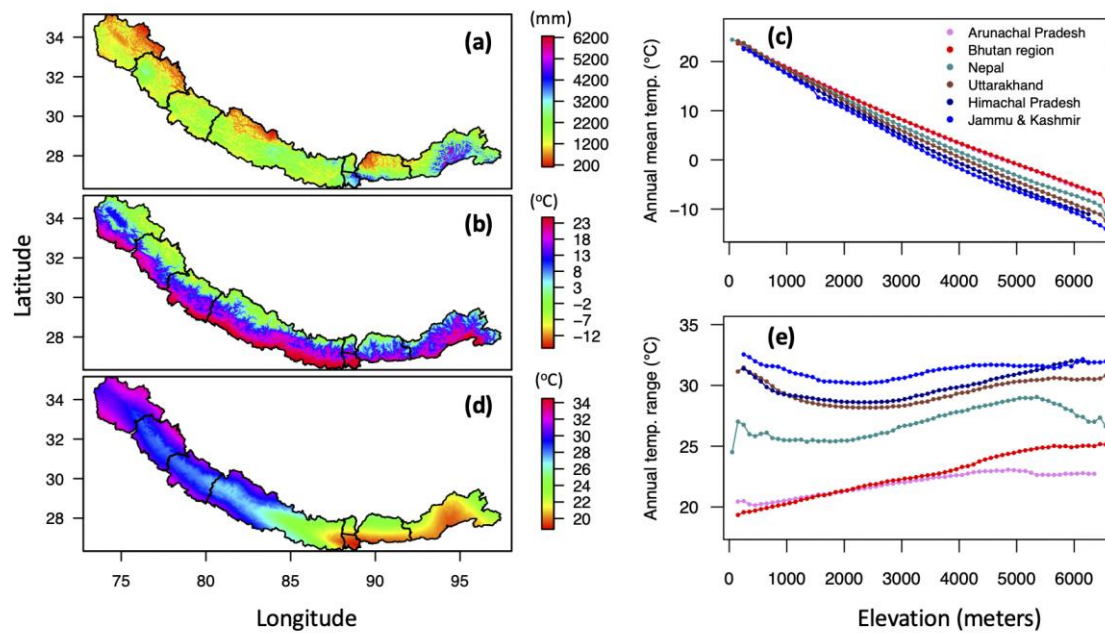


Fig. S2. (a) Phylogenetic diversity index (PDI), (b) Elevational pattern of PDI, (c) Mean family age (MFA), and (d) Elevational pattern of MFA (as in Fig. 1 of the test for NRI). The PDI and MFA maps are smoothed by the inverse distance weight spatial interpolation technique (Lu & Wong, 2008) based on the values assigned to 1140 grids at 0.2° resolution.

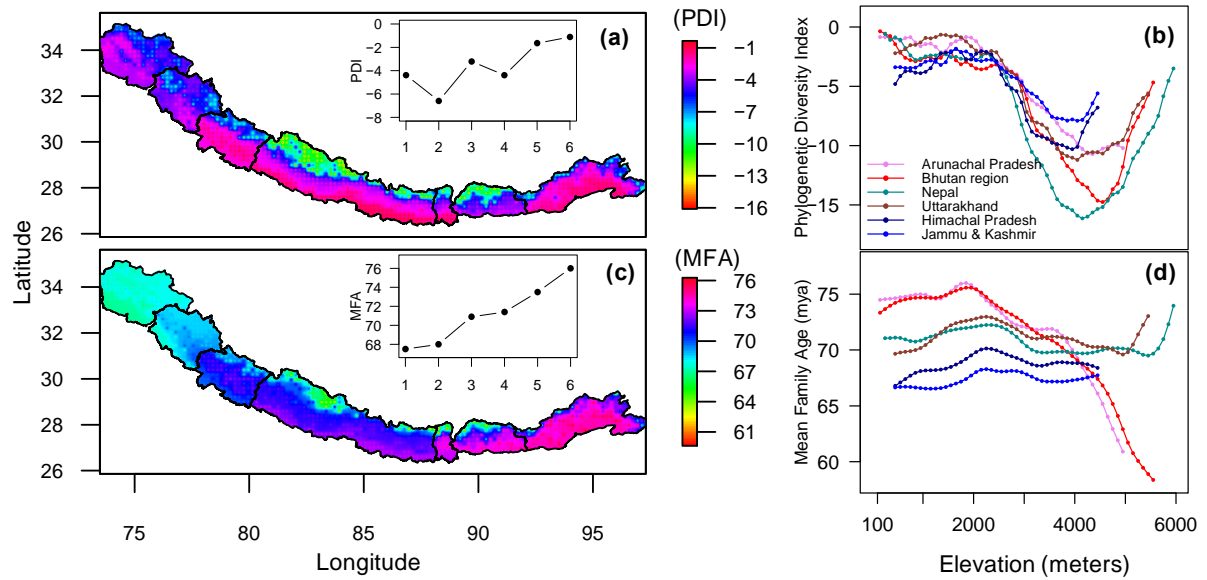


Fig. S3. Net relatedness index (NRI) in 100-m elevational bands of six elevational gradients across the Himalaya. Black solid dots show the NRI of all species in each band and gray shaded area represents 95% confidence interval of 1000 samples of $n = 1649$ which is equal to species richness in Jammu & Kashmir.

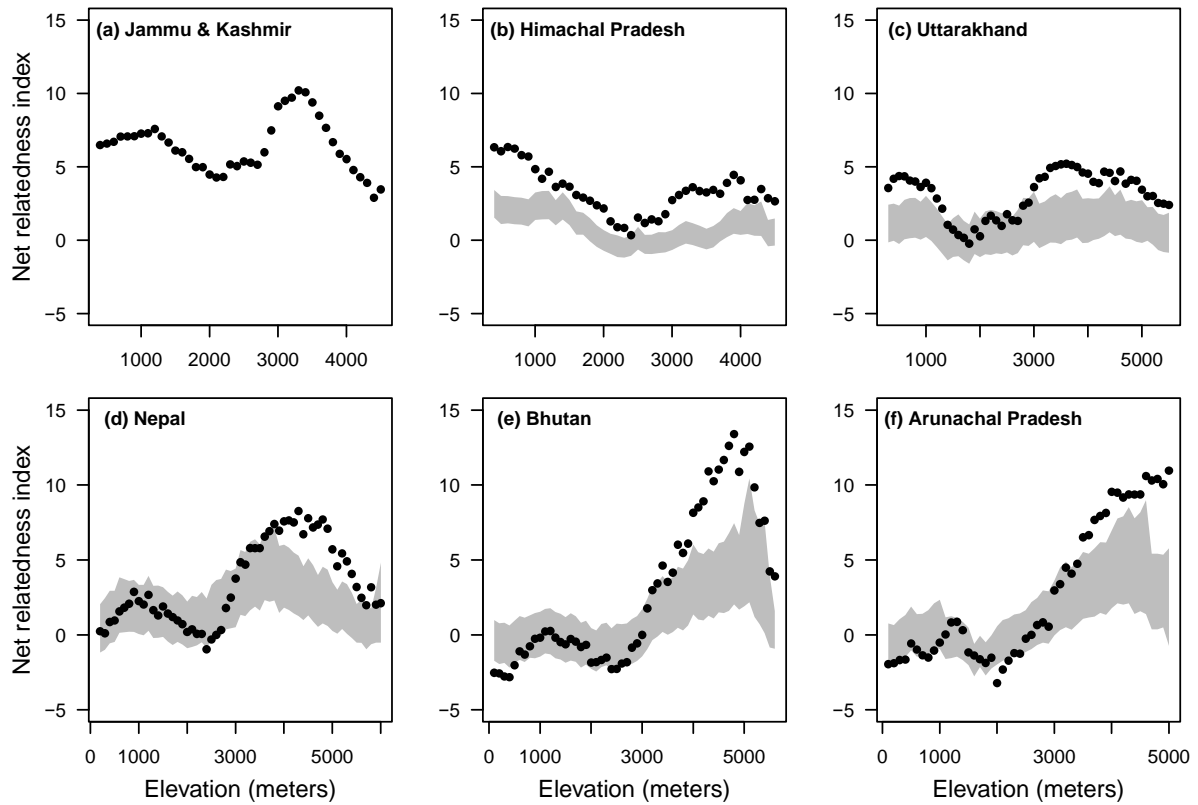


Fig. S4. Phylogenetic diversity index (PDI) in 100-m elevational bands of elevational gradients across the Himalaya. Black solid dots show the PDI of all species in each band and gray shaded area represents 95% confidence interval of 1000 samples of $n=1649$ which is equal to lowest species richness among the six regions.

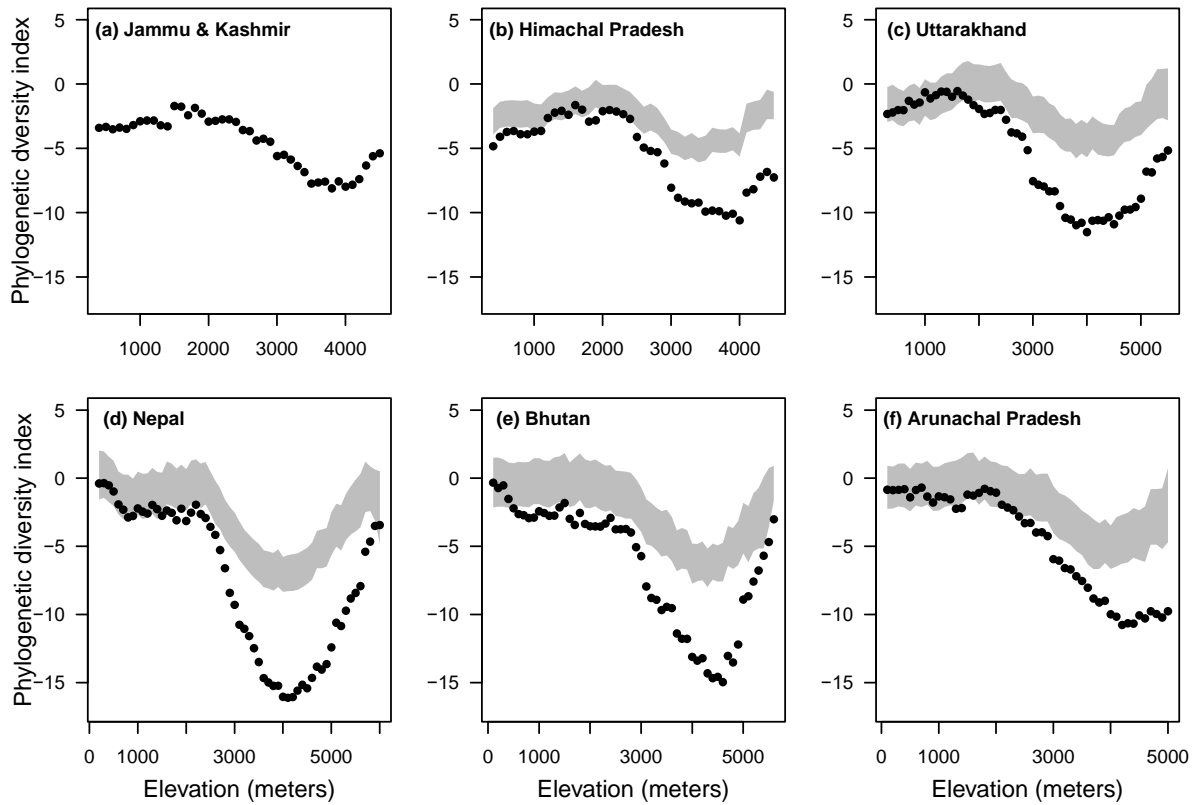


Fig. S5. NRI scattered against species richness for five regions combined (excluding Arunachal Pradesh).

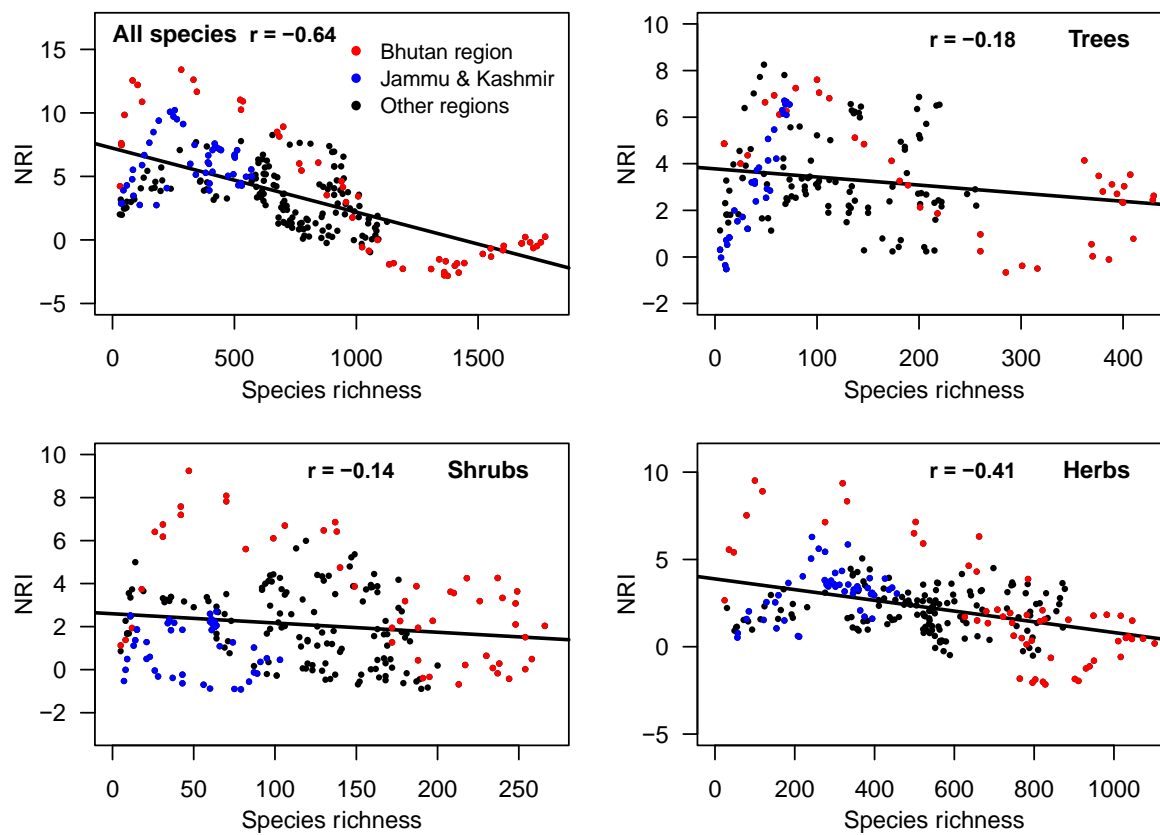


Fig. S6. Species richness of trees, shrubs and herbs in 100-m elevational bands of four elevational gradients across the Himalaya.

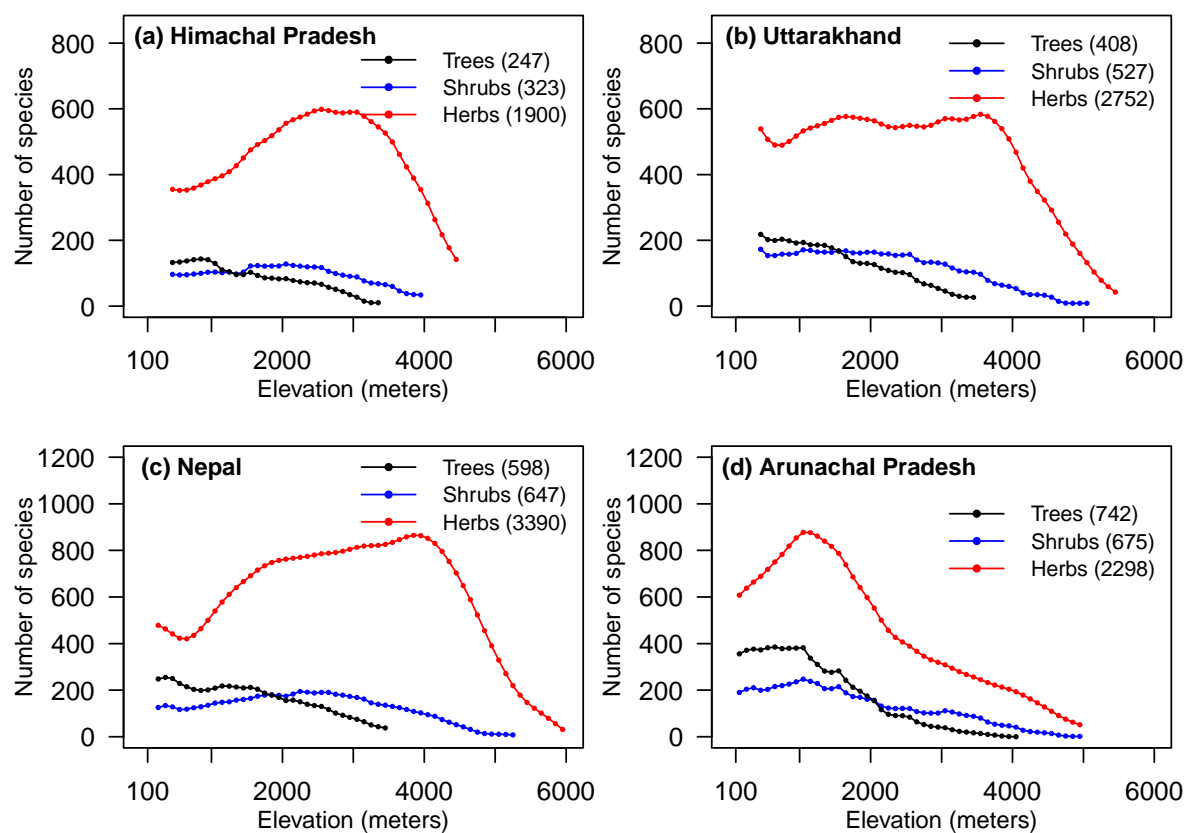


Fig. S7. Net relatedness index of trees, shrubs and herbs in 100-m elevational bands along four elevational gradients across the Himalaya.

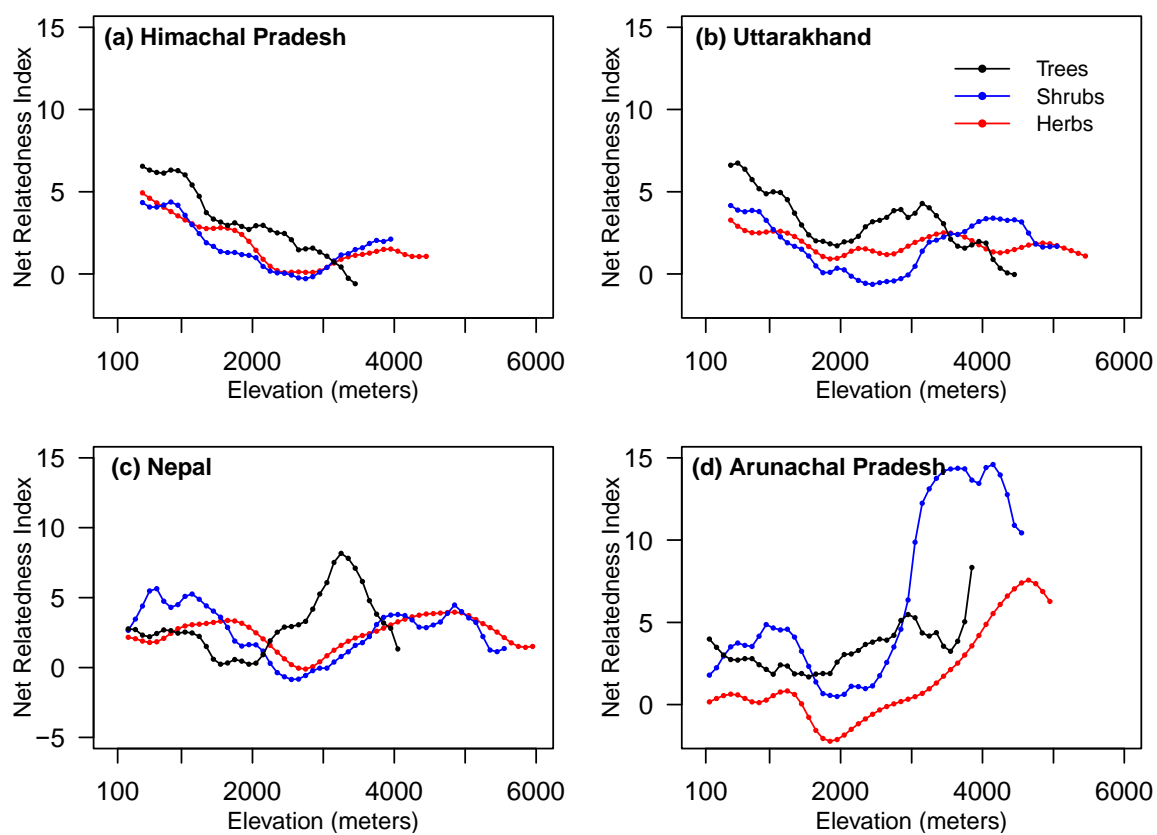


Fig. S8. Species:genus ratio of trees, shrubs and herbs in 100-m elevational bands along six elevational gradients across the Himalaya.

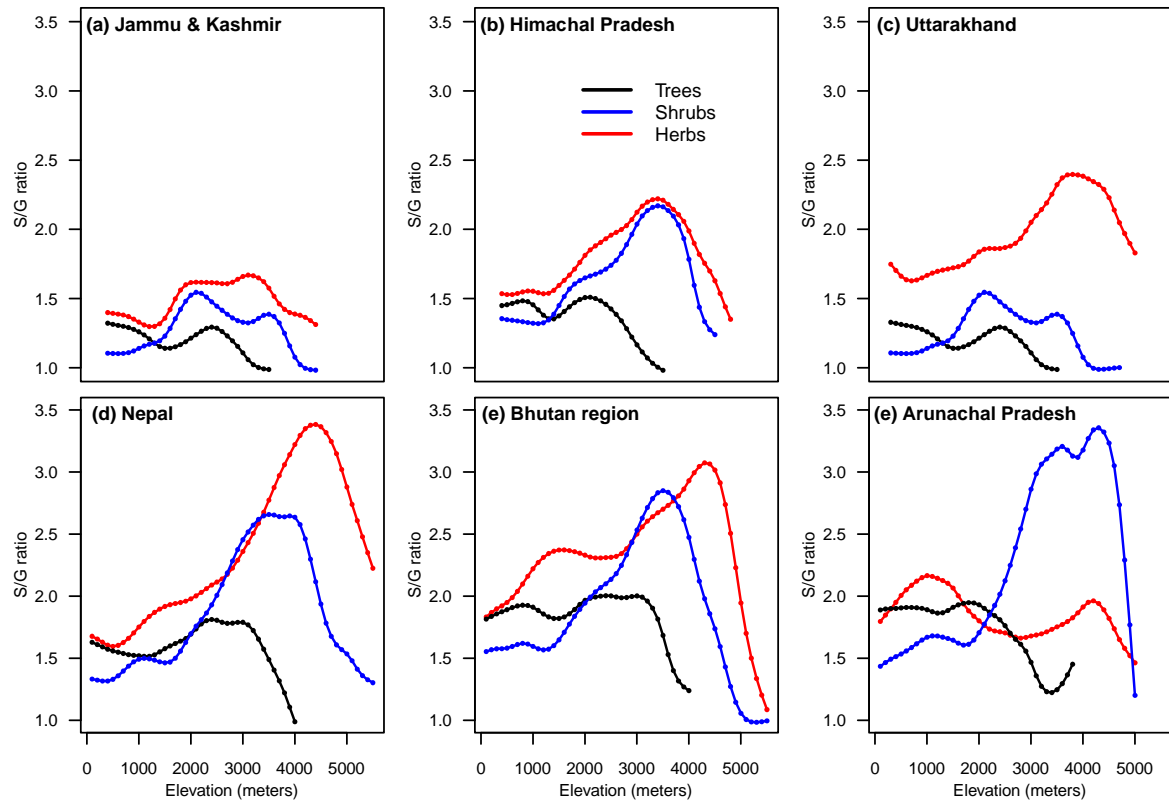


Fig. S9. Species and genus richness and NRI for three different lifeforms in Jammu & Kashmir and the Bhutan region.

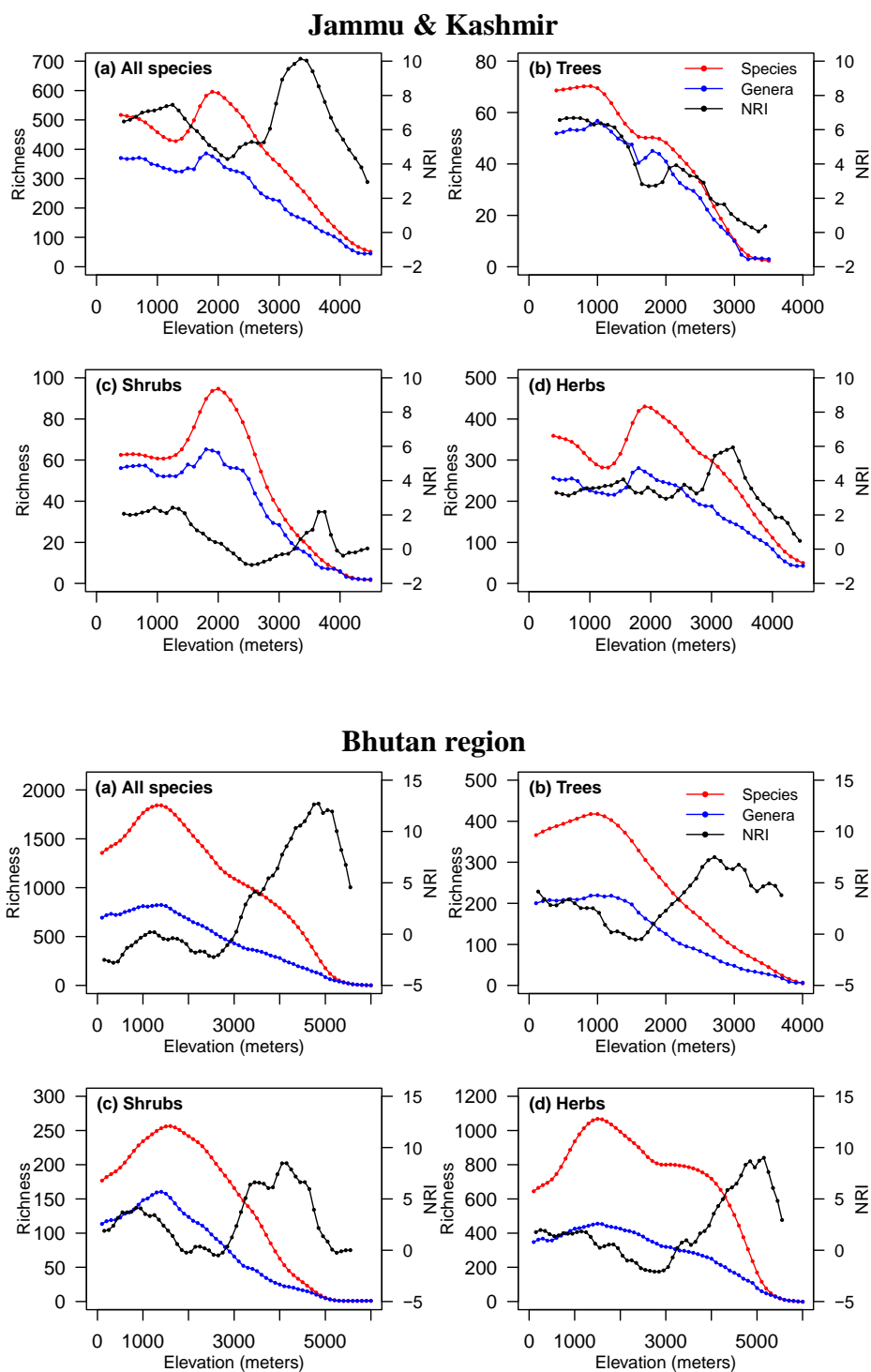


Fig. S10. Structural equation models on effects of climate (data from Worldclim; www.worldclim.org, (Fick and Hijmans 2017)) and geography on species richness and the net relatedness index along five elevational gradients (excluding Arunachal Pradesh) of the Himalaya. Only elevational bands with at least 30 species in total are included.

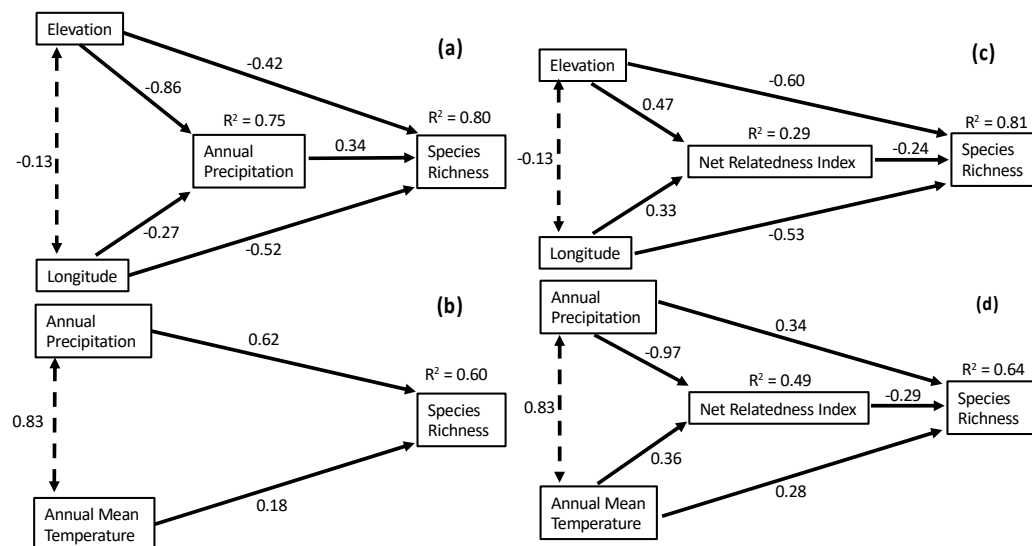


Fig. S11. Structural equation model of the effects of climate (data from Worldclim; www.worldclim.org, (Fick and Hijmans 2017) on tree species richness and net relatedness index along five elevational bands gradients (excluding Arunachal Pradesh) of the Himalaya.

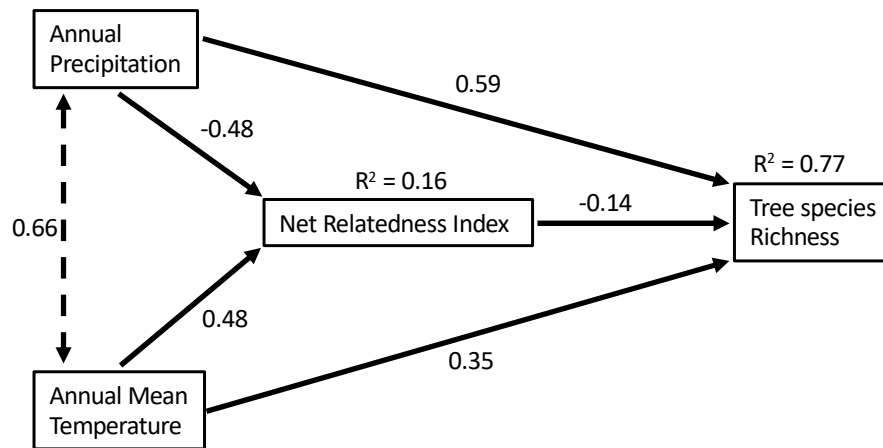
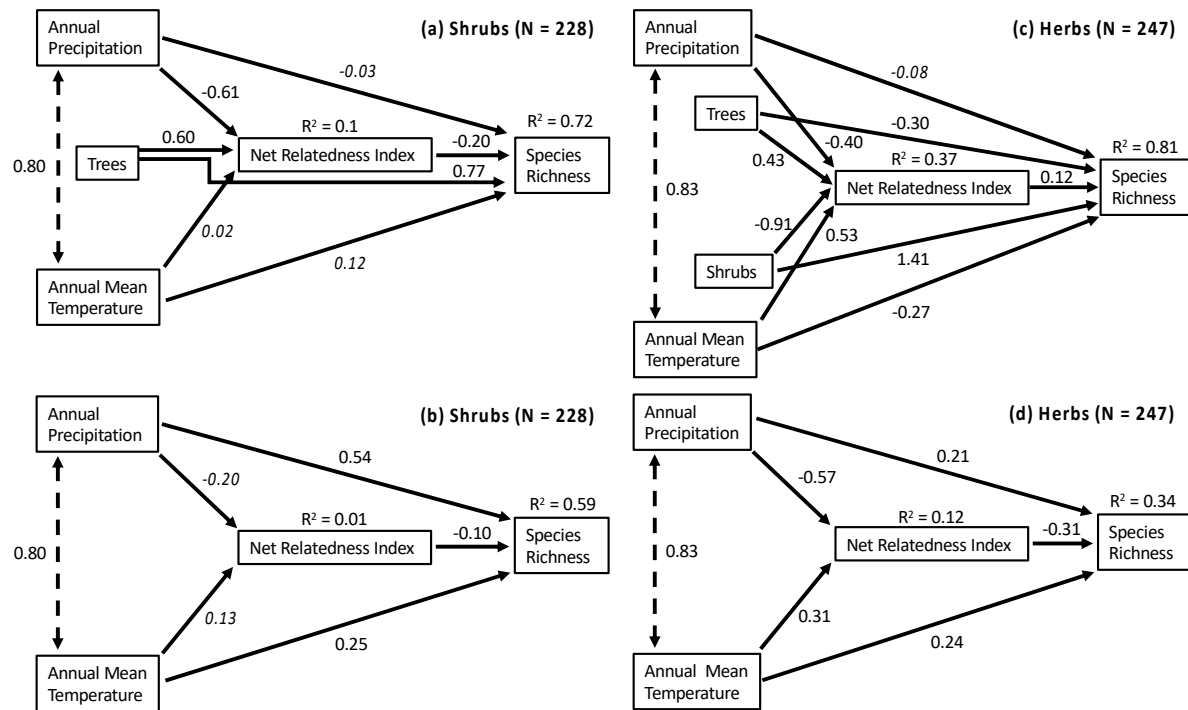


Fig. S12. Structural equation model of the effects of climate (data from Worldclim; www.worldclim.org, (Fick and Hijmans 2017) on species richness and net relatedness index of shrubs and herbs along five elevational bands gradients (excluding Arunachal Pradesh) of the Himalaya.



References

- Fick, S. E. and Hijmans, R. J. 2017. WorldClim 2: new 1-km spatial resolution climate surfaces for global land areas. - *Int. J. Climatol.* 37: 4302–4315.
- Karger, D. N. et al. 2017. Climatologies at high resolution for the earth's land surface areas. - *Sci. Data* 4: 170122.
- Lu, G. Y. and Wong, D. W. 2008. An adaptive inverse-distance weighting spatial interpolation technique. - *Comput. Geosci.* 34: 1044–1055.