

## **Why inputs matter: Selection of climatic variables for species distribution modelling in the Himalayan region**

Maria Bobrowski and Udo Schickhoff

CEN Center for Earth System Research and Sustainability, Institute of Geography, Hamburg, Germany  
([maria.bobrowski@uni-hamburg.de](mailto:maria.bobrowski@uni-hamburg.de))

*Betula utilis* is a major constituent of alpine treeline ecotones in the western and central Himalayan region. The objective of this study is to provide first time analysis of the potential distribution of *Betula utilis* in the subalpine and alpine belts of the Himalayan region using species distribution modelling. Using Generalized Linear Models (GLM) we aim at examining climatic factors controlling the species distribution under current climate conditions. Furthermore we evaluate the prediction ability of climate data derived from different statistical methods. GLMs were created using least correlated bioclimatic variables derived from two different climate models: 1) interpolated climate data (i.e. Worldclim, Hijmans et al., 2005) and 2) quasi-mechanistical statistical downscaling (i.e. Chelsa; Karger et al., 2016). Model accuracy was evaluated by the ability to predict the potential species distribution range. We found that models based on variables of Chelsa climate data had higher predictive power, whereas models using Worldclim climate data consistently overpredicted the potential suitable habitat for *Betula utilis*.

Although climatic variables of Worldclim are widely used in modelling species distribution, our results suggest to treat them with caution when remote regions like the Himalayan mountains are in focus. Unmindful usage of climatic variables for species distribution models potentially cause misleading projections and may lead to wrong implications and recommendations for nature conservation.

### References:

Hijmans, R.J., Cameron, S.E., Parra, J.L., Jones, P.G. & Jarvis, A. (2005) Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology*, **25**, 1965-1978.

Karger, D.N., Conrad, O., Böhner, J., Kawohl, T., Kreft, H., Soria-Auza, R.W., Zimmermann, N., Linder, H.P. & Kessler, M. (2016) Climatologies at high resolution for the earth land surface areas. arXiv:1607.00217 [physics].