

Interactive comment on “Climate effects on the vitality of boreal forests at the treeline in different ecozones of Mongolia” by Michael Klinge et al.

U. Schickhoff (Referee)

udo.schickhoff@uni-hamburg.de

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The paper is of considerable interest to a broad readership of Biogeosciences since it is one of very few studies that focus on the relationship of forest distribution and treeline positions with climatic parameters in Mongolia. Especially the combination with remote sensing indices (NDVI) had been rather neglected so far. The paper is an important original contribution, and I recommend it for publication after - from my perspective - necessary revisions. In my view, the usage of the term 'ecozone' in the paper (in the title, throughout the text, in the figures) is not appropriate. The term 'ecozone' is associated with large-scale units (biomes) such as humid mid-latitudes, dry mid-latitudes etc. I believe it is confusing to use it for small-scale units as in this paper. The authors should apply a consistent, generally accepted terminology for habitats / vegetation for-

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mations along horizontal and altitudinal zonation (see below). Without explicitly saying so the authors suggest that treeline positions (upper and lower treelines) are in accordance with present climatic conditions. This must not necessarily be the case. Most treelines are in a process of climate tracking, and lag behind climatic changes, in particular when those changes take place very fast. Human impact on treelines is only briefly touched in the paper. I would like to have stressed by the authors the influence of e.g. climate history, vegetation history and historical human impact, and to what extent these factors might influence the results of this study. The manuscript needs language editing in many lines, I suggest to involve a native speaker. Specific remarks as follows: - line 54: ...strongly varies in space and time... - line 61-62: soil temperature, soil moisture and soil nutrients might also play a role - line 64-65: usage of the term 'ecozone' is confusing. Regarding altitudinal zonation I suggest to use the term 'zone' or 'belt' (alpine zone or alpine belt), regarding horizontal zonation I suggest to use the term 'habitat' or 'zone' or another term since the term 'ecozone' is associated with large-scale units (biomes) such as humid mid-latitudes, dry mid-latitudes etc. - line 67: altitudinal zones are not biomes, but zones or belts - line 85: no comma after et al. - line 103: either no comma before which or comma after Spot VGT) - line 105: see line 103 - line 128-130: language editing - line 144: trends of instead of trends for - line 166: showed the NDVI to be well usable.... - line 167: tree biomass of Mongolian forests - line 176: climatically restricted? I suggest to rewrite: ...'is delimited by a constellation of climatic threshold values' - line 177-178: reflect climate-ecological relationships and limitations - line 195: highly continental semi-humid - line 196: with little snowfall - line 205: ...are arranged in characteristic sequences along latitudinal and altitudinal gradients - line 206: obovata kursiv - line 207: selectively? Please rewrite this sentence - line 211: intra-montane basins - line 217: the terms playas and takirs should be explained - line 222: forest management - line 226/227: Please explain the increasing fire susceptibility - line 241: Fig. 2 - line 244: language editing - line 259: In the upper elevational zones? - line 265: tree species maps - line 268-270: Using this approach the authors should be aware of and should point out that this is a simpli-

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fication since the plant species respond to inter-annual variations and extreme values; plant species do not respond to mean values - line 293-294: language editing - line 298: multiple comparisons - line 306-308: Alteration of treelines requires successful recruitment of tree species. The authors should be aware of the fact that bioclimatic requirements of seedlings and saplings might deviate to a considerable extent from those of adult trees - line 332: intermontane basins - line 335: language editing - line 340-341: language editing - line 344: language editing - line 347-348: language editing - line 380: blank space - line 381: forest distribution or forest stand distribution - line 433ff: *Ulmus* trees along water courses in the steppes should also be mentioned here - line 447: intramontane basins - line 472-473: language editing - line 474: 2x thus - line 474-475: hygrophilous instead of water-demanding - line 478: which additional factors? - line 479: results instead of tendencies - line 496: language editing - line 507: Climatic change will lead... - line 509: Forest dynamics - line 510: modelled - Fig. 5: Map legend: there is no reference to the black line (not all of the readers are familiar with the borders of Mongolia) - Fig. 6: Legend: *Pinus sibirica*

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