Biogeosciences

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Discussions

Interactive comment on "A simple model for predicting the global distribution of the N_2 fixing host genus *Alnus Mill.*: impact of climate change on the global distribution in 2100" *by* A. Sakalli

Anonymous Referee #2

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General comments

This paper tried to establish a model predicting the distribution of alder species. The issue is important to estimate carbon cycle in the terrestrial ecosystem coupled with nitrogen. However, the model was too simple to predict the species distribution even in the global scale. The author used only four parameters, Tann, Pann, soil category, vegetation category to construct the model. As the author stated, climate and soil conditions are not sufficiently for the modeling of the distribution of species. The "potential distributional area" will be decreased with increasing the number of assumed limiting factors. In actual, the predicting power of environmental factors for species distribution is very low (sometimes less than 10 %) in local scales (Jones et al. 2008 Oecologia;

Flinn et al. 2010 Jornal of Ecology; Aiba et al. 2012 Jornal of Ecology). Other factors such as seed dispersal limitation, competition or stochastic processes are more important.

Furthermore, when we construct a distributional model using presence data only (not presence-absence data), we have to pay attention to the amount of data lucking and bias, and the distributional area should be represented as the probabilities. For example, MaxEnt model is robust even when the sample size is small although the model also have some weak points.

Specific comments

Title; I recommend to change the title from ". . .predicting the global distribution" to " . . .predicting the potential global distribution"

P13051L15; The author stated that the density of alders amounts 8 % of total plant biomass. I think the ratio is too high in accordance with some data base of forest plots such as Ishihara et al. (2011) Ecological Research.

P13052L17; The author stated that most alder species occur on fenlands, in swamp areas, along brooks, rivers, and streams in bogs. However, some species such as A. firma, and A. crispa occur on steep slopes, then it should be noted.

Eq (5) & (6); The variant to evaluate a model should be independent, but these equations include the factor of climates. Statistical analysis such as fig 4 should be conducted by the soil factor and vegetation factor, in addition to "all method".

P13061 4.3; The author used the data from only 13 countries. However, the criteria is unclear. Why did you not use the data such as TW, AT, and PT which had high value of Rec/Grid ratio? I wonder whether the statistical power should be changed if you use the other data in fig 4.

Technical comments

P13060L13; It soils -> wet soils?

Figs 8&9 are not necessary.