General comments

The clarity of the methods used in the paper is much improved. I have one substantial comment.

Specific comments

On page 4 lines 2-4 you wrote: “and is normalized to 1. It defines the probability density function of the environment, given no prior information and some observed count y_{k0} of taxon k.”

I wondered in my comment (2 January 2017) whether this normalization was needed and concluded that it was not. This conclusion disregarded the somewhat ad-hoc combination in equation (6). Without the normalization of L_y and L_p (but with normalization of $prob(x)$), we still have the same result for η = 0 and η = 1 and the same path of solutions, but for the meaning of η would change. In particular, the calculations for η = 0.5 would give different results (the current result can be obtained with a different value for η).

The authors can either keep the current normalization (but please deleted the “It defines..” sentence, as it adds nothing) and the ad-hoc combination or change things to a perhaps more defendable combination as follows.

Two models are proposed to infer about x. The first model (M_1) says that abundance percentages relate to x and the second model (M_2) that the presences relates to x. So, first a posterior is made on the basis of the first model, say $prob_y(x)$), and then one on the basis of the second model, say $prob_p(x)$. Both probability densities are normalized, of course. Let the prior probability of M_1 be η. Then the final posterior of x is

$$prob(x) = \eta\, prob_y(x) + (1-\eta)prob_p(x).$$

This construct gives again the same path of solutions as the one with early normalization, but the new construct is a little bit more logical. If desired so, it even allows estimation of η on the basis of the posterior probability of M_1.

I note for clarity (and you may wish to add it) that equation (4) follows from the law of total probability:

$$prob(y_{k0}|x) \;=\; \Sigma_j\, prob(y_{k0}, SRC_{jk}|x) \;=\; \Sigma_j\, prob(SRC_{jk})prob(y_{k0}|SRC_{jk}, x)$$

Typo: Equation number (3) is italic.

Cajo ter Braak, Wageningen , 3 January 2017