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Interactive comment on "Plant colonization, succession and ecosystem development on Surtsey with reference to neighbouring islands" *by* B. Magnússon et al.

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The authors thank Anonymous Referee #3 for his/her fine and contructive comments and thorough checking of the manuscript.

We have accepted most of the comments and made corrections to the manuscript (see attached PDF-file of manuscript).

Our response to the specific comments:

p. 9381-9382: Introduction

We have worked further on the introduction and tried to improve it as suggested.

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Interactive Discussion

Discussion Paper

The first and second paragraphs have been united, in the following way: page 9381: line 5 – 10. ..... "The lava flows around Mt. Hekla in the south of Iceland have provided excellent opportunities for chronosequence studies of plant colonization and community development (Bjarnason, 1991; Cutler et al., 2008; Cutler, 2010), comparable to studies around active volcanoes in temperate and tropical regions. The 1963 submarine eruption and birth of Surtsey island off the south coast of Iceland was, however, a surprise." .....

At the end of the third paragraph we have added the following: page 9382, line 10: "On Surtsey it has been possible, for the first time, to follow the initial steps of colonization and primary succession of these subarctic volcanic islands. As outlined by Svavarsdóttir and Walker (2009), the detailed studies carried out on Surtsey are of particular value due to their long-term data, detailed demographic data, information on species interactions and responses to nutrient inputs, opportunities to test of island biogeography concepts, and more."

At the end of the introduction we have added the following on the objectives: page 9382: line 16: "The general objectives of our studies are to follow plant colonization and ecosystem development on the island under different nutrient loads from seabirds and compare to the biotas and ecosystems of the several thousand years older neighbouring islands."

p. 9384-9385: Methods

Permanent plots on older island and extension of study. We decripe further how the plots were selected and why in the following way: page 9385, line 5: "The aim was to investigate old grassland communities of the islands under different nutrient inputs from seabirds as these grasslands are indicative of the future development on Surtsey. Two accessible islands and areas with limited human disturbance were selected. The number of plots was determined by the available time and manpower and considered as an absolute minimum for a comparison to the Surtsey plots. "

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Text on sampling of cover of mosses and lichens has been deleted from the text: page 9385: line 22.

p. 9392-9393: Results

Ordination results and our choice of DCA rather than CCA. We also got an earlier and a very similar comment from John Birks on this which we have responded to, see comments on interactive discussion.

Page 9392, line 27-28: In the paragraph on the DCA results we have now included information on eigenvalues and total gradient length of the first two axes, thus: "DCA separated plots with dense grasslands, regardless of location, from poorly developed and barren Surtsey plots on the first axis (eigenvalue 0.791, gradient final length 6.172) . Main separation along the second axis (eigenvalue 0.453, gradient final length 4.077) was between sandy and lava plots on Surtsey (Fig. 8).“

Our choice of using DCA rather than CCA is due to that important external variables are not quite comparable between the islands or can not with accuracy be put on the same scale, e.g. the nutrient impact of the seabirds. On Surtsey we have the gulls and a count of their nests by each plot, but on ElliÃřaey we have puffins and an estimation of their nest density. However, how to put these into numbers of e.g. N-input is difficult and we did not attempt that in the present analysis. Therefore we decided to use DCA to compare vegetation similarities between the islands and successional trends.

Also the ordination analysis is not a central part of the paper or analysis and we use the DCA to show the general relationships and trends but do not attempt to go into further details. Had we been dealing with the Surtsey plots alone, CCA would certainly have been a more appropriate method to follow.

Response to the technical corrections:

We have made the corrections and changes suggested, taken out references and added missing ones, changes have been made to Fig. 3 to indicate the different

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periods (see attahced PDF-file of manuscript).

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/11/C3415/2014/bgd-11-C3415-2014-supplement.pdf

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Interactive comment on Biogeosciences Discuss., 11, 9379, 2014.

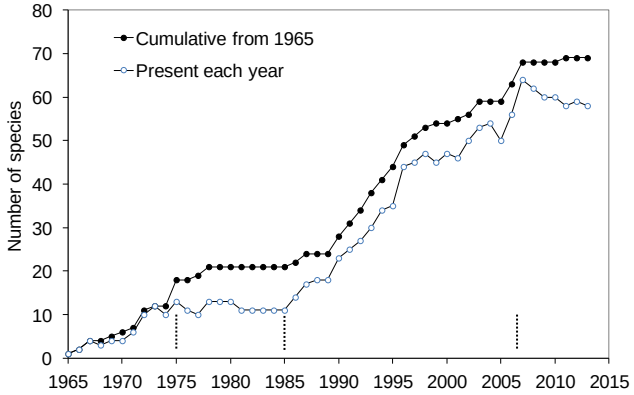

Fig. 3.

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