Ecography

ECOG-04757
Lindholm, M., Alahuhta, J., Heiono, J. and Toivonen, H. 2019. No biotic homogenisation across decades but consistent effects of landscape position and pH on macrophyte communities in boreal lakes. – Ecography doi: 10.1111/ecog.04757

Supplementary material

Supplementary material

No biotic homogenisation across decades but consistent effects of landscape position and pH on macrophyte communities in boreal lakes

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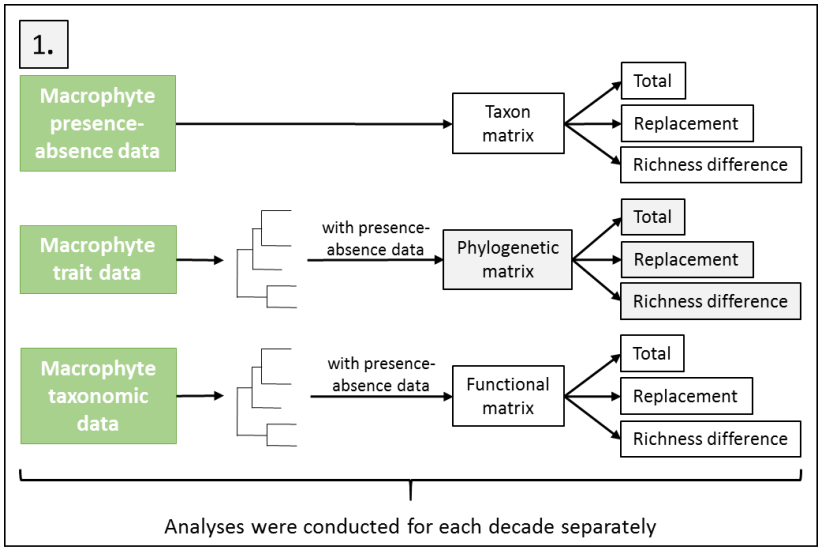
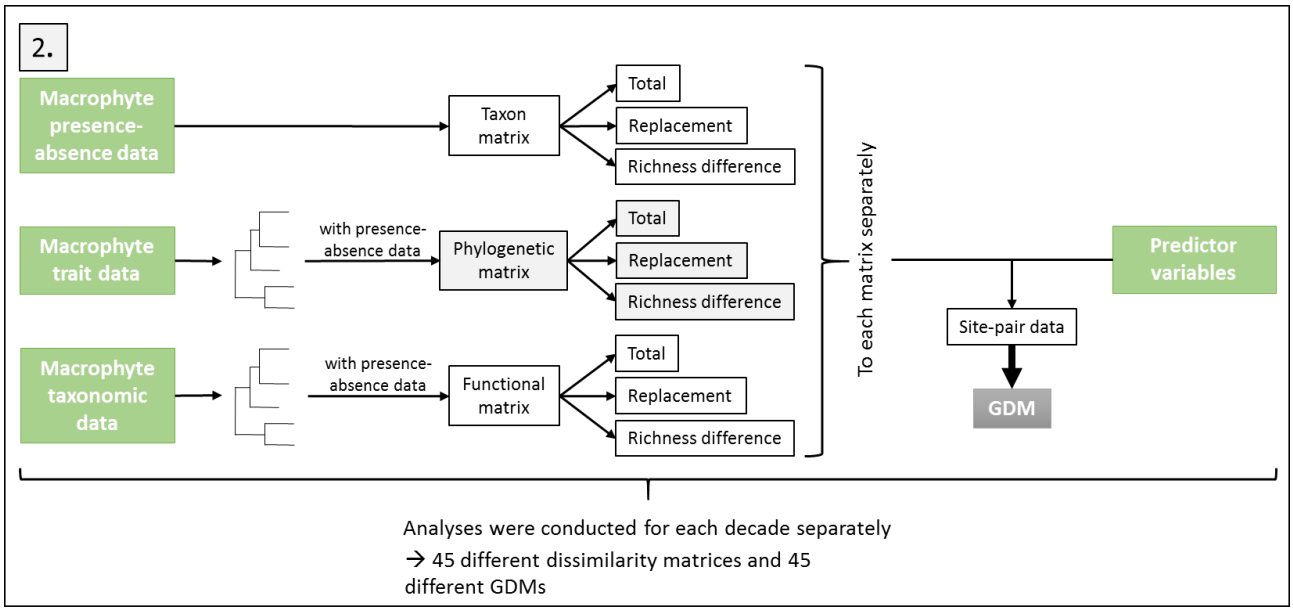
Appendix 1. Aquatic macrophyte species used in analyses.

Acorus calamus L.
Alisma plantago-aquatica L.
Alopecurus aequalis Sobol.
Butomus umbellatus L.
Callitriche hermaphroditica L.
Carex acuta L.
Carex aquatilis Wahlenb.
Carex diandra Schrank
Carex lasiocarpa Ehrh.
Carex pseudocyperus L.
Carex rostrata Stokes
Carex vesicaria L.
Ceratophyllum demersum L.
Crassula aquatica (L.) Schönl.
Elatine alsinastrum L.
Elatine hydropiper complex
Elatine triandra Schkuhr
Eleocharis acicularis (L) Roem. et Schult.
Eleocharis palustris complex
Elodea canadensis Michx.
Equisetum fluviatile L.
Glyceria fluitans (L.) R. Br.
Glyceria maxima (Hartm.) Holmb.
Hippuris vulgaris L.
Hydrocharis morsus-ranae L.
Iris pseudacorus L.
Juncus bulbosus L.
Lemna minor L.
Lemna trisulca L.
Limosella aquatica L.
Lobelia dortmanna L.
Lysimachia thyrsiflora L.
Myriophyllum alterniflorum DC.
Myriophyllum verticillatum L.
*Nuphar lutea (*L.) Sibth. & Sm.
Nymphaea candida C. Presl
Persicaria amphibia (L.) Delarbre
Phragmites australis (Cav.) Trin. ex Steud.

Potamogeton alpinus Balb.
Potamogeton berchtoldii Fieber
Potamogeton compressus L.
Potamogeton crispus L.
Potamogeton gramineus L.
Potamogeton lucens L.
Potamogeton natans L.
Potamogeton obtusifolius Mert. & W. D. J. Koch
Potamogeton perfoliatus L.
Potamogeton praelongus Wulfen
Ranunculus lingua L.
Ranunculus peltatus Schrank
Ranunculus reptans L.
Rorippa amphibia (L.) Besser
Rumex hydrolapathum (Scop.) Hudson
Sagittaria sagittifolia L.
Schoenoplectus lacustris (L.) Palla
Scolochloa festucacea (Willd.) Link
Sparganium emersum Rehmann
Sparganium erectum L.
Sparganium gramineum Georgi
Sparganium natans L.
Spirodela polyrhiza (L.) Schleid.
Stratiotes aloides L.
Subularia aquatica L.
Typha angustifolia L.
Typha latifolia L.
Utricularia intermedia Hayne
Utricularia minor L.
Utricularia vulgaris L.

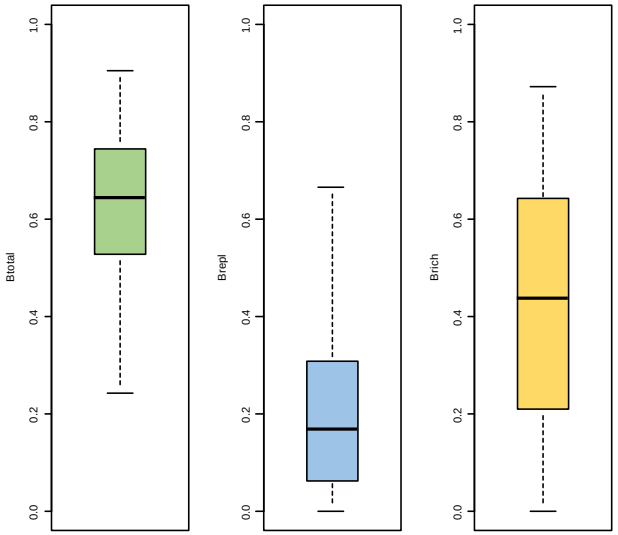
Appendix 2. A schematic diagram showing the used methodology: beta diversity calculations (1) and Generalised dissimilarity modelling (GDM) (2).



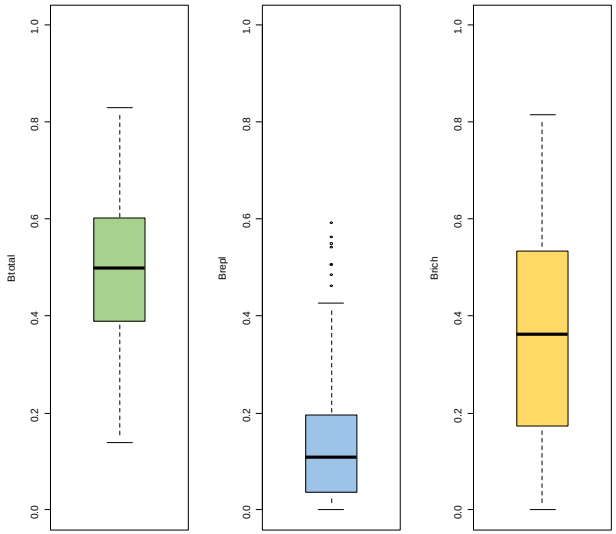


Appendix 3. The total (Btotal), replacement (Brepl) and richness difference (Brich) components of taxon, phylogenetic and functional facets of beta diversity in 1940s, 1970s, 1990s, 2000s and 2010s. Shown are boxplots of pairwise dissimilarities between sites

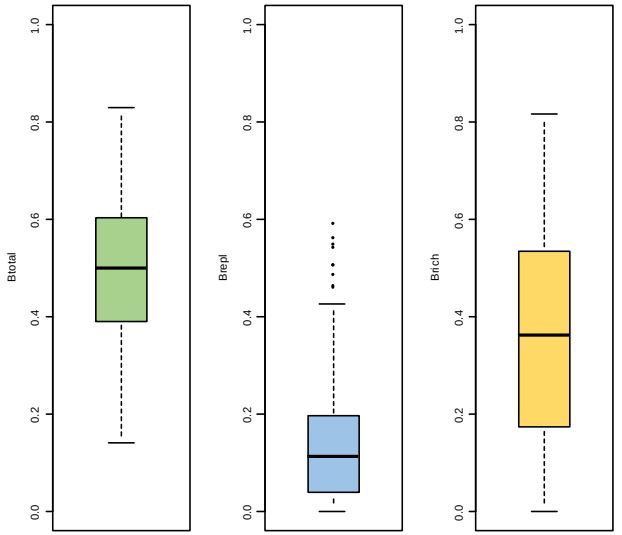
Taxon facet in 1940s



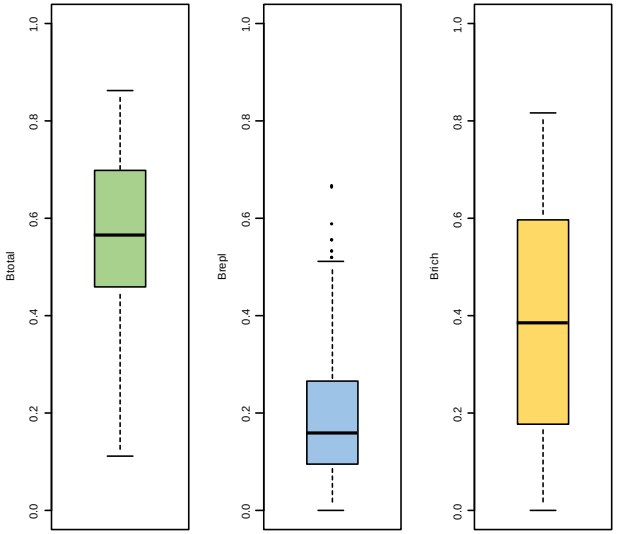
Phylogenetic facet in 1940s



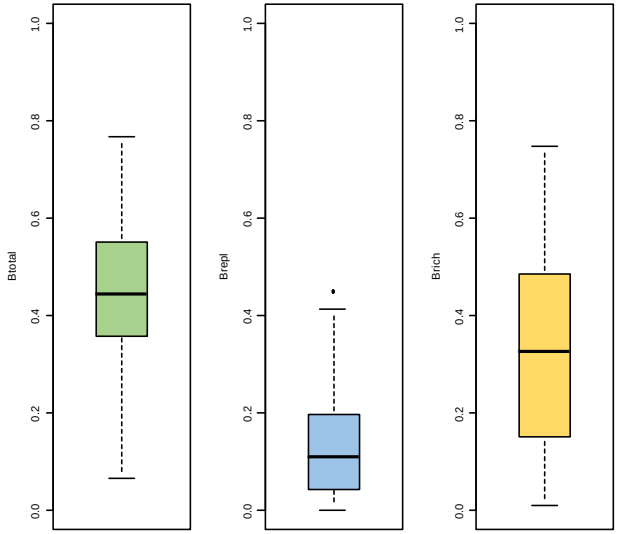
Functional facet in 1940s



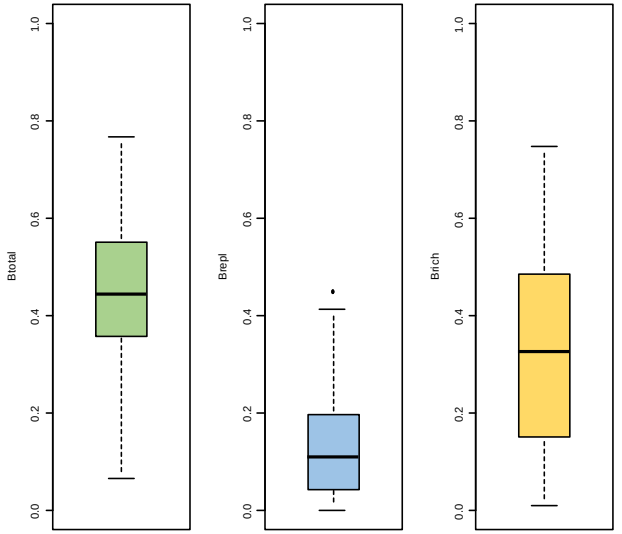
Taxon facet in 1970s



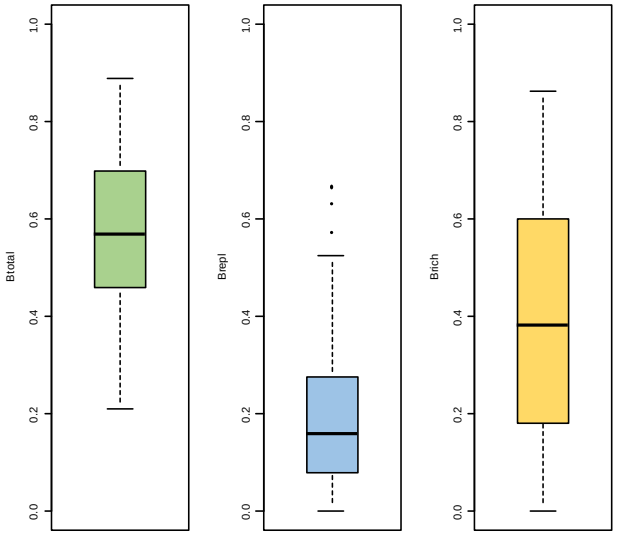
Phylogenetic facet in 1970s



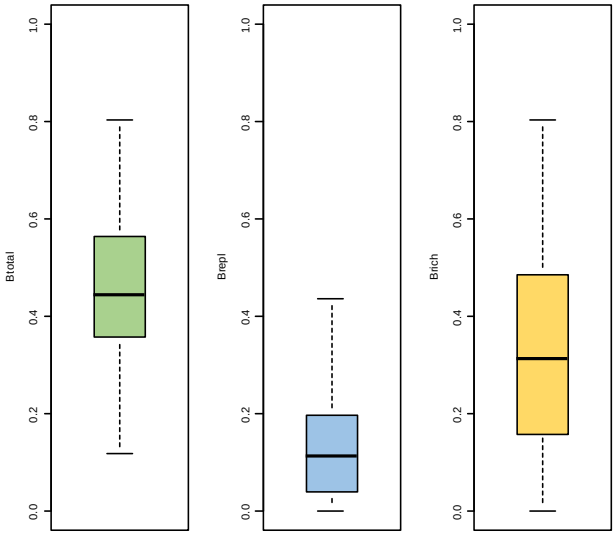
Functional facet in 1970s



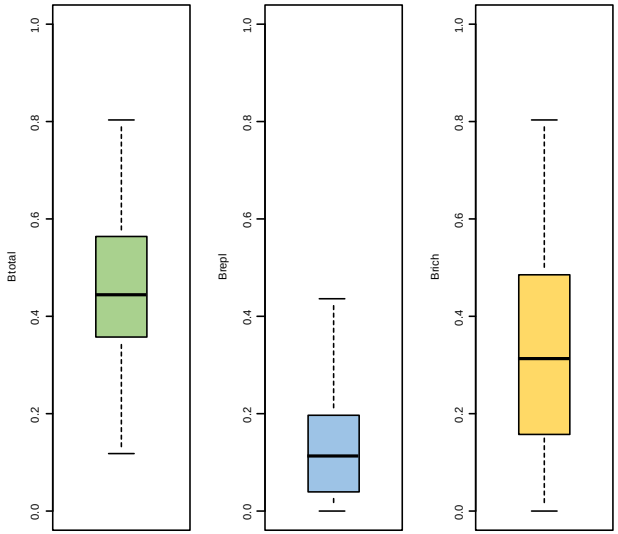
Taxon facet in 1990s



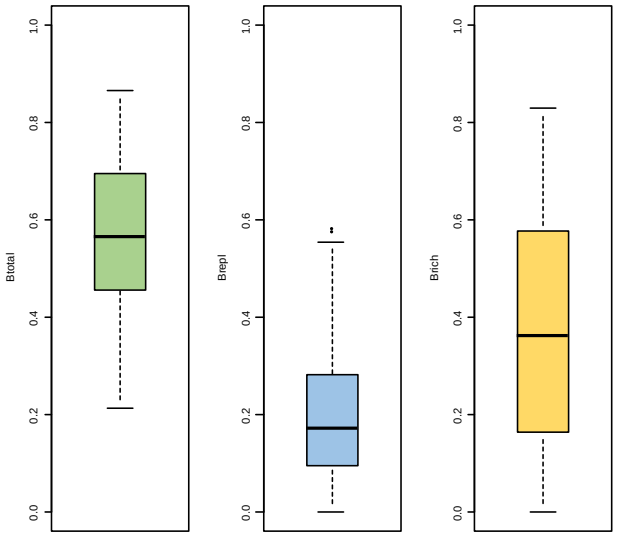
Phylogenetic facet in 1990s



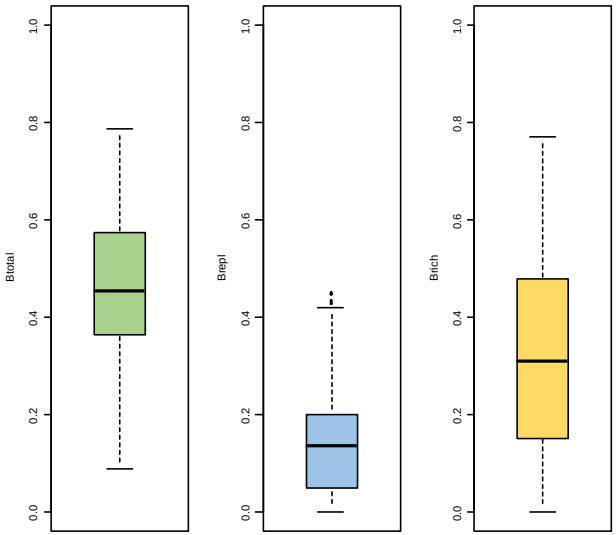
Functional facet in 1990s



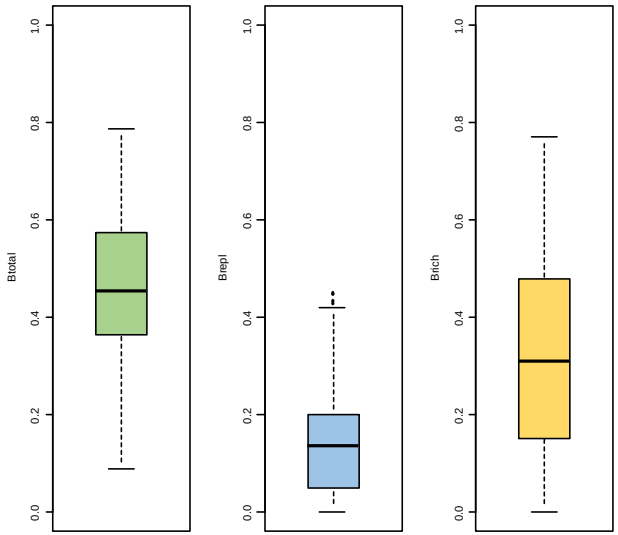
Taxon facet in 2000s



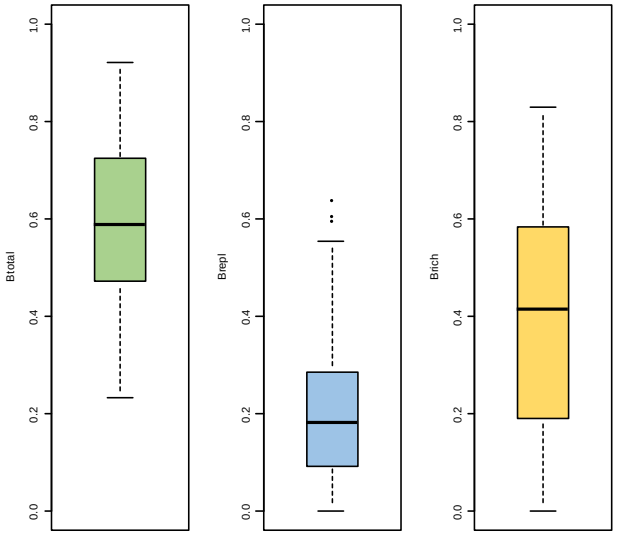
Phylogenetic facet in 2000s



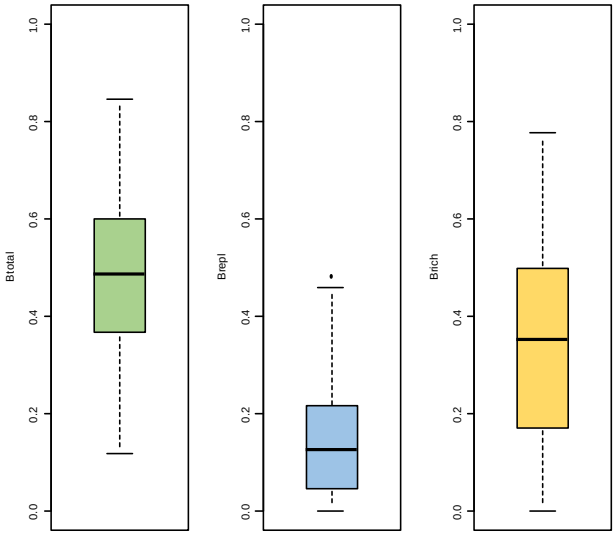
Functional facet in 2000s



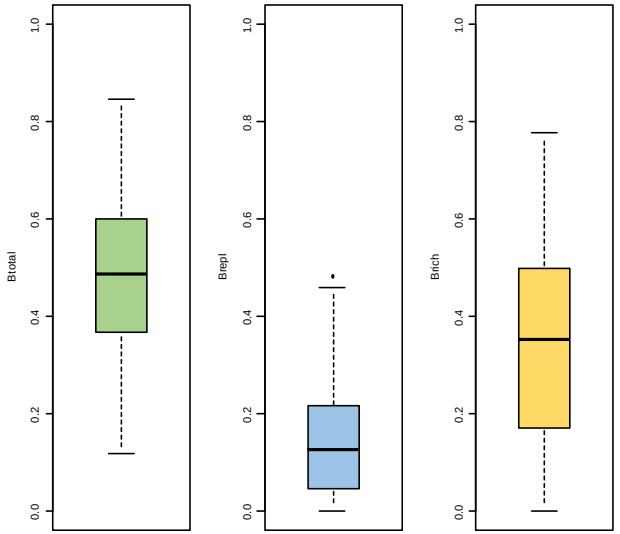
Taxon facet in, 2010s



Phylogenetic facet in 2010s



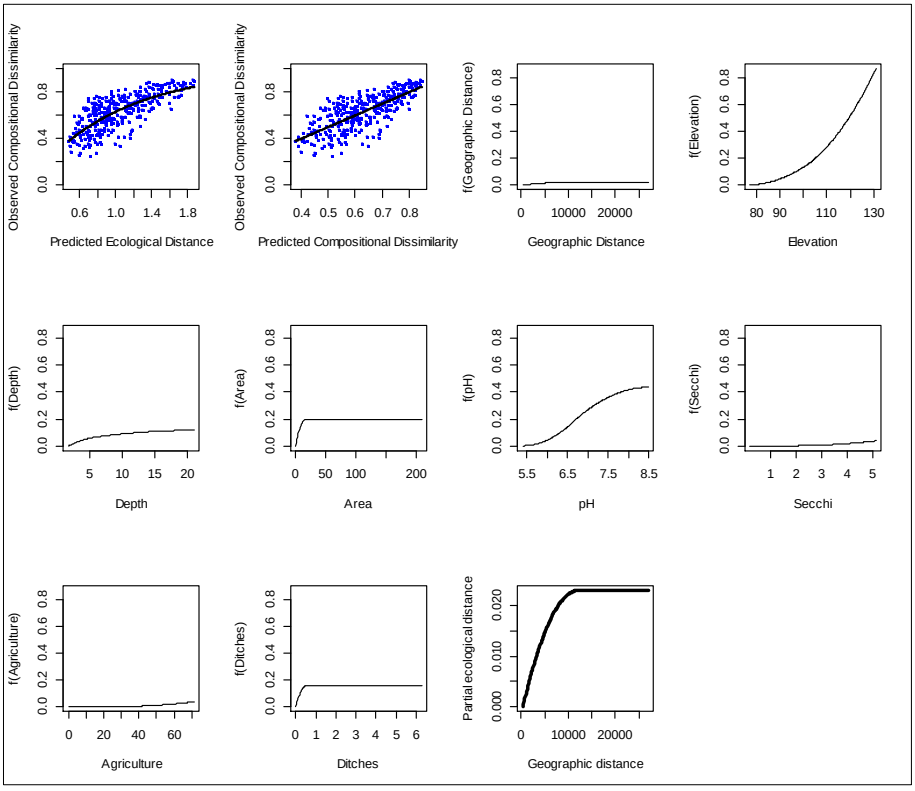
Functional facet in 2010s



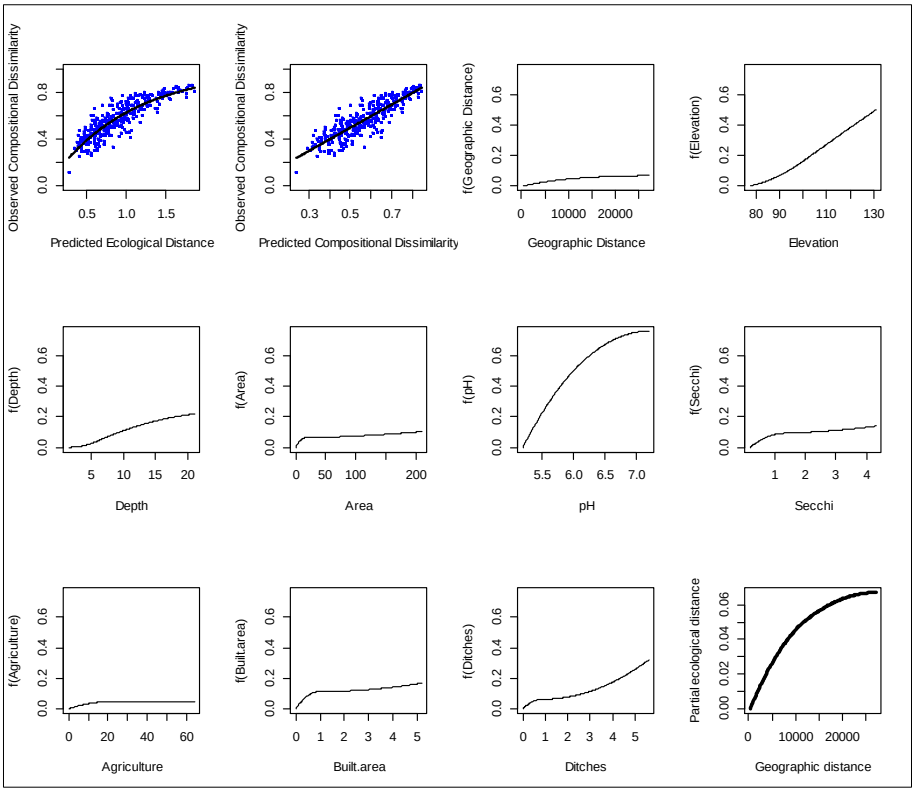
Appendix 4. The generalised dissimilarity modelling (GDM) results with the taxon, phylogenetic and functional facets of total beta diversity at the five different decades: relationships between observed compositional dissimilarity and predicted community dissimilarity between site pairs, and fitted functions of observed compositional change of vascular aquatic macrophytes using nine environmental variables.

Taxon compositional dissimilarity

1940s



1970s


Observed Compositional Dissimilarity
Predicted Ecological Distance
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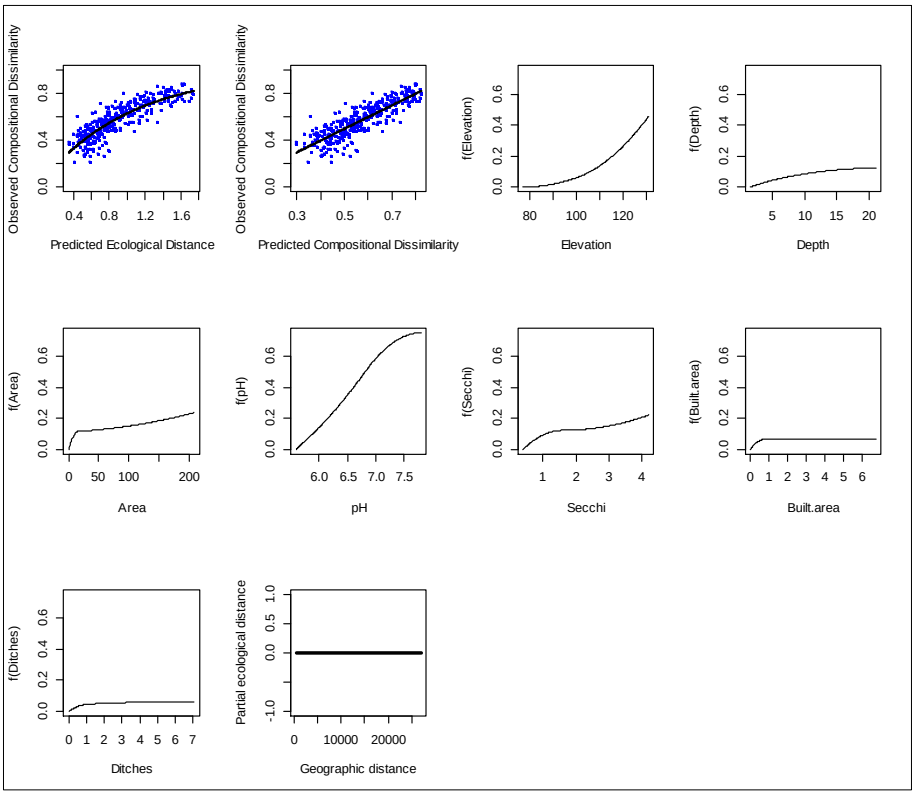
f(Built.area)
Built.area
f(Ditches)
Ditches
Partial ecological distance
Geographic distance

1990s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Predicted Compositional Dissimilarity
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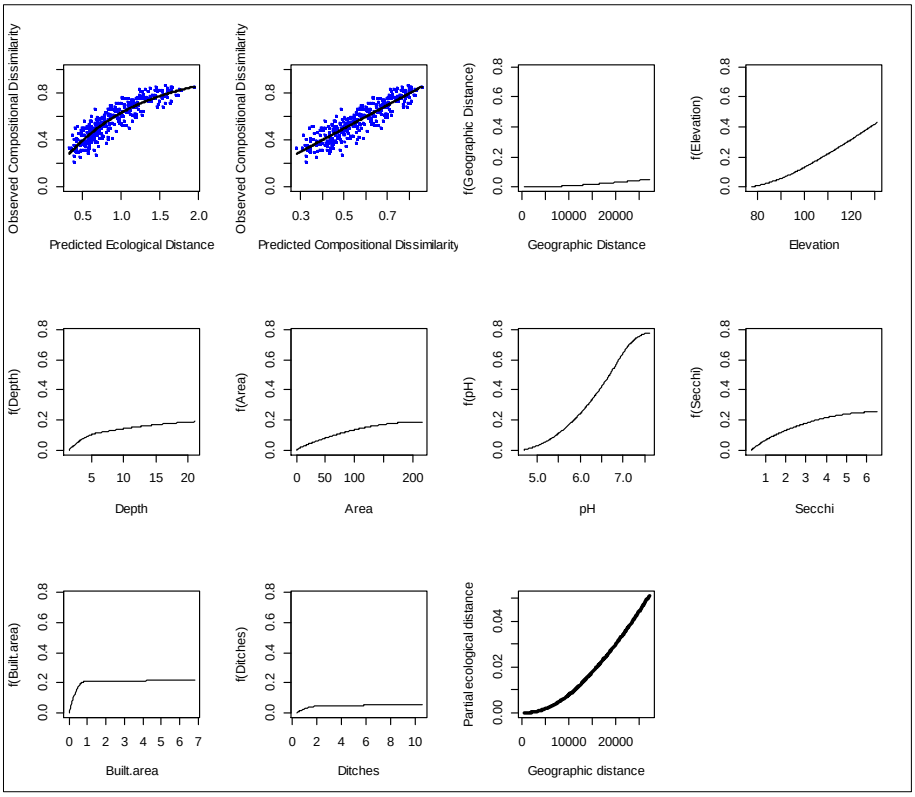
f(Built.area)
Built.area
f(Ditches)
Ditches
Partial ecological distance
Geographic distance

2000s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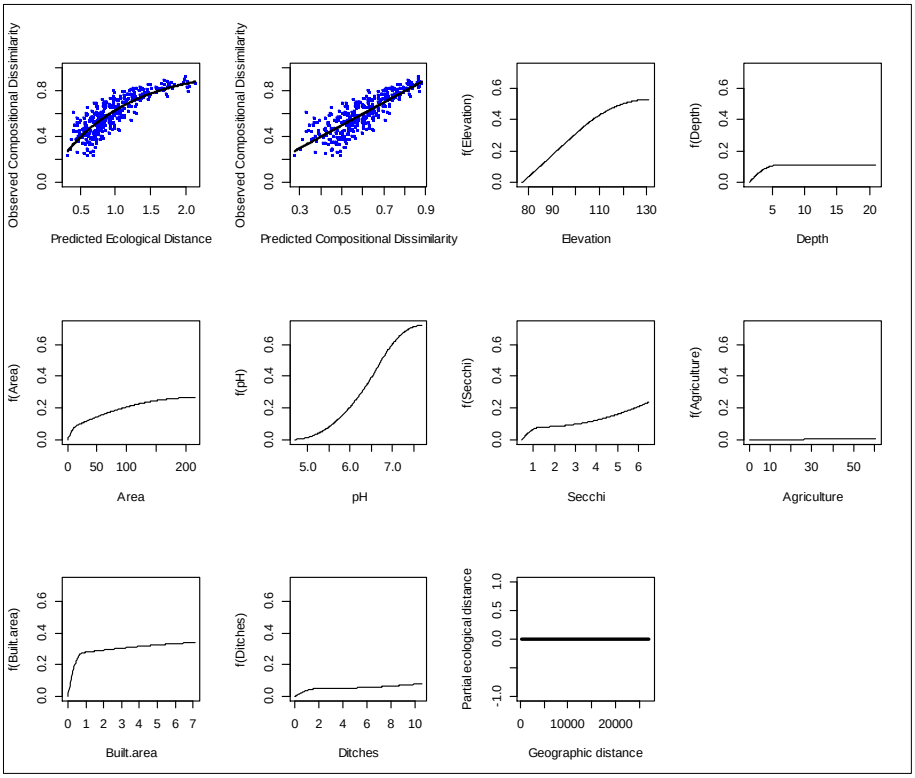
Partial ecological distance
Geographic distance

2010s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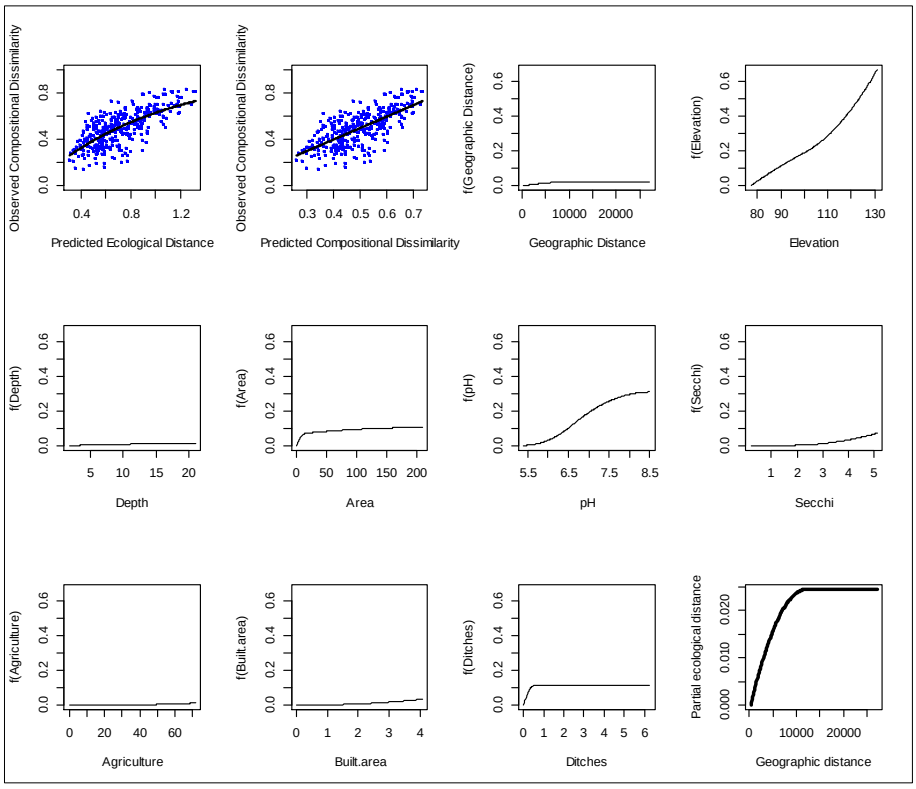
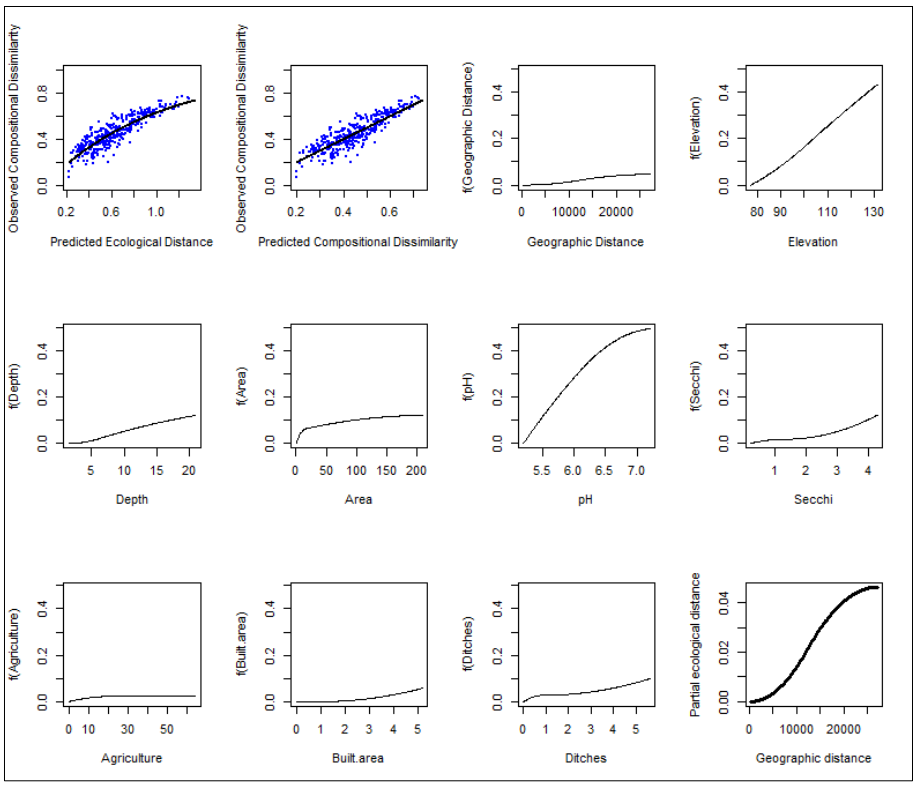
Partial ecological distance
Geographic distance

Phylogenetic compositional dissimilarity

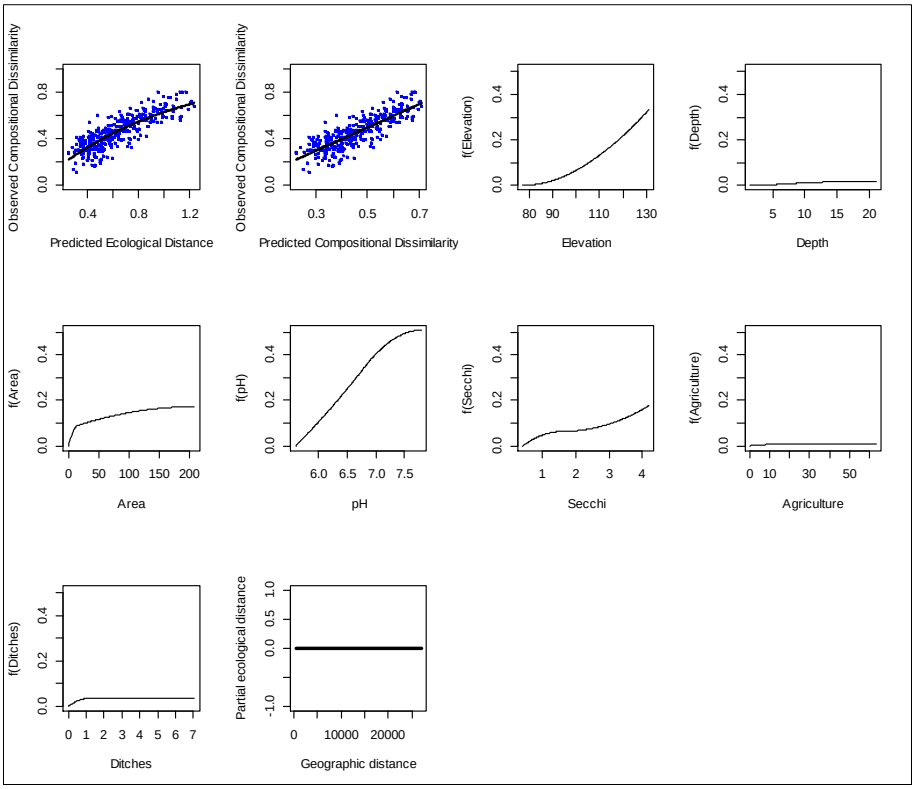
1940s



1970s



1990s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Agriculture
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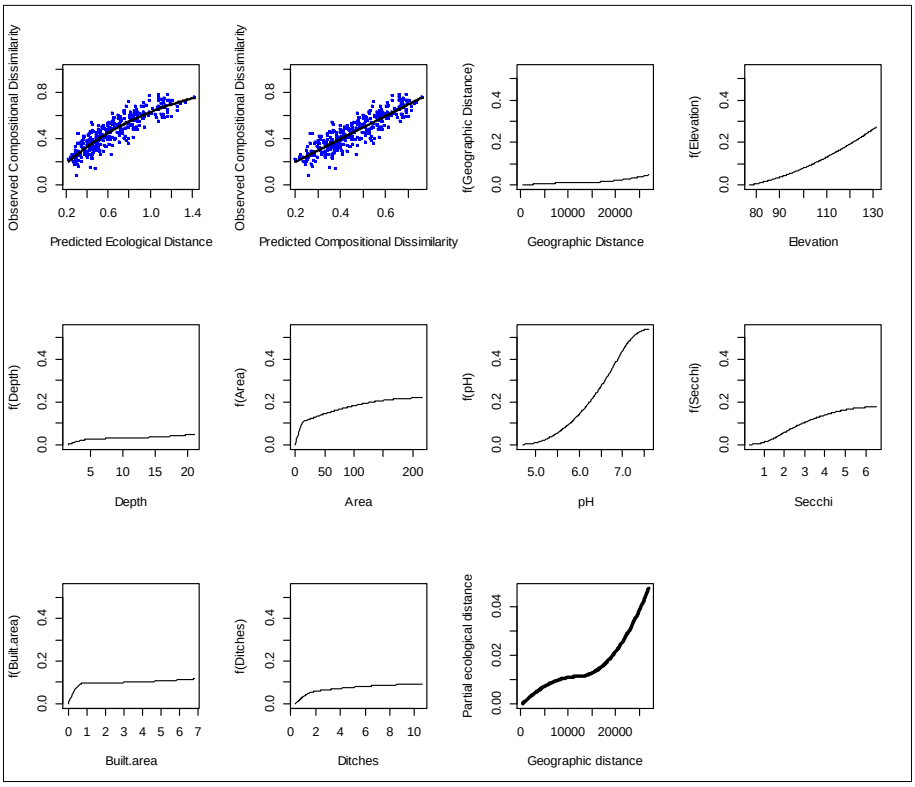
Partial ecological distance
Geographic distance

2000s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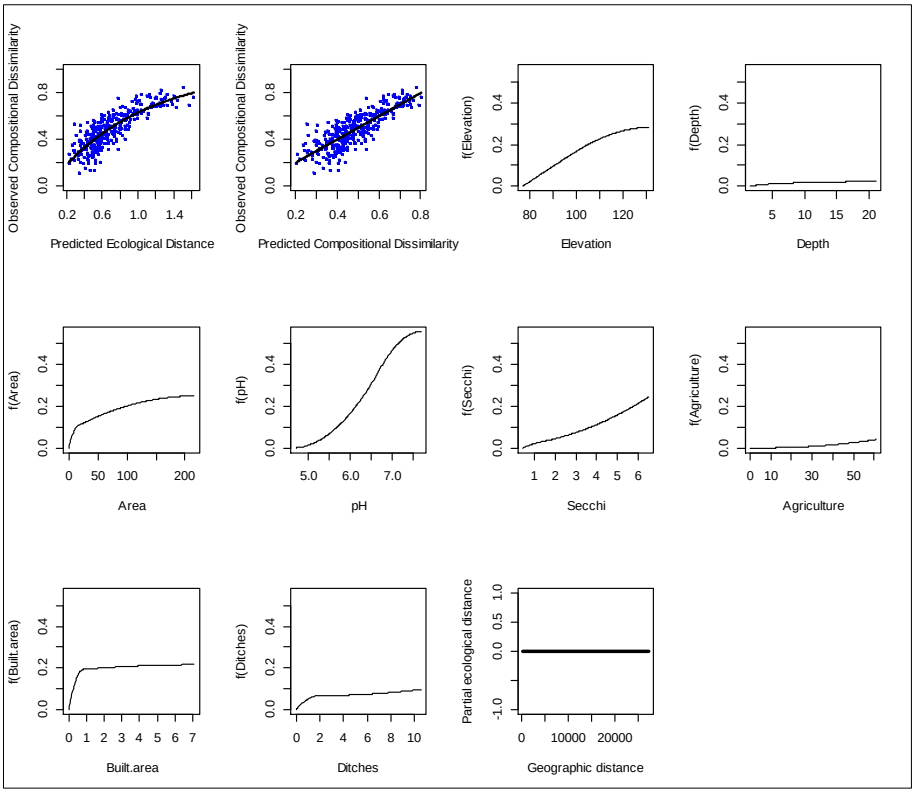
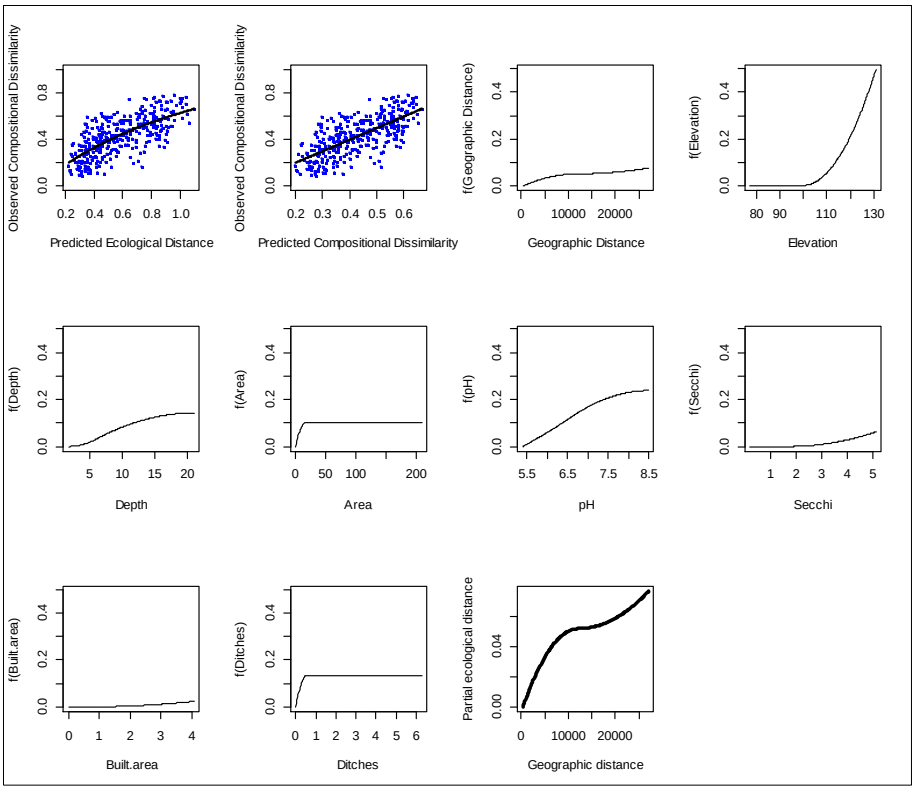
2010s

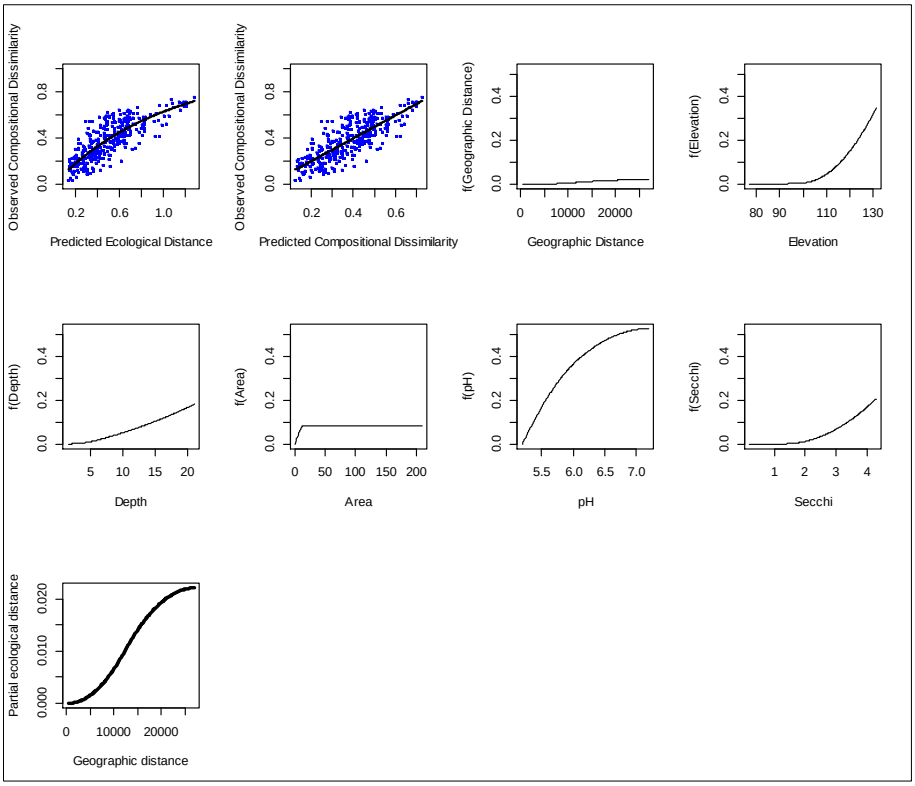


Functional compositional dissimilarity

1940s



1970s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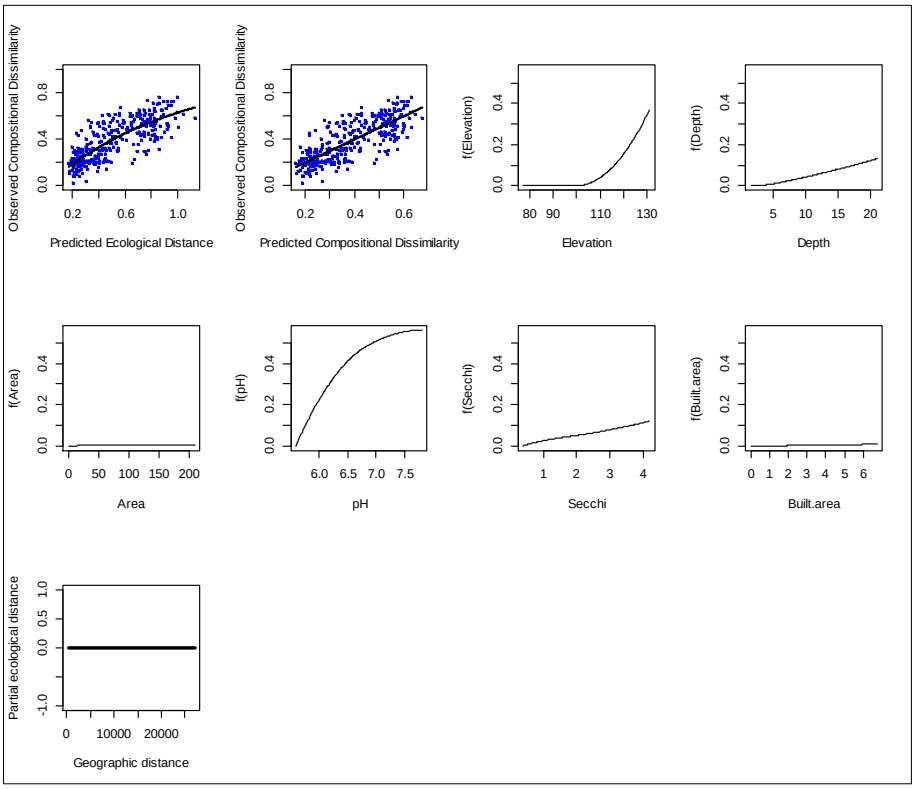
1990s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Partial ecological distance
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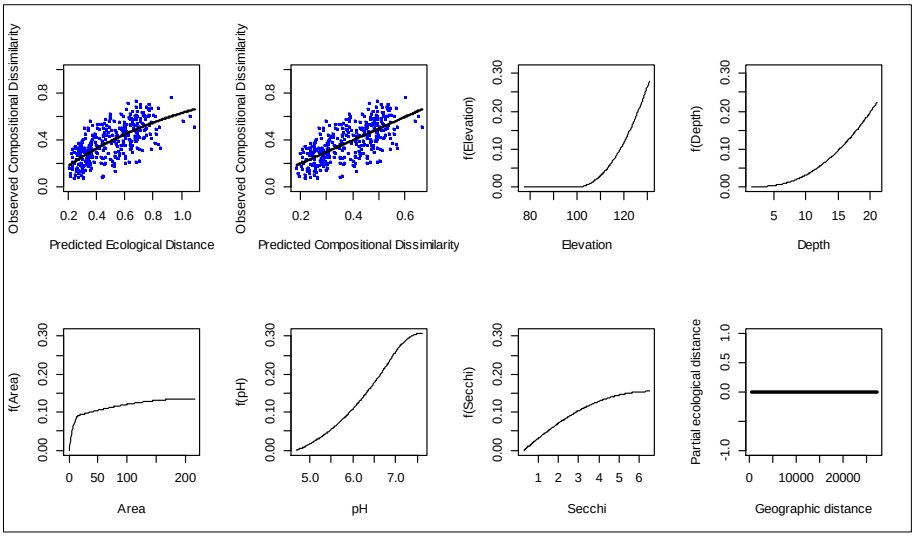
2000s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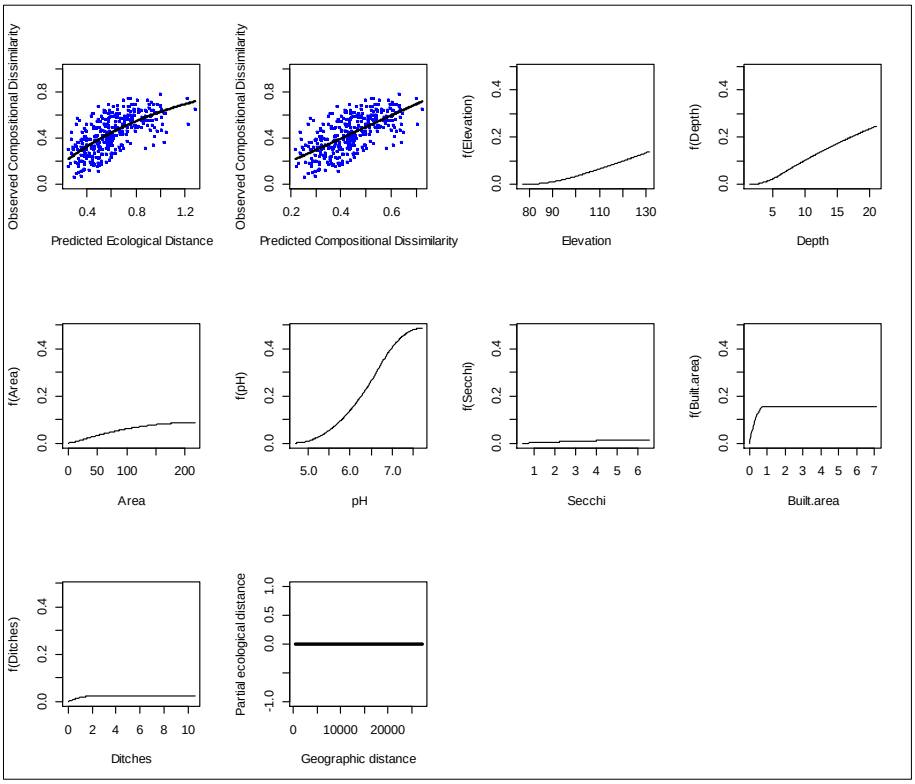
2010s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Ditches
Partial ecological distance
Geographic distance

Appendix 5. The alpha diversity (species richness in sites) in 1940s, 1970s, 1990s, 2000s and 2010s.