

Snorri Sturluson – the author of *Egils saga*?

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Structure

- 1. Traditional philological aspects of the authorship of *Egils saga*
- 2. Early quantitative philology
- 3. Contemporary stylometry

Overlaps between Snorri and *Egils saga*

- Snorri Sturluson (1178/1779-1241) – Icelandic author, chieftain, politician and diplomat
 - *Prose Edda* 1220-1225
 - *Heimskringla* ca. 1230 – kings' sagas
- *Egils saga*:
 - Icelandic family saga
 - story between 850 – 1000, partially based on real events and people
 - Oldest fragment: θ (AM 162 A θ, fol.), ca. 1250
 - Most modern editions based on *Mǫðruvallabók*: AM 132, fol.; ca. 1350
- Snorri's lifetime might overlap with the time when the *Egils saga* have been created

- Snorri is related to Egil (Mýramenn family)
- He lived at *Borg*, homestead of Egil
- Claims of *Borgarfjörður*
 - *Egils saga* as a means for making exaggerated territorial claims?
- LándnÓlsen 1904
- Intimate knowledge of geography of *Borgarfjörður*
- Knowledge of Norway's geography acquired through traveling
- Parallels between the conflicts of Snorri's life and depicted in *Egils saga*

To show:

Heimskringla  Egils saga

To show:

Heimskringla  Egils saga

But:

Attribution of Heimskringla to Snorri is indirect! Based on two Swedish translations from 1550 and 1599

„Zwar wird Snorri in keinem der erhaltenen Manuskripte der *Heimskringla* als Autor des Werkes genannt, doch in den Übersetzungen zweier Norweger aus dem 16. Jahrhundert, Laurents Hanssøns Übersetzung des ersten Teiles der *Heimskringla* aus der Zeit um 1550 und Peder Claussøn Friis' Übersetzung des ganzen Werkes aus dem Jahr 1599, wird Snorri als Verfasser genannt.“

Haraldsdóttir 1989, S. 98

- „Eptir þat lagði Haraldr konungr undir sik Sunnmœri. Vémundr, bróðir Auðbjarnar konungs, helt Firðafylki ok gerðiz þar konungr yfir. Þetta var síð um haustit, ok gerðu menn þat ráð með Haraldi konungi, at hann skyldi eigi fara suðr um Stað á haustdegi. Þá setti Haraldr konungr Rognvald jarl yfir Mœri hváratveggju ok Raumsdal. Haraldr konungr sneri þá norðr aptr til Þrándheims ok hafði um sik mikit fjölmenni.“ *Egils saga*, Ch. 4. (my underlinings)
- „Haraldr konungr lagði undir sik Sunn-Mœri. Vémundr, bróðir Auðbjarnar konungs, helt Firðafylki. Þetta var síðla um haust ok gera menn þat ráð með Haraldi konungi, at hann skyldi eigi fara suðr um Stað á haustdegi. Þá setti Haraldr konungr Rognvald jarl yfir Mœri hváratveggju ok Raumsdal ok hafði hann þá um sik mikit fjölmenni.” *Heimskringla, Haraldz saga ins hárfagra*, Ch. 12 my underlinings)

- „Norðimbraland er kallað fimtungr Englandz“, *Egils saga*, Ch. 52.
- „Norðimbraland er kallað fimtungr Englandz“. *Hmsk, Uphaf sögu Hákonar góða*, Ch. 3.
- Words that occur only in *Egils saga* and *Heimskringla*, but not in other family sagas:
 - *afnám, formál, sjónleysi, finnkaup, landsmegin, landvegr, óró, ótili, viðstaða,...*
 - *málreitinn/-rættinn, innlenskr, skóglaus, ættborinn, þjónustufullur, ...*
 - *frillusonr, múgi, flóttamaðr, ...*

Discrepancies between *Egils saga* and *Hmsk.*

- Relationship to Norwegian kings:
 - *Egils saga* - negative, *Hmsk.* - rather positive.
- A driving force of the story in *Egils saga*: opposition to kings
- E.g.:
- King Harald Fairhair: Unifier of Norway, but why was he so easily deceived and convinced, that Þórólfr Kveld-Úlfsson might be a threat to his rule? Indirectly father of Icelanders, since by oppression forces them out of Norway.

Discrepancies between *Egils saga* and *Hmsk.* II

- Story behind the epithets *hárfagra* and *lúfa* of King Haraldr
- Only in *Hmsk.*: Gyða Eiríksdóttir rejects Haraldr, but she states, she will be his, when/if he unites Norway => Haraldr does not cut his hair or comb it until he unites Norway.
- „at hon mun því at einu játa at gerask eigin kona hans, ef hann vill þat gera fyrir hennar sakir áðr, at leggja undir sik allan Nóreg ok ráða því ríki jafnfrjálsliga“ (Haraldz s. Kap. 3.)
- Not until chapter 13. *hárfagra* and *lúfa*:
- „var hann áðr kallaðr lúfa, en síðan gaf Rögnvaldr jarl honum kenningarnafn ok kallaði hann Harald hinn hárfagra“

Discrepancies between *Egils saga* and *Hmsk.* II

- Yet no Gyða in *Egils saga*
- First *lúfa* in Ch. 3.:
- „Hann hafði þess heit strengt að láta eigi skera hár sitt né kemba fyrr en hann væri einvaldskonungur yfir Noregi. Hann var kallaður Haraldur lúfa.“
- In Ch. 22 *hárfagra*
- To portray him with no redeemable traits?

Traditional Philology on Authorship (Selection)

- Berman 1982: Which came first: *Egils saga* or *Heimskringla*? "Dating *Egils saga* after *Heimskringla* seems to entail fewer problems and inconsistencies." Other discrepancies.
- Cormack 2001: some historical discrepancies.
- Nordal 2002: no single author, but several, bc. copies. Snorri is not the author of the *Egils saga* from *Mǫðruvallabók*.
- Tulinus 2014: possible parallels between Snorri's life and that of Egil.
 - Saga as a wedding gift to reconcile with the family?
- Males 2015: Ólafur Þórðarson (Snorri's nephew) is the author, because of historically incorrect account of runes in *Egils saga*. Ólafur Þórðarson seems to have been more interested in runes than Snorri.

Quantitative Philology

- Wieselgren 1927:
 - 25 stylistic elements, including optative vs. munu, optative vs. skulu: the ratios (opt. to munu/skulu) for *Prose Edda* and *Heimskringla* do not agree with *Egils saga*. Snorri is not the author of Egil's saga.
 - But: θ not studied
- van den Toorn 1959:
 - Sentence and syntax statistics
 - Sentence-initiating subordinate clause: *Egla* 11%, *Ólafs s.* 12.5%, *Hrafnkels s.* 2.4% *Fóstbræðra s.* 8.1%, ...
 - Asyndeton in verbs
 - But: weak selection of works for comparison., e.g. occasionally *Laxdæla s.*, no *Eyrbyggja s.*, *Njáls s.*, *Grettis s.*

Quantitative Philology

- Hallberg 1962, 1968:
 - Pairwords (parord) = words that occur in *Hmsk.* and only in one further text.
 - Result: *Heimskringla* had more pairwords in common with *Egils saga*
 - Low frequency of *kveðask* : *Hmsk* A 8, *Hmsk* B 5, *Egla* 7, *Laxdæla* 134, *Eyrb.* 55, *Njáls* 76, *Grettis* 92.
 - between *ok er* vs. *en er* "as" Snorri prefers *en er*
 - *eptir um daginn* instead of *um daginn eptir*
- West 1974, 1980:
 - unlike Hallberg, West focused on the frequencies of most frequently used words.
 - *Egils saga*, *Ólafs s.*, *Fóstbræðra s.*, *Hrafnkels s.*, *Njáls s.*
 - "Snorri text segments correlate well with themselves, poorly with non-Snorri text segments, and moderately with *Egils saga*" and "[Snorri's] statistical fingerprint is very clear from the data of this study."
 - End section of *Ólafs s.* not written by Snorri. End part of *Egils saga* contains "non-Snorri" material.

Was Hallberg right?

- For a long time: yes!
- No, according to Louis-Jensen(2006): Hallberg divided the *Hmsk*. wrong. Questionable authorship of *Hmsk*. Tested only additionally on Laxdæla s.

Was Hallberg right?

- Saga Corpus: 49 texts
 - 45 family sagas (incl. *Egils saga*) + *Sturlunga s.* + *Heimskringla* + *Landnámabók* + *Íslendinga þættir*
 - 1.5 million words
 - *Nefnir* lemmatizer
 - By Eiríkur Rögnvaldsson and Sigrún Helgadóttir (2011)
- Based on *lemmata*
- Tagging ca. 93% correct, therefore still many misattributions
- Ignoring the composition of *Heimskringla*
- Normalization (same as Hallberg) :
(pairwords of a texts/length of text) * length of *Egils saga*
- Preliminary results

Was Hallberg right? (not normalized results)

Ran	Works	Pairwords resp. Hmsk.
1	<i>Egils s.</i>	161
2	<i>Njáls s.</i>	77
3	<i>Laxdæla s.</i>	71
4	<i>Eyrbyggja s.</i>	59
5	<i>Grettis s.</i>	51
6	<i>Fóstbr. s.</i>	37
7	<i>Vatnd. s.</i>	35
8	<i>Fljótsd. s.</i>	21

>= 20 pairwords, only family sagas

Rank	Works	Pairwords resp. Hmsk.
1	<i>Sturlunga s.</i>	202
2	<i>Íslendinga þættir</i>	110
3	<i>Egils. s.</i>	99
4	<i>Laxdæla s.</i>	47
5	<i>Njáls s.</i>	36
6	<i>Eyrbyggja s.</i>	30
7	<i>Fóstbr. s.</i>	28
8	<i>Grettis s.</i>	27
9	<i>Landn. b.</i>	23
10	<i>Vatnsdæla s.</i>	21

>= 20 pairwords, family sagas + Landnámabok + Sturlunga s. +
Íslendinga þættir

Was Hallberg right?

Ran	Works	Pairwords resp. Hmsk.
1	<i>Egla</i>	161
2	<i>Grænlandinga þ</i>	119
3	<i>Eiríks rauða</i>	112
4	<i>Valla-Ljóts</i>	98
5	<i>Eyrbyggja</i>	95
6	<i>Bárðar</i>	89
7	<i>Þorsteins S</i>	80
8	<i>Laxdæla</i>	77

>= 20 pairwords, only family sagas

Rank	Works	Pairwords resp. Hmsk.
1	<i>Egla</i>	99
2	<i>Jökuls þ</i>	93
3	<i>Valla-Ljóts</i>	72
4	<i>Íslendinga þ</i>	63
5	<i>Fóstbræðra</i>	55
6	<i>Kormáks</i>	53
7	<i>Laxdæla</i>	50
8	<i>Eiríks rauða</i>	48
9	<i>Eyrbyggja</i>	48
10	<i>Bárðar</i>	47

>= 20 pairwords, family sagas + Landnámabok + Sturlunga s. + Íslendinga þættir

Asking further questions

- Does *Heimskringla* have more lexical 2-grams in common with *Egils saga* than with other texts from the corpus?
- Normalization:
- $(\text{Length of common 2-grams} / \text{length of text}) * (\text{length of unique 2-grams of Heimskringla})$

n-gram

- $S = \text{„Úlfur hét maður, son Bjálfa og Hallberu, dóttur Úlfs hins óarga.“}$
(*Egils saga*, Ch. 1)
- Lexical 1-gram:
 - $S_{1\text{-lex-gram}} = \{\text{„Úlfur“}, \text{„hét“}, \text{„maður“}, \text{„son“}, \text{„Bjálfa“}, \dots, \text{„óarga“}\}$
- Lexical 2-gram:
 - $S_{2\text{-lex-gram}} = \{\text{„Úlfur hét“}, \text{„hét maður“}, \text{„maður son“}, \text{„son Bjálfa“}, \text{„Bjálfa og“}, \dots, \text{„hins óarga“}\}$
- Character 4-gram:
 - $S_{4\text{-char_gram}} = \{\text{„Úlfu“}, \text{„lfur“}, \text{„fur “}, \text{„ur h“}, \dots, \text{„rga.“}\}$

Rank	Works	Common lexical 2-grams resp. Hmsk. (normalized freq.)
1	<i>Egla</i>	2445
2	<i>Sturlunga</i>	1935
3	<i>Íslendinga þ</i>	1554
4	<i>Brennu-Njáls</i>	1138
5	<i>Laxdæla</i>	1045
6	<i>Landnámabók</i>	1017
7	<i>Grettis</i>	984
8	<i>Fóstbræðra</i>	974
9	<i>Eyrbyggja</i>	958
10	<i>Kjalnesinga</i>	812

excl. combinations w/ pairwords

Rank	Works	Common lexical 2-grams resp. Hmsk. (normalized freq.)
1	<i>Egla</i>	2282
2	<i>Sturlunga</i>	1810
3	<i>Íslendinga þ</i>	1459
4	<i>Brennu-Njáls</i>	1106
5	<i>Laxdæla</i>	983
6	<i>Grettis</i>	961
7	<i>Landnámabók</i>	940
8	<i>Fóstbræðra</i>	903
9	<i>Eyrbyggja</i>	894
10	<i>Egla</i>	2282

incl. combinations w/ pairwords

Recent Quantitative Text Analysis

- Tulinius 2014:
 - Irony through *ekki er þess getið*. Rare – *Egils saga*: 2, *Heimskringla*: 2, other works: 2.
- Þorgeirsson 2014:
 - faithful transmission of a preference for *en er* in manuscripts of *Egils saga*, although *Möðruvallabók* between Ch. 55–87 is an outlier.
 - High % *en er* in „Snorri-texts“:
 - *Heimskringla*: 94%, *Egils Saga*: 89%, *Prose Edda*: 83%.
 - Other texts: 2%-79%

Computational Stylometric Contributions

- Þorgeirsson 2018:
 - *Egils saga* is closest to *Heimskringla*
 - Burrows' (improved) Delta = robust intertextual distance measure
 - Demonstrated to work well with modern Icelandic literature
 - But: few works taken for comparison: 4 Icelandic sagas and 4 historical texts.
- Björnsson, Helgason, Káráson 2021
 - *Egils saga* is closest to *Heimskringla* (esp. second half of *Ólafs s. h.*)
 - Cosine Delta
 - 150 most used part-of-speech tags
 - 1000 most used 4-gram character features (after excluding nouns)
 - {„Egil“, „gils“, „ils“, „ls a“, „s sa“, „ sag“, „saga“}

Table 15: Burrows' delta for both parts of *Heimskringla*, 1000 MFW.

Heimskringla A	Delta	Heimskringla B	Delta
Egils saga	968	Egils saga	1013
Eyrbyggja saga	1243	Eyrbyggja saga	1232
Grettis saga	1285	Grettis saga	1329
Laxdæla saga	1309	Laxdæla saga	1423
Njáls saga	1343	Njáls saga	1464

Table 18: Burrows' delta for both parts of *Heimskringla*, 1000 MFW.

Heimskringla A	Delta	Heimskringla B	Delta
Egils saga	803	Egils saga	873
Knýtlinga saga	936	Knýtlinga saga	897
Íslendinga saga	1138	Íslendinga saga	1066
Morkinskinna	1147	Jómsvíkinga saga	1248
Jómsvíkinga saga	1149	Morkinskinna	1301

Table 16: The two parts of *Heimskringla* compared to the five sagas of Icelanders

Text	Lowest delta	Difference	Most frequent words
Heimskringla A	Egils saga	34.8 %	500
Heimskringla B	Egils saga	24.2 %	500
Heimskringla A	Egils saga	28.4 %	1000
Heimskringla B	Egils saga	21.6 %	1000
Heimskringla A	Egils saga	32.5 %	2000
Heimskringla B	Egils saga	22.4 %	2000

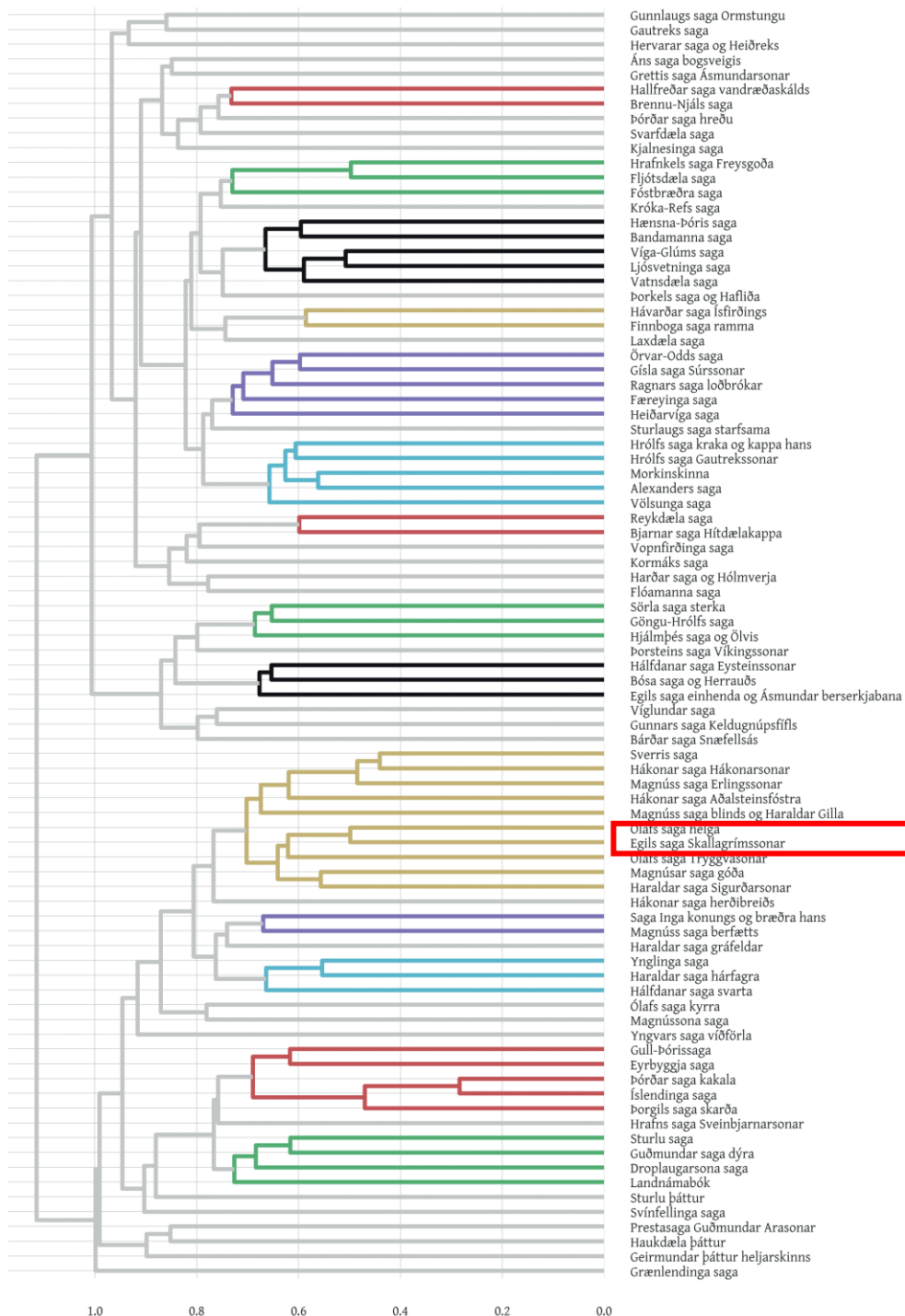
Table 19: The two parts of *Heimskringla* compared to five historical texts.

Text	Lowest delta	Difference	Most frequent words
Heimskringla A	Egils saga	17.4 %	500
Heimskringla B	Egils saga	6.2 %	500

Table 19: (Continued)

Text	Lowest delta	Difference	Most frequent words
Heimskringla A	Egils saga	16.4 %	1000
Heimskringla B	Egils saga	2.7 %	1000
Heimskringla A	Egils saga	12.6 %	2000
Heimskringla B	Egils saga	1.8 %	2000

Porgeirsson (2018)



“Sections from *Egils saga* generally measure close to the latter half of *Ólaf's saga helga*, but less so to other parts of *Heimskringla*.”

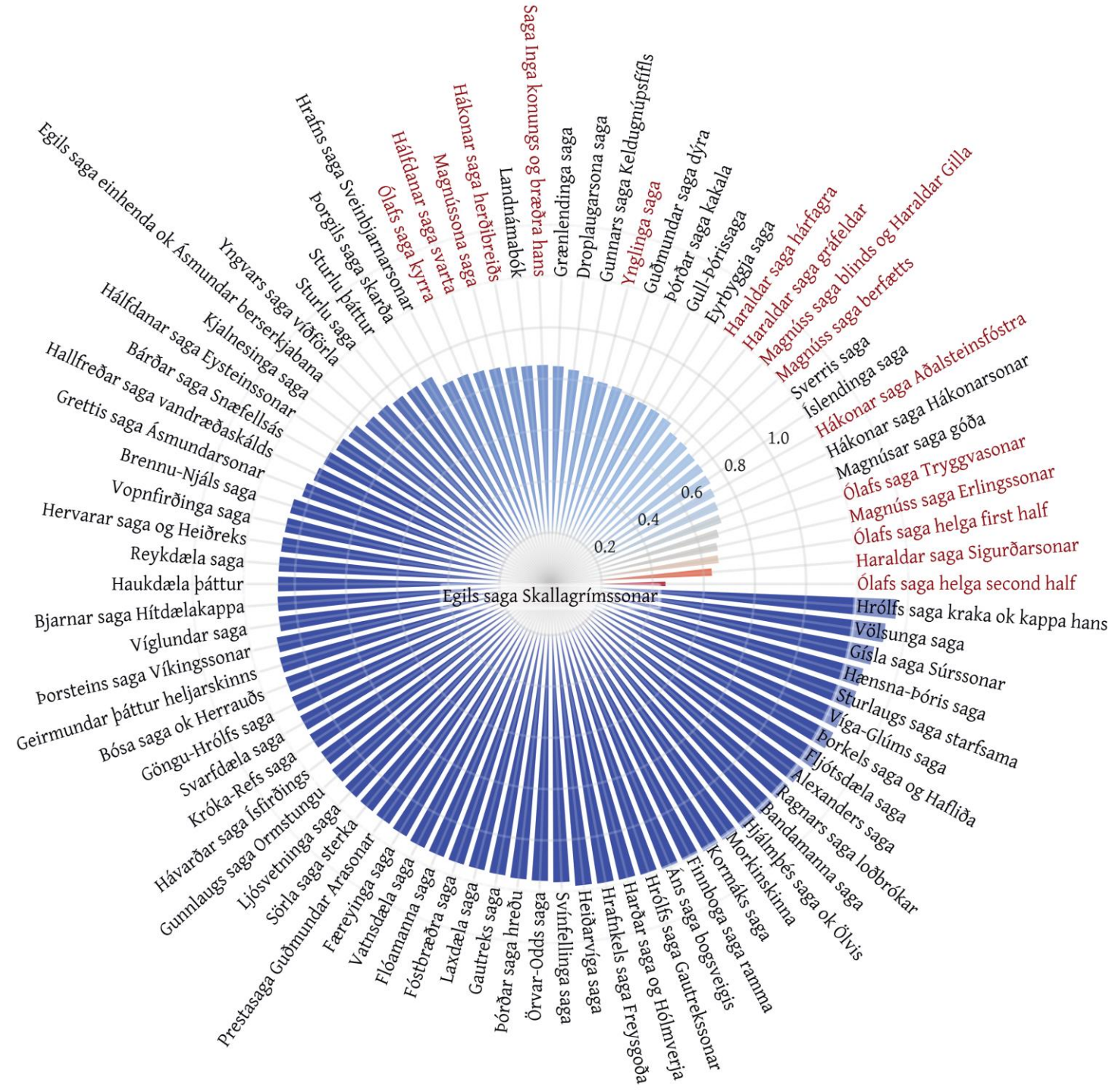
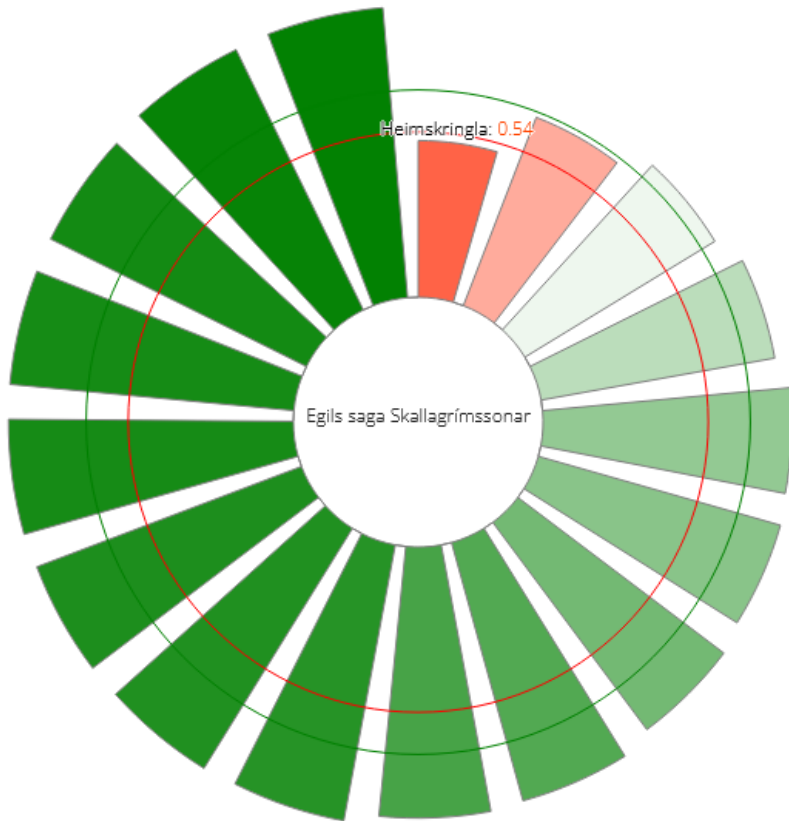
“None of the sagas that measure close to *Heimskringla* show a strong stylistic similarity to the first part of *Ólaf's saga helga*. This may indicate that this part of *Ólaf's saga helga* was composed by someone else than the composer of the rest of *Heimskringla* or copied from an independent source.”

	Íslendinga saga	Þórðar saga kakala	Sverris saga	Hákonar saga Hákonarsonar	Magnúss saga Erlingssonar	Þorgils saga skarða	Hrafnkels saga Freysgoða	Fljótsdæla saga	Egils saga Skallagrímssonar	Ólaf's saga helga	
Egils saga Skallagrímssonar	0.78	0.81	0.75	0.73	0.72	0.92	1.18	1.24	0.00	0.50	
Ólaf's saga helga	0.91	0.85	0.63	0.63	0.60	0.87	1.13	1.25	0.50	0.00	

Björnsson, Helgason, Kárason 2021

Björnsson, Helgason, Kárason 2021

- <http://fingrafor.ullur.net/>
[25.12.2021]



My approach

- Saga Corpus
- 49 Texts
 - 45 family sagas (incl. *Egils saga*)+ *Sturlunga s.* + *Heimskringla* + *Landnámabók* + *Íslendinga þættir*
 - 1.5 million words
 - *Nefnir* lemmatizer
 - POS-tags: 93% correctness
 - By Eiríkur Rögnvaldsson and Sigrún Helgadóttir (2011)
 - Texts are either in modern Icelandic or were normalized to it

- Lexical 1-, 2-, 3- grams
- Burrows' Delta and Cosine Delta as an intertextual distance measure
- Excluding:
- *Íslendinga þættir* – collection of texts
- using the stylometry package *Stylo* for R

Burrows' (classic) Delta

1-grams & 500 MFW

2-grams & 300 MFF

3-grams & 150 MFF

Work	resp. <i>Egils s.</i>		Work	resp. <i>Egils s.</i>		Work	resp. <i>Egils s.</i>
<i>Heimskringla</i>	0.57712097	→	<i>Heimskringla</i>	0.55923814	→	<i>Heimskringla</i>	0.49695746
<i>Eyrbyggja</i>	0.66790223	→	<i>Eyrbyggja</i>	0.65095502	↘	<i>Sturlunga</i>	0.59320783
<i>Grettis</i>	0.72706594	↘	<i>Sturlunga</i>	0.65130604	↗	<i>Íslendinga þættir</i>	0.62287122
<i>Íslendinga þættir</i>	0.75073023	↗	<i>Grettis</i>	0.74291163	↘	<i>Grettis</i>	0.66919035
<i>Laxdæla</i>	0.770762	↘	<i>Íslendinga þættir</i>	0.78028144	↗	<i>Eyrbyggja</i>	0.67376747
<i>Sturlunga</i>	0.77384499	↗	<i>Laxdæla</i>	0.78421216	↘	<i>Víga-Glúms</i>	0.77439755
<i>Harðar og Hólmverja</i>	0.81807587		<i>Fóstbræðra</i>	0.85000229		<i>Laxdæla</i>	0.7796641
<i>Fóstbræðra</i>	0.82197157		<i>Brennu-Njáls</i>	0.85902616		<i>Brennu-Njáls</i>	0.78170574
<i>Bjarnar</i>	0.82269988		<i>Gísla Súrssonar L</i>	0.87470385		<i>Bjarnar</i>	0.79851313
<i>Bárðar</i>	0.82950892		<i>Bárðar</i>	0.87987419		<i>Fljótsdæla</i>	0.82046054
<i>Flóamanna</i>	0.83125701		<i>Flóamanna</i>	0.8882014		<i>Fóstbræðra</i>	0.82564176
<i>Vatnsdæla</i>	0.8351724		<i>Bjarnar</i>	0.90567995		<i>Ljósvetninga C</i>	0.83101133
...
<i>Landnámabók</i>	1.28863884		<i>Ölkofra</i>	1.37138842		<i>Ölkofra</i>	1.36105445

Burrows' (classic) Delta

1-grams & 500 MFW

2-grams & 300 MFF

3-grams & 150 MFF

Work	resp. <i>Egils s.</i>		Work	resp. <i>Egils s.</i>		Work	resp. <i>Egils s.</i>
<i>Heimskringla</i>	0.57415302	→	<i>Heimskringla</i>	0.56501985	→	<i>Heimskringla</i>	0.50677495
<i>Eyrbyggja</i>	0.6655066	↘	<i>Sturlunga</i>	0.64297971	→	<i>Sturlunga</i>	0.61193908
<i>Grettis</i>	0.72840253	↗	<i>Eyrbyggja</i>	0.64414042	↘	<i>Grettis</i>	0.70223387
<i>Sturlunga</i>	0.77702982	↗	<i>Grettis</i>	0.73268308	↗	<i>Eyrbyggja</i>	0.70731028
<i>Laxdæla</i>	0.77994382	→	<i>Laxdæla</i>	0.77059254	→	<i>Laxdæla</i>	0.78477311
<i>Harðar og Hólmverja</i>	0.8169439		<i>Fóstbræðra</i>	0.82232417		<i>Víga-Glúms</i>	0.79555269
<i>Fóstbræðra</i>	0.81913		<i>Brennu-Njáls</i>	0.84452211		<i>Bjarnar</i>	0.80176725
<i>Bjarnar</i>	0.82076706		<i>Bárðar</i>	0.86810909		<i>Brennu-Njáls</i>	0.80668118
<i>Bárðar</i>	0.82373531		<i>Gísla Súrssonar L</i>	0.87043882		<i>Fóstbræðra</i>	0.83201454
<i>Flóamanna</i>	0.8296799		<i>Flóamanna</i>	0.87248234		<i>Fljótsdæla</i>	0.83883118
<i>Hallfreðar Ó</i>	0.83163064		<i>Bjarnar</i>	0.88913617		<i>Ljósvetninga C</i>	0.85653823
<i>Brennu-Njáls</i>	0.83395664		<i>Víga-Glúms</i>	0.8989896		<i>Gísla Súrssonar L</i>	0.88193914
...
<i>Landnámabók</i>	1.27965828		<i>Ölkofra</i>	1.35400857		<i>Ölkofra</i>	1.39321084

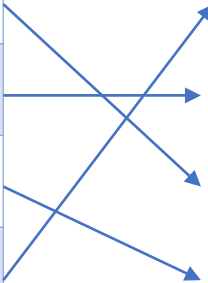
Burrows' (classic) Delta 1000 MFW & MFF

1-grams

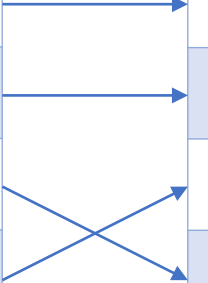
2-grams

3-grams

Work	resp. Egils s.
<i>Heimskringla</i>	0.5705743
<i>Eyrbyggja s.</i>	0.6631921
<i>Grettis s.</i>	0.7115175
<i>Laxdæla s.</i>	0.7416694
<i>Sturlunga s.</i>	0.7502277
<i>Fóstbroethra s.</i>	0.7772485
<i>Vatnsdæla s.</i>	0.7793171
<i>Bjarnar s.</i>	0.7924141
<i>Flóamanna s.</i>	0.8002936
<i>Harðar s.</i>	0.8110069
<i>Hallfreðar úr Ó.</i>	0.8156321
<i>Brennu-Njáls s.</i>	0.817968
...	...
<i>Ölkofra s.</i>	1.205848



Work	resp. Egils s.
<i>Heimskringla</i>	0.534153
<i>Sturlunga s.</i>	0.6376481
<i>Grettis s.</i>	0.7118011
<i>Eyrbyggja s.</i>	0.7184119
<i>Laxdæla s.</i>	0.73025
<i>Brennu-Njáls s.</i>	0.8155865
<i>Fóstbroethra s.</i>	0.8302124
<i>Bjarnar s.</i>	0.8641483
<i>Bárthar s.</i>	0.8725762
<i>Fljótsdæla s.</i>	0.8844473
<i>Svarfdæla s.</i>	0.8898304
<i>Bjarnar s.</i>	0.8641483
...	...
<i>Ölkofra s.</i>	1.3816747



Work	resp. Egils s.
<i>Heimskringla s.</i>	0.5627
<i>Sturlunga s.</i>	0.6463475
<i>Grettis s.</i>	0.6895905
<i>Laxdæla s.</i>	0.7126062
<i>Eyrbyggja s.</i>	0.7668168
<i>Brennu-Njáls s.</i>	0.787495
<i>Fóstbroethra s.</i>	0.7975899
<i>Fljótsdæla s.</i>	0.8199854
<i>Vatnsdæla s.</i>	0.8213339
<i>Gísla s. L</i>	0.8339832
<i>Ljósvetninga s. C</i>	0.8363056
<i>Víga-Glúms s.</i>	0.8446046
...	...
<i>Groenlendinga þ.</i>	1.1830651

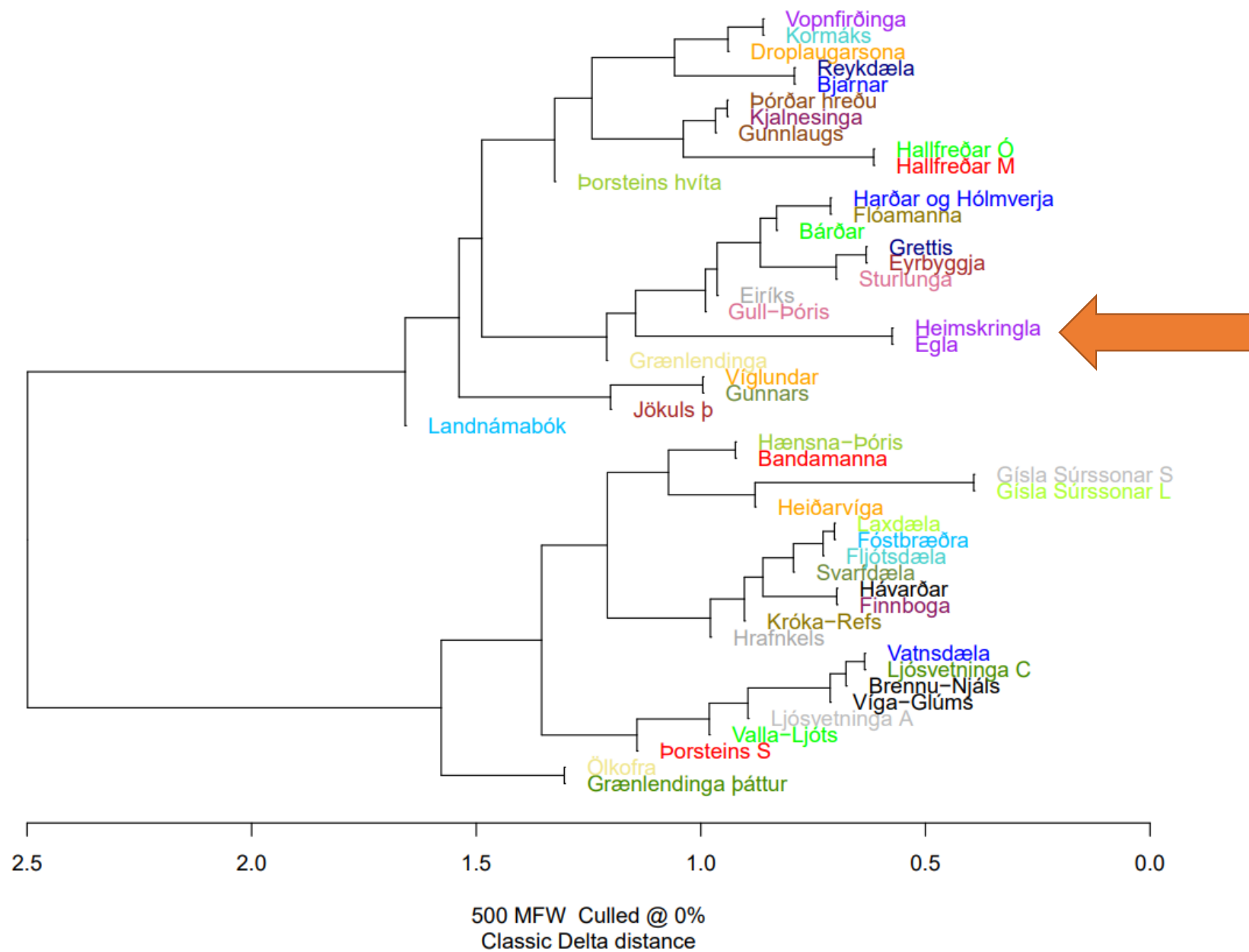
From 10 to 1000 MFW & MFF

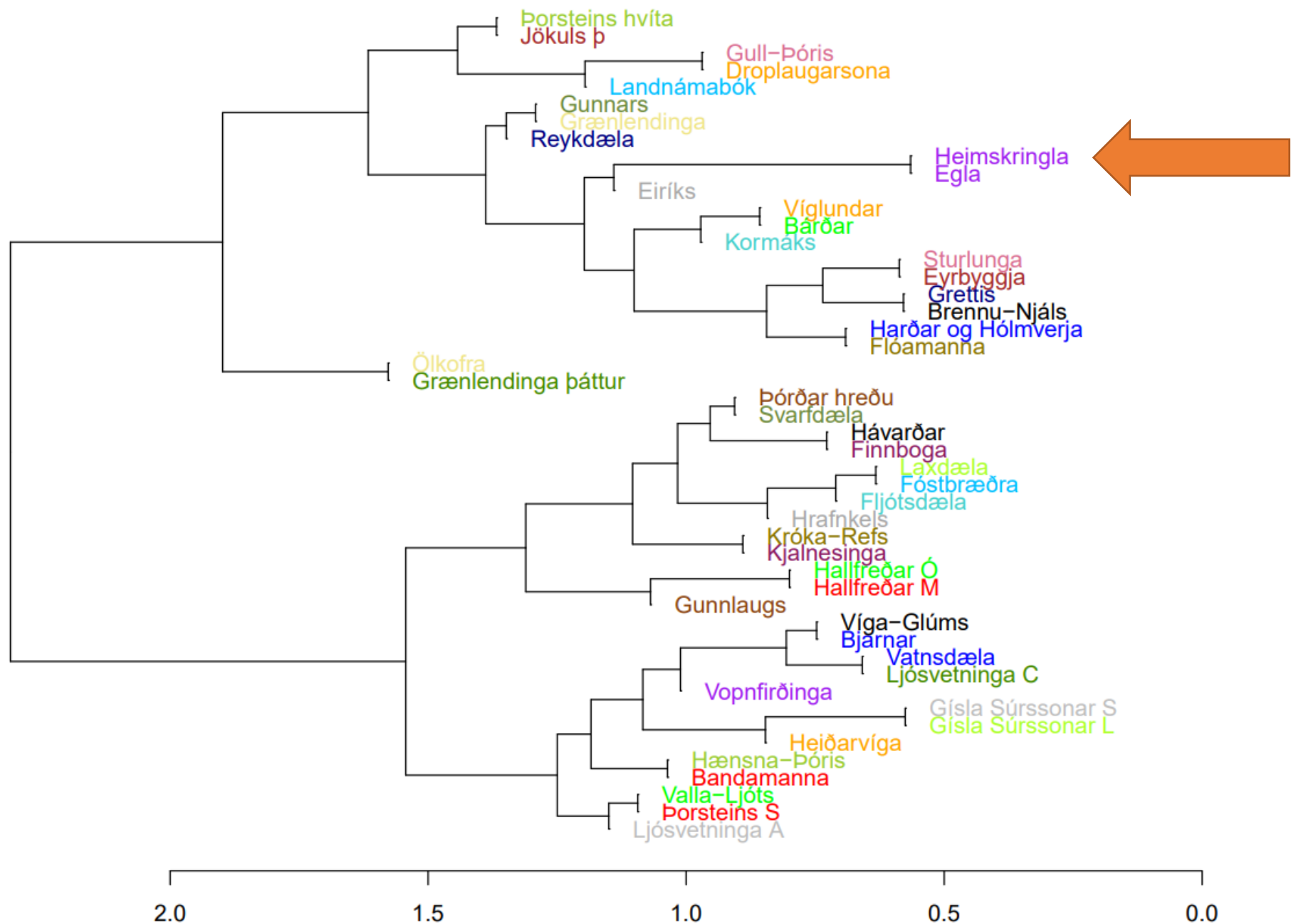
- Burrows' Delta:
 - 1-gram:
 - Closest to *Egils saga*: 989 *Heimskringla*, 2 *Eyrbyggja s.*
 - Closest to *Heimskringla*: 991 *Egla*
 - 2-gram:
 - Closest to *Egils saga*: 986 *Heimskringla*, 5 *Eyrbyggja s.*
 - Closest to *Heimskringla*: 991 *Egla*
 - 3-gram:
 - Closest to *Egils saga*: 974 *Heimskringla*, 5 *Eyrbyggja s.*, 12 *Sturlunga s.*
 - *Sturlunga s.* < 25 MFF, *Eyrbyggja* < 28 MFF,
 - Closest to *Heimskringla*: 597 *Egla*, *Sturlunga s.* 392, *Landnámabók* 2
 - *Sturlunga s.* dominates < 586 MFF, *Landnámabók* @ 11 & 12 MFF

From 10 to 1000 MFW & MFF

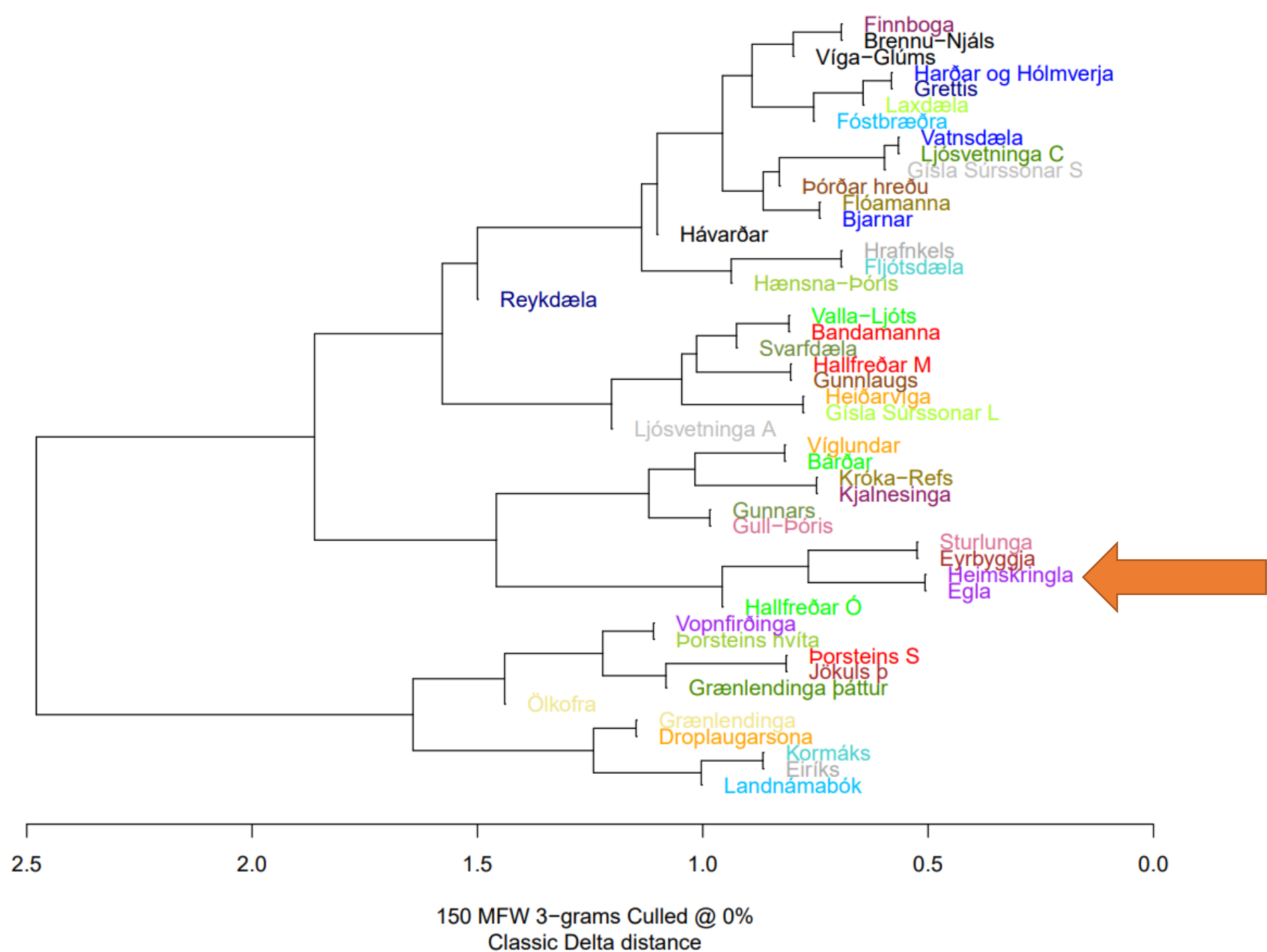
- Cosine Delta:
 - 1-gram:
 - Closest to *Egils saga*: 991 Heimskringla
 - Closest to *Heimskringla*: 991 Egla
 - 2-gram:
 - Closest to *Egils saga*: 986 Heimskringla, 5 Eyrbyggja s.
 - Closest to *Heimskringla*: 991 Egla
 - 3-gram:
 - Closest to *Egils saga*: 981 Heimskringla, 5 Eyrbyggja s., 5 Sturlunga s.
 - Sturlunga s. < 25 MFF, Eyrbyggja < 28 MFF,
 - Closest to *Heimskringla*: 972 Egla, Sturlunga s. 13, Landnámabók 6
 - Sturlunga s. & Landnámabók < 40 MFF

Cluster Analysis

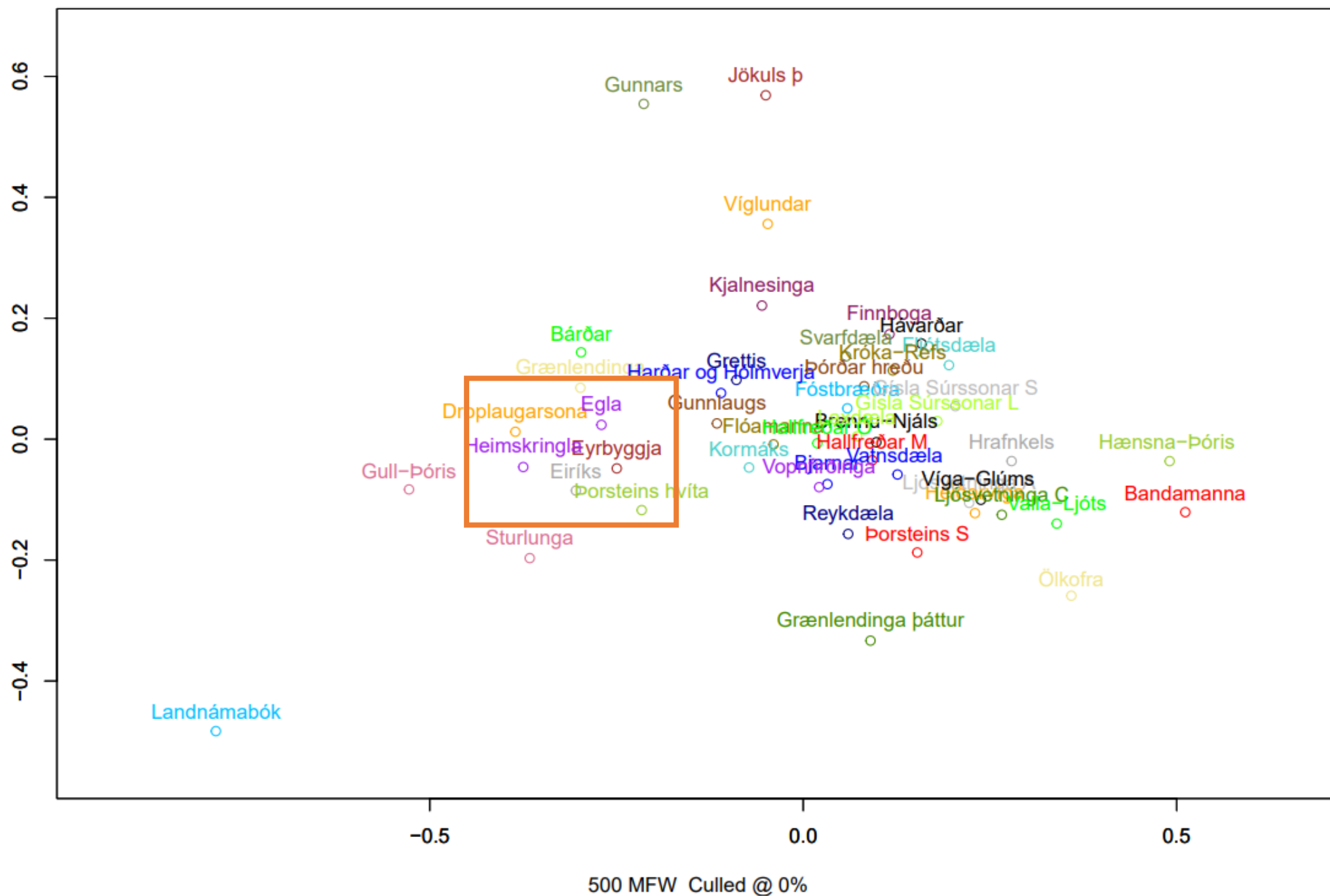




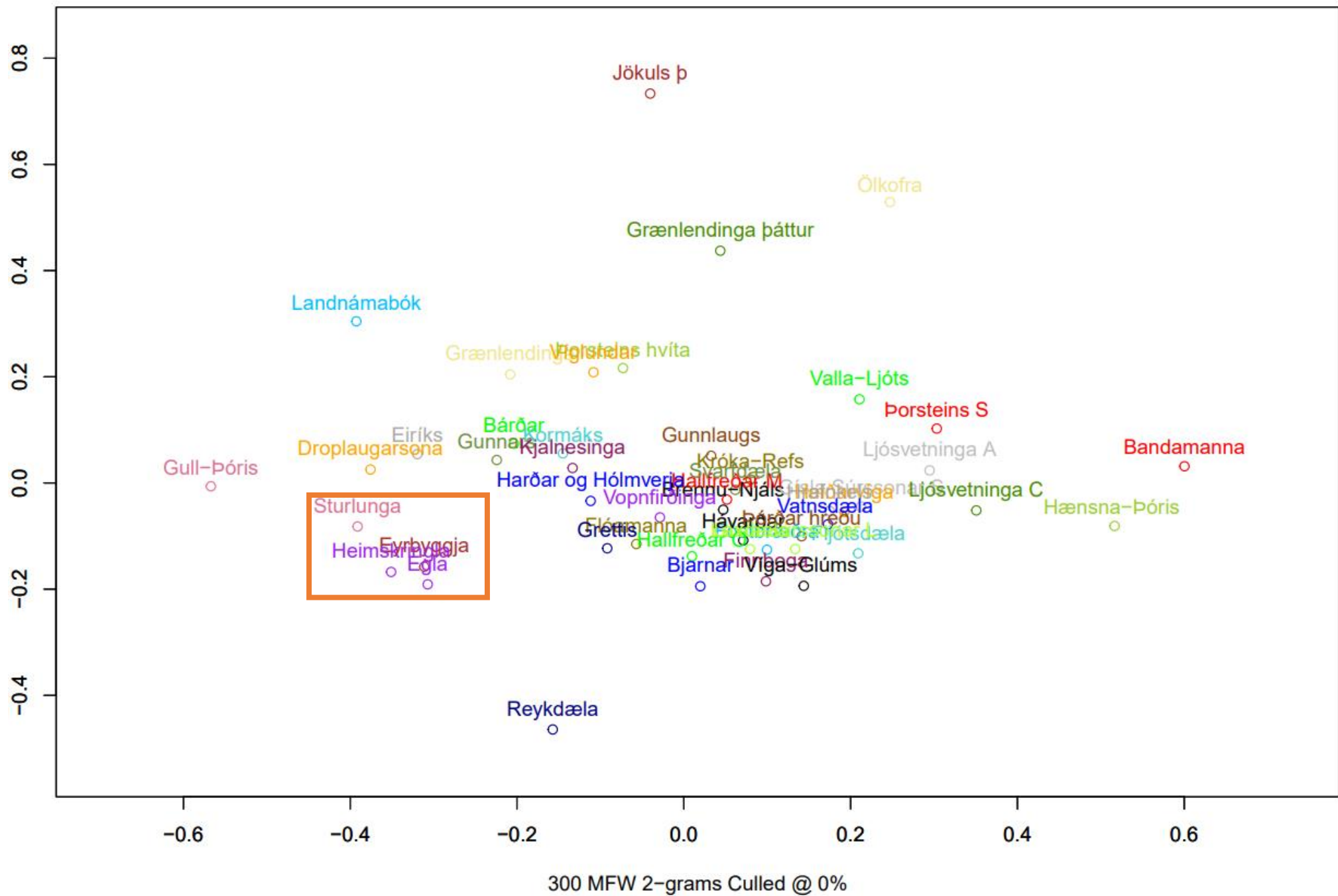
300 MFW 2-grams Culled @ 0%
Classic Delta distance



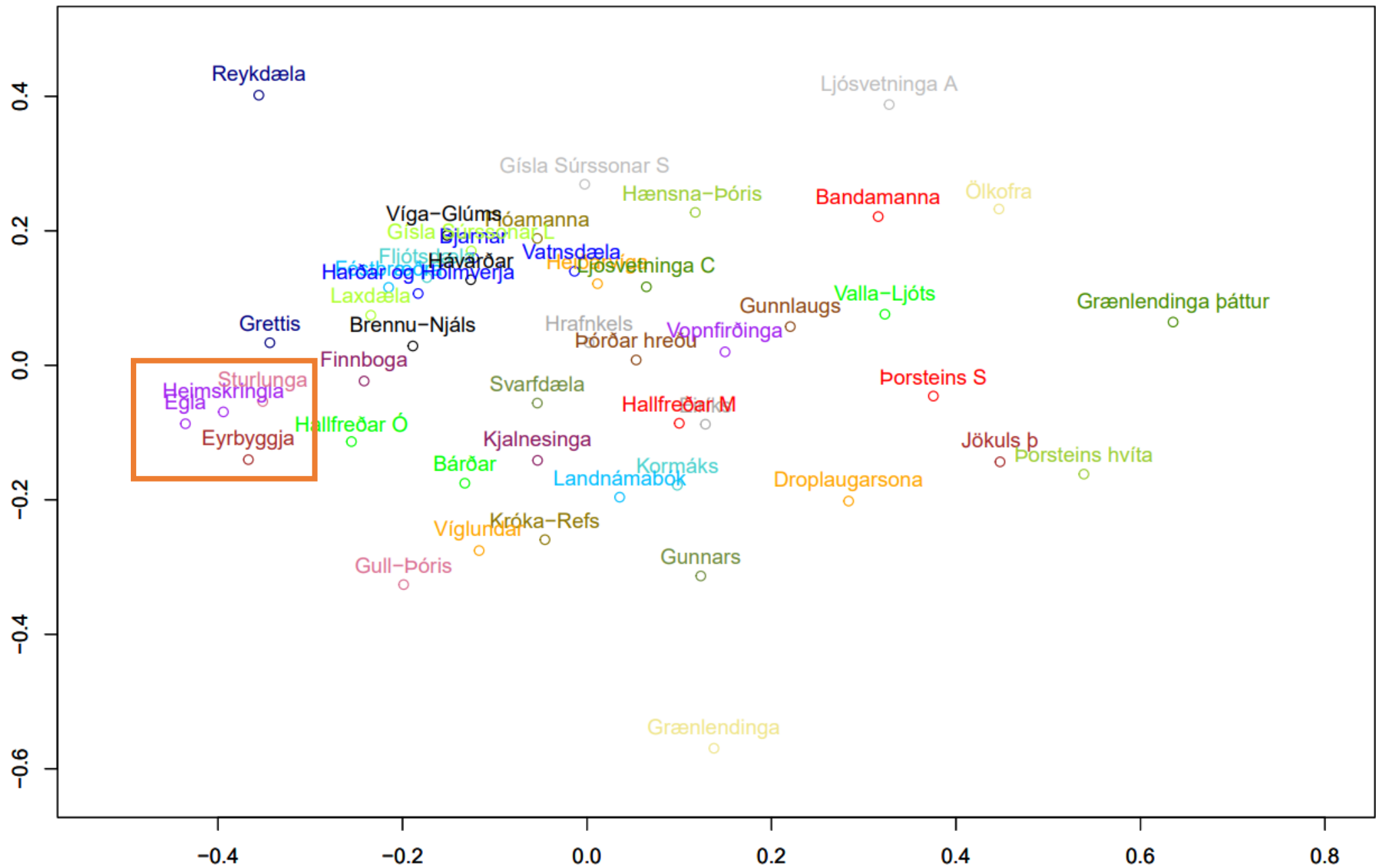
Multidimensional Scaling



Multidimensional Scaling

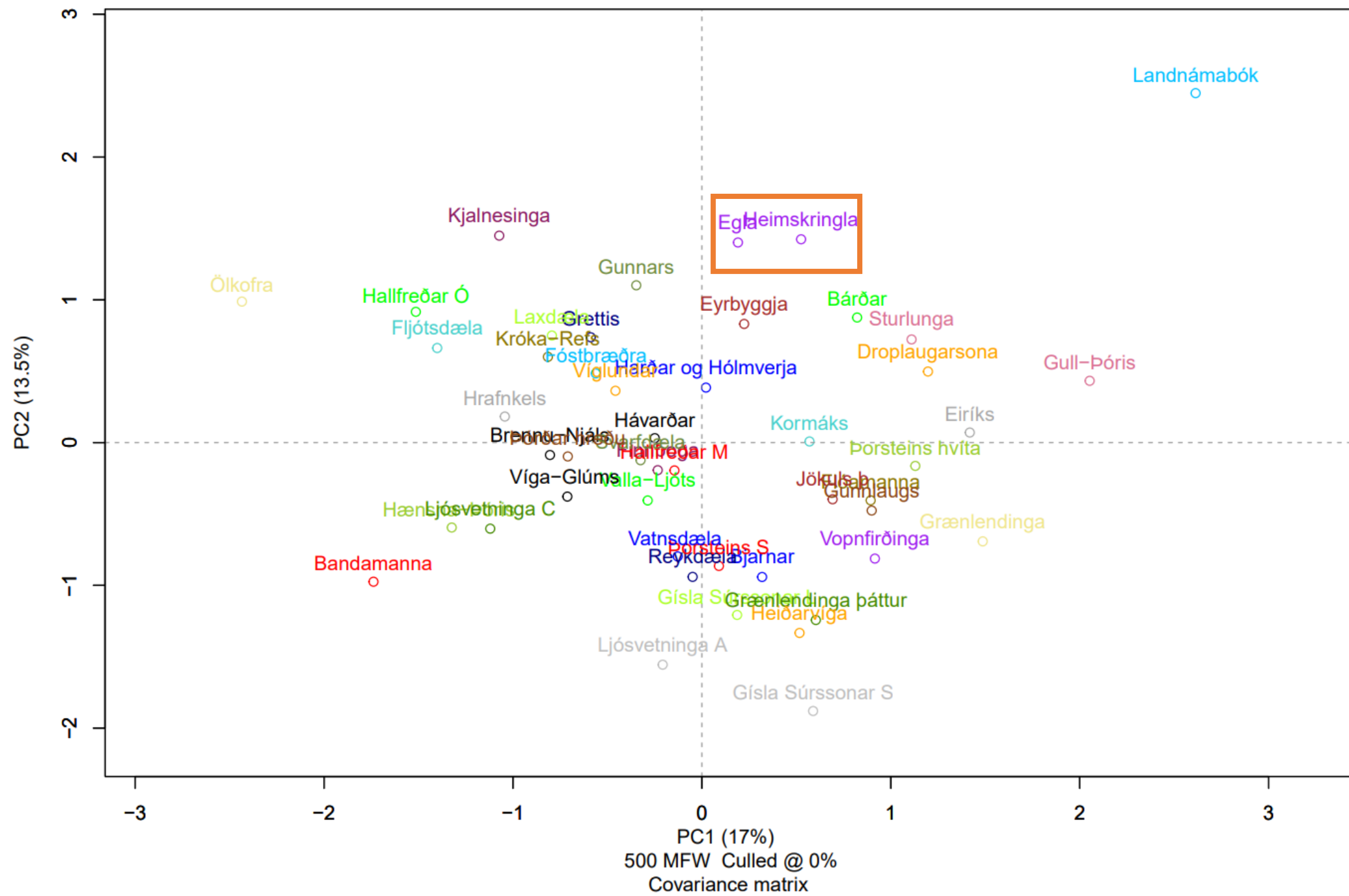


Multidimensional Scaling

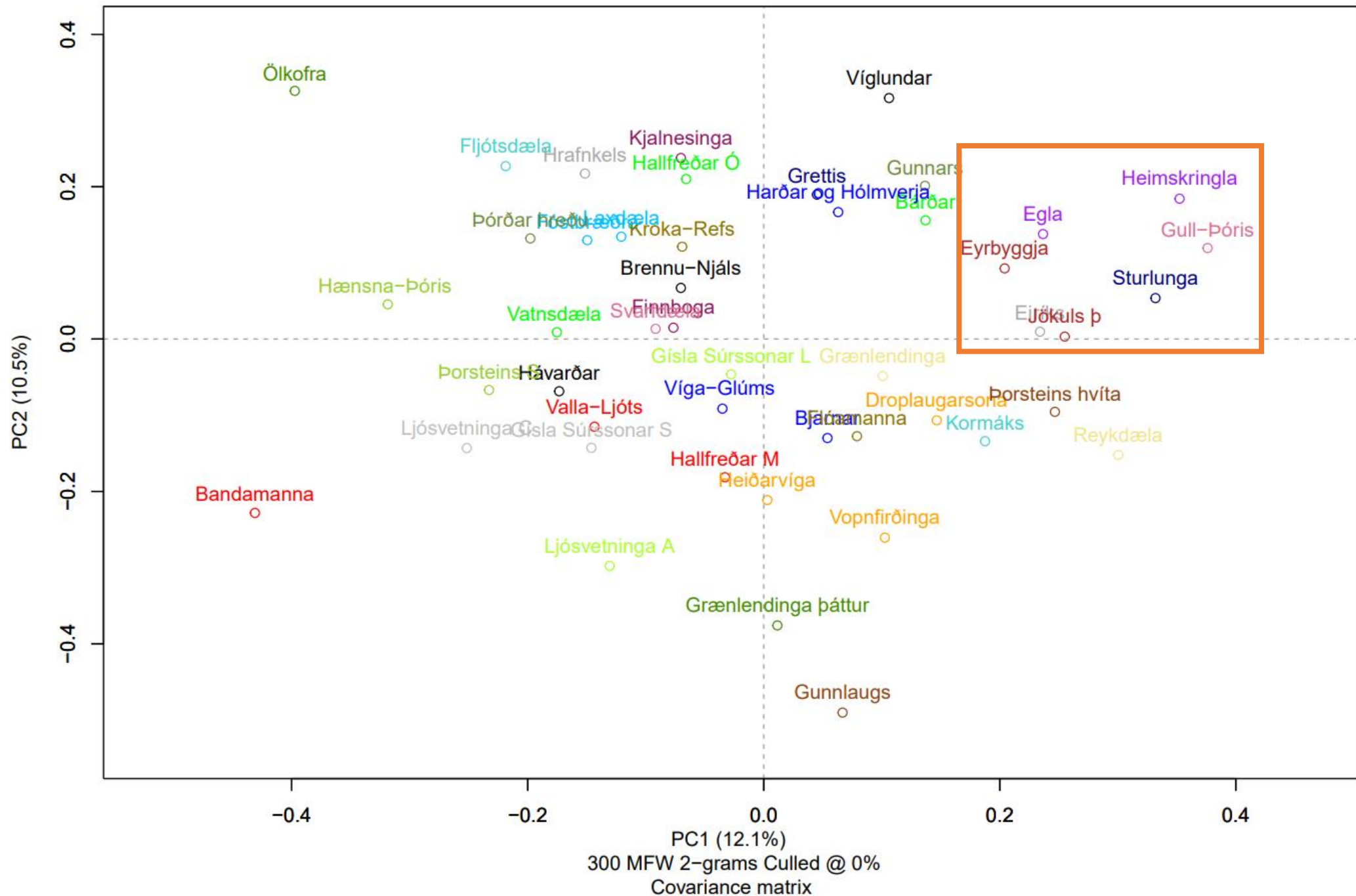


150 MFW 3-grams Culler @ 0%

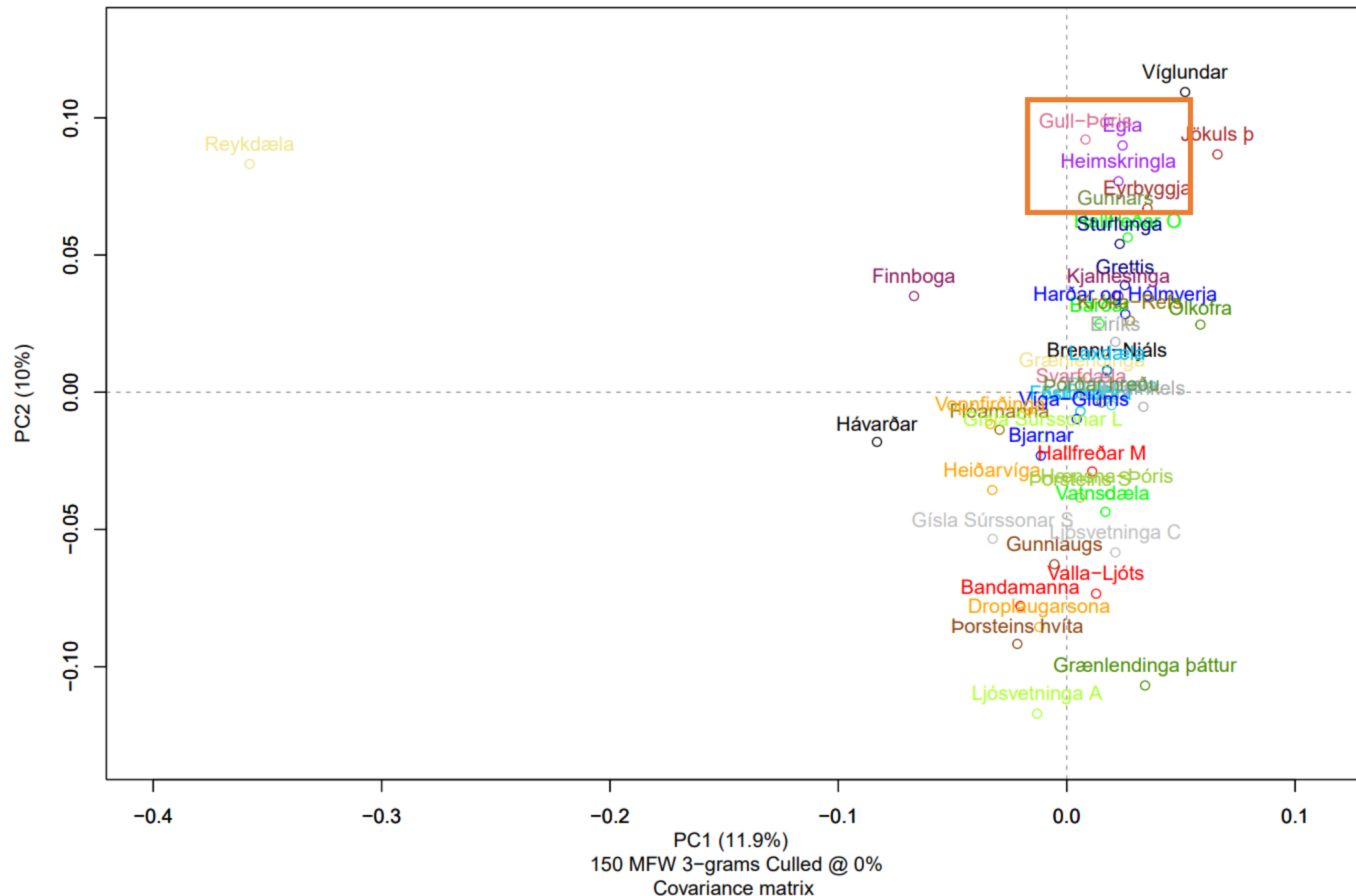
Principal Components Analysis



Principal Components Analysis



Principal Components Analysis



Open questions & problems

- Is our modern notion of authorship applicable to texts from the medieval period?
- How applicable are stylometric approaches to a corpus of predominantly anonymous texts?
- If *Egils saga* (e.g. from the *Mǫðruvallabók*) and/or *Heimskringla* have not been authored by Snorri or another single author, why are both texts closer to each other than to other works from the corpus?

- One of my preliminary hypotheses is that *Egils saga* could have been commissioned to a collective of authors who worked with the aim to reach some pragmatic purposes in favour of Sturlunga dynasty. The literary patterns elaborated in *Heimskringla* were implemented in *Egils saga* to reach essentially different political and practical aims (last but not least to claim ownership of lands)

More specific questions

- Can we infer authorship using normalized texts and modern Icelandic instead of Old Icelandic?
- Currently we have tools for modern Icelandic and lack them for Old Icelandic.

Literature (selection):

1. Snorri and Traditional Philology:

- Ólason 1968 [summary of research before 1968].
- Ólsen 1904 [p. 228 „Requirements' Checklist" for author of Egils saga]
- Tulinius 2014 [conflicts in Snorri's life and parallel zw. Egils saga]

2. Stylometry of the Egils saga:

- van den Toorn 1959 [sentence statistics, syntax]
- Hallberg 1962, 1968 [*parord*=infrequent words, *en er*, *kveðask*]
- West 1974, 1980 [most frequent words]
- Tulinius 2014., p. 214f [irony through *ekki er þess getið*]
- Þorgeirsson 2014 [faithful transmission of the preference for *en er*]
- Þorgeirsson 2018 [Burrows' (improved) Delta]
- Björnsson/Kárason/Helgason 2021 [cosine delta]

3. Modern stylometry:

- Eder,Rybicki,Kestemon 2016 [Stylo library for R]
- Evert et al. 2017 [Theoretical foundations of delta distance measure for authorship attribution]
- Juola 2007, Kopel, Schler,Argamon 2008, Stamatos 2008 [Foundations of authorship attribution]

Egils saga = Egils Saga Skallagrímssonar nebst den größeren Gedichten Egills, ed. Finnur Jónsson (= Altnord. Saga-Bibliothek 3; Halle/Saale ²1924)

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Berman 1982 = Melissa A. Bernman, Egils Saga and Heimskringla. In: Scand. Studies 54(1) (1982) 21-50.

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Eder/Rybicki/Kestemon 2016 = Maciej Eder/Jan Rybicki/Mike Kestemon, Stylometry with R: a package for computational text analysis. In: R Journal 8(1) (2016) 107-121.

Evert/Proisl/Jannidis/Reger/Pielström/ Schöch/Vitt 2017 = Stefan Evert/Thomas Proisl/Fotis Jannidis/Isabella Reger/Steffen Pielström/ Christof Schöch/Thorsten Vitt, Understanding and explaining Delta measures for authorship attribution. In: *Digital Scholarship in the Humanities* 32(Suppl. 2) (2017) 4–16.

Hallberg 1962 = Peter Hallberg, Snorri Sturluson och Egils saga Skallagrímssonar. Ett försök till språklig författarbestämning (= Studia Islandica 20; Reykjavík 1962).

Hallberg 1968 = Peter Hallberg, Stilsignalelement och författarskap i norrön sagalitteratur. Synpunkter och exemple. (= Nordistica Gothoburgensia 3; Göteborg 1968)

Haraldsdóttir [1998/]2012 = Kolbrún Haraldsdóttir, Der Historiker Snorri: Autor oder Kompilator? In: Snorri Sturluson: Beiträge zu Werk und Rezeption, ed. Hans Fix (Berlin/Boston 2012) 97-108.

Juola 2007 = Patrick Juola, Authorship Attribution (=Foundations and Trends in Information Retrieval 1(3); Boston 2007)

Louis-Jensen [2006/] 2009 = Jonna Louis-Jensen, Heimskringla og Egils saga – samme forfatter? In: Studier i Nordisk 2006-2007 (2009), 103-111.

Kopel/Schler/Argamon 2008 = Moshe Koppel/Jonathan Schler/Shlomo Argamon, “Computational Methods in Authorship Attribution” In: JASIST 60(1) (2008) 9-26.

Males 2015 = Mikael Males, Er Ólafur Þórðarson höfundur Eglu? In: Són 13 (2015) 173-178.

Nordal 2002 = Guðrún Nordal, Egill, Snorri og höfundurinn. In: Lesbók Morgunblaðsins 21.12. (2002) 8-9.

Ólason 1968 = Vésteinn Ólason, Er Snorri höfundur Egils sögu? In: Skírnir 142 (1968) 48-67.

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