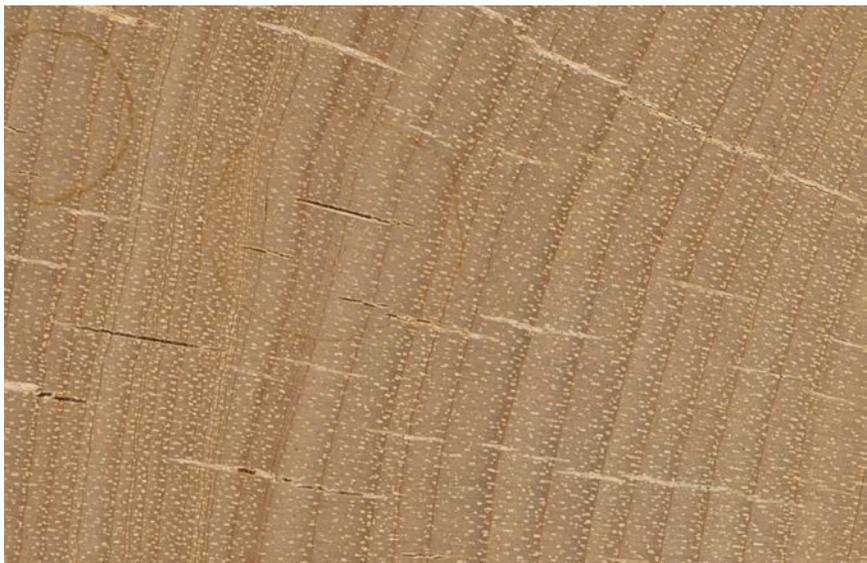


The practical applications of the study of tree rings (dendrochronology) in Iceland

Ólafur Eggertsson, LBHI, Environmental and forest sciences.



Dendrochronology is the dating and study of annual rings in trees.

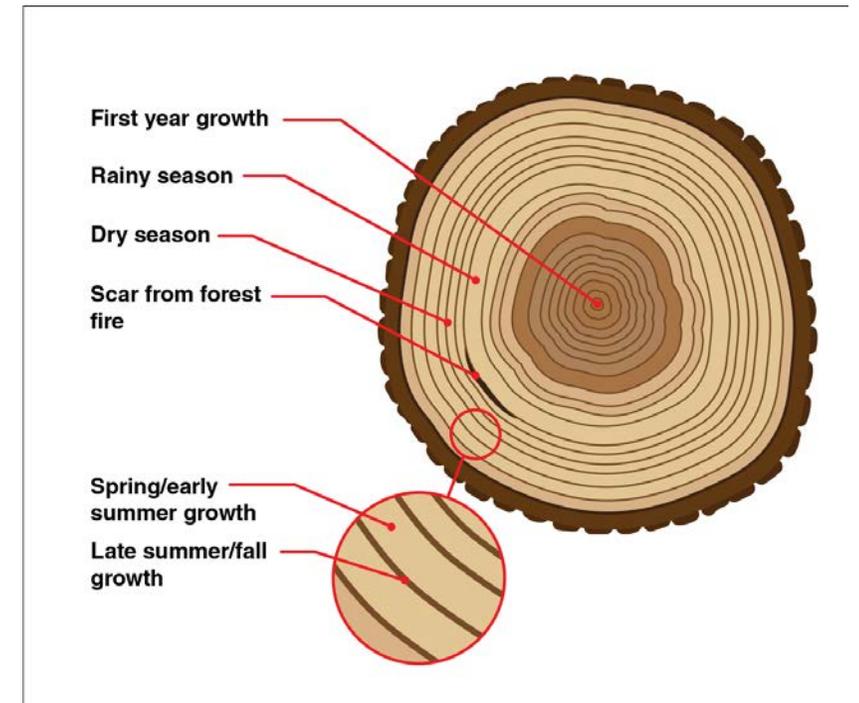
It is an interdisciplinary science that focuses on the practical application of the study of tree rings.

The practical applications of the study are many:

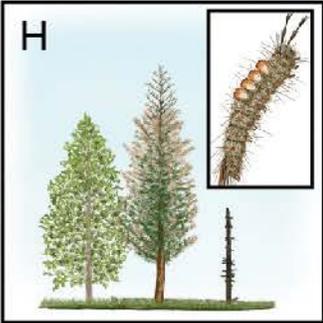
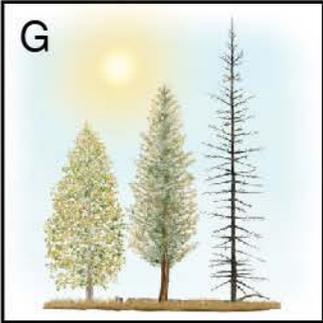
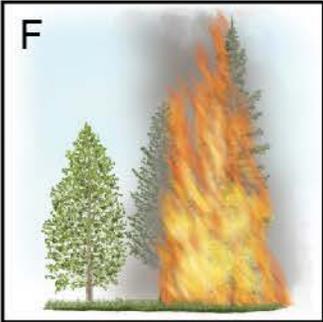
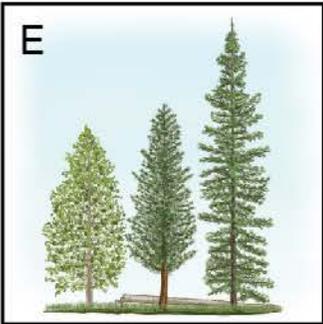
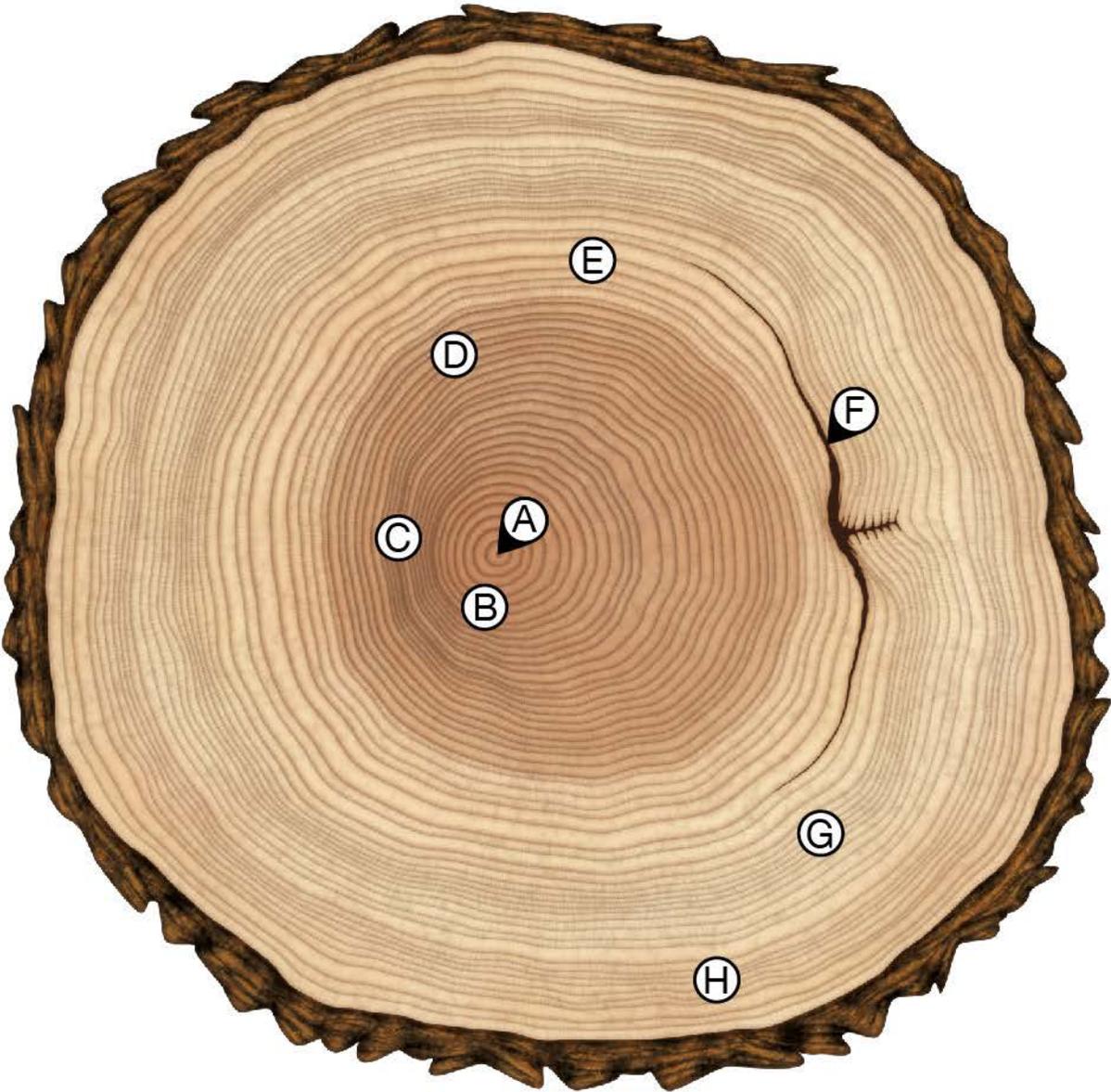
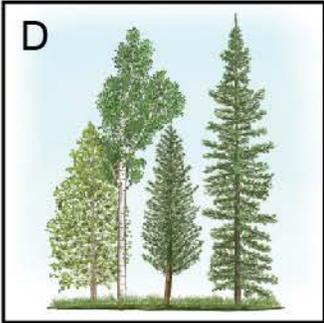
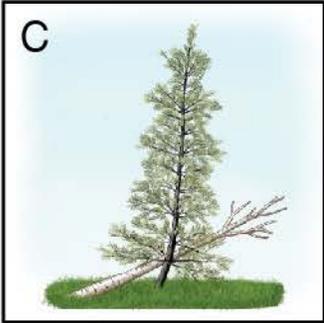
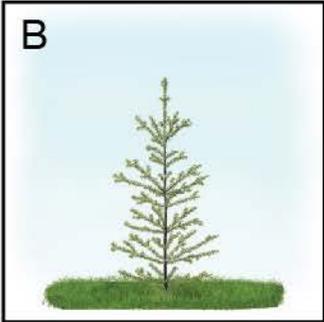
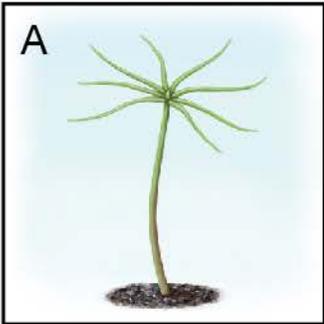
- Tree age
- Past climate conditions
- Dating of different events
- Insect outbreaks
- Forest fire history
- Wood quality

Crossdating is the fundamental technique in tree-ring studies

- Matching ring-growth across many samples from a homogeneous area (area of similar environmental conditions) permits identification of EXACT year of formation for each ring.

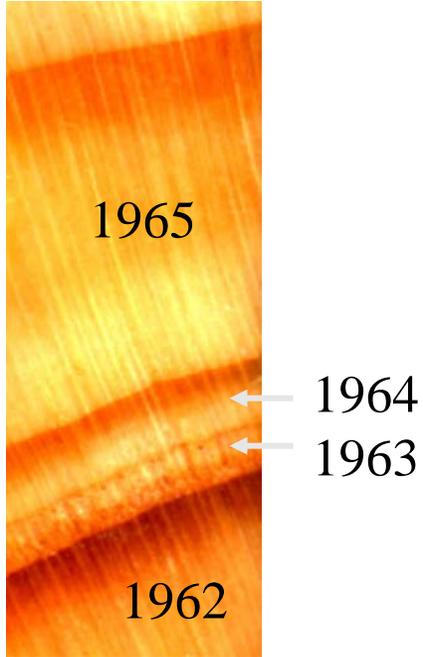


History of a tree



Dendrochronology possible on different species in Iceland

Exotics: Spruce, Pine, Larix etc.



Birch (Betula sp.)

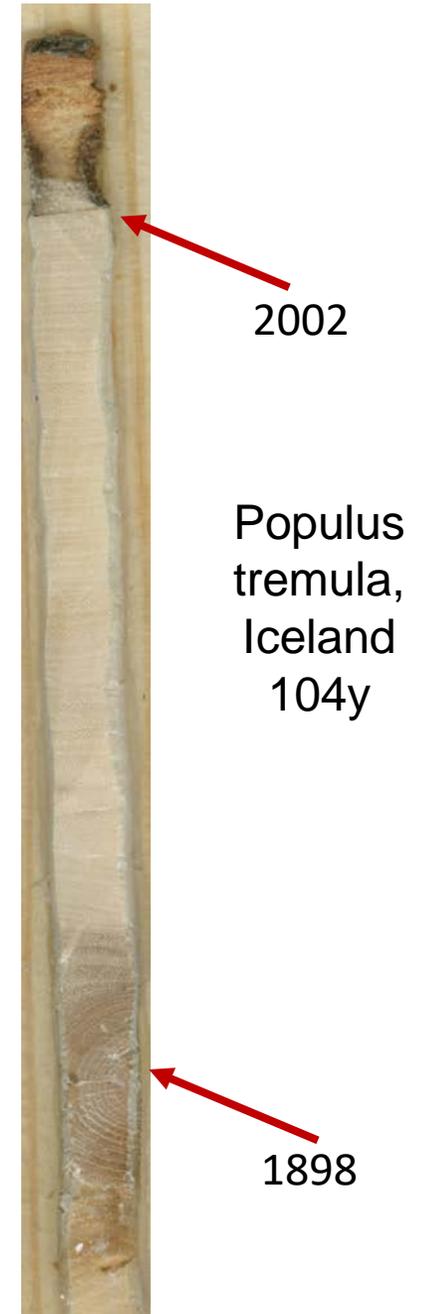


Betula nana

Rowan (Sorbus)



Salix sp.



Juniperus



Also: Empetrum, Vaccinium, Dryas etc

Holocene wood, mainly Betula



Old driftwood, Snæfellsnes

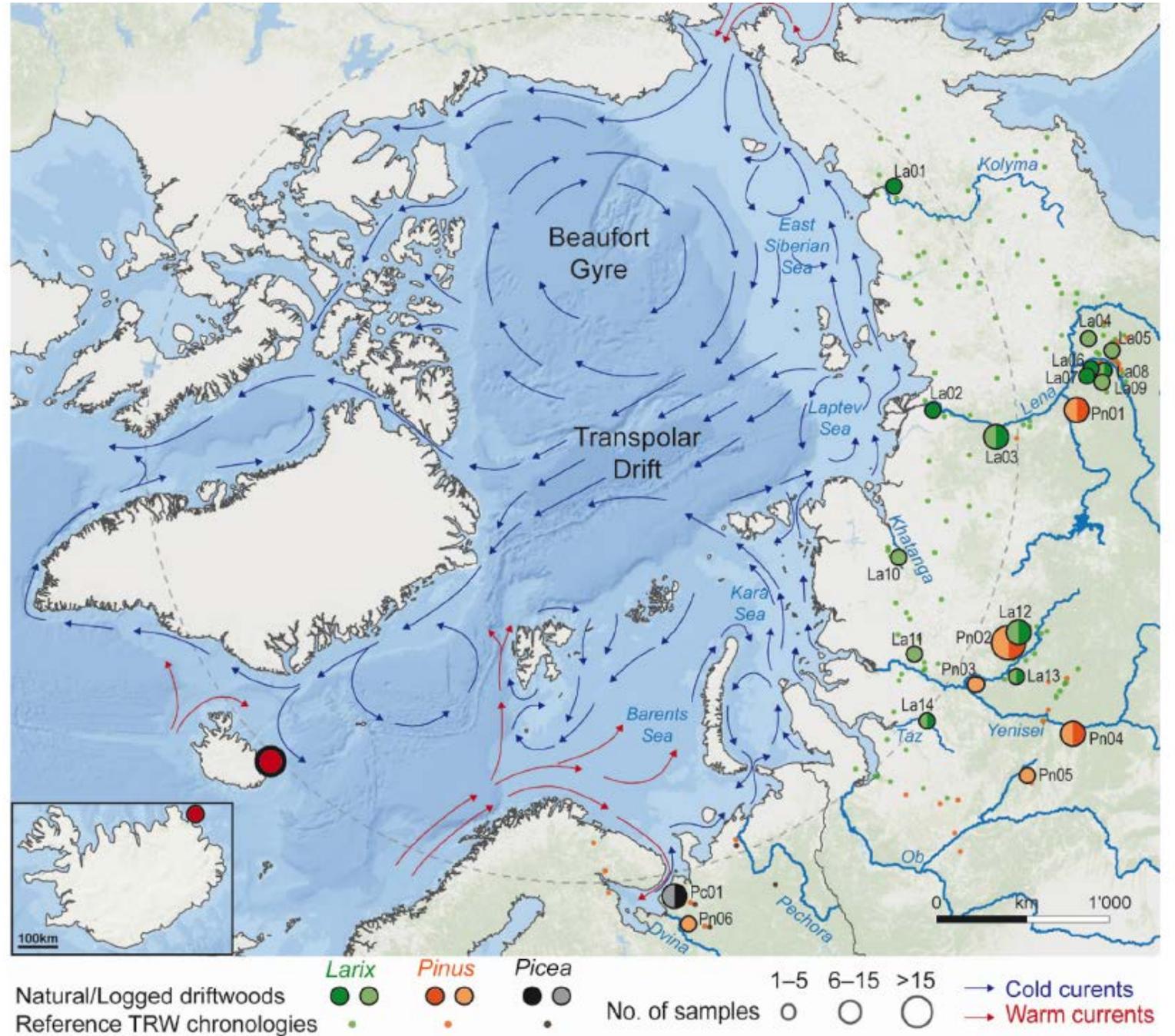
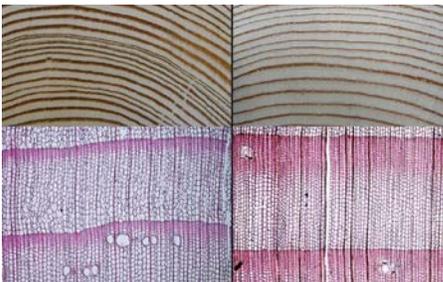


Old driftwood, in peat layers close to the shores



Driftwood studies

Due to natural riverbank erosion and industrial wood logging, huge amounts of driftwood enter the Arctic Ocean every year through the large boreal river systems



Sampling for tree-ring studies



Example: Colonization of birch on Skeiðarársandur

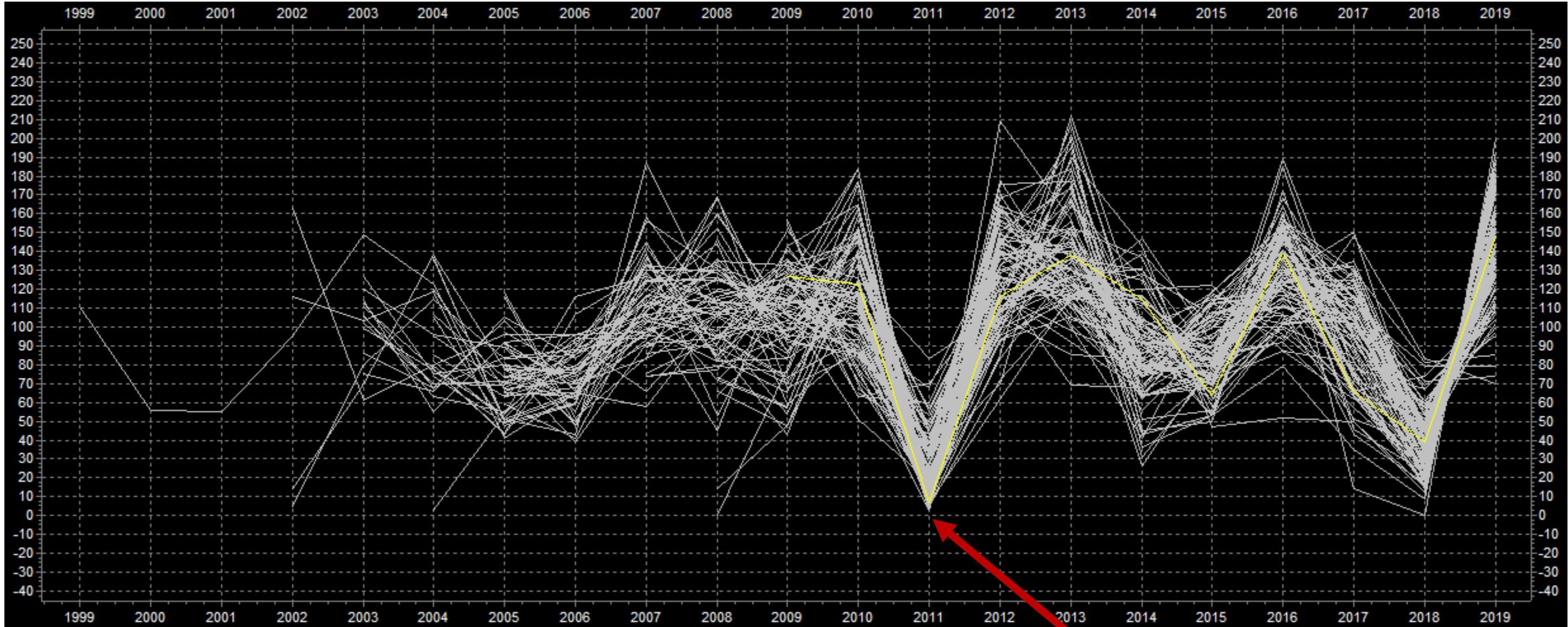


Tree ring studies:

- age of trees (when “born”)
- time of colonization
- growth rate

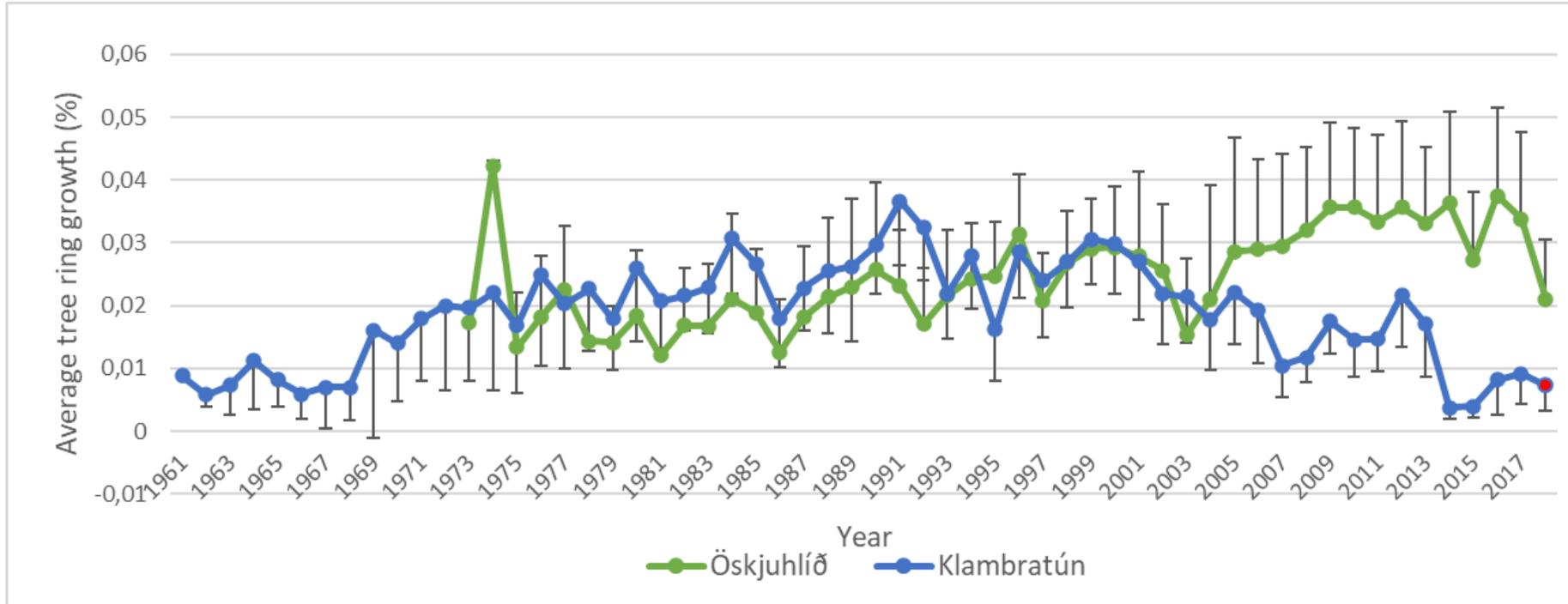
The oldest tree germinated from seed c. 1994

Betula from Skeiðarársandur, 55 trees plotted

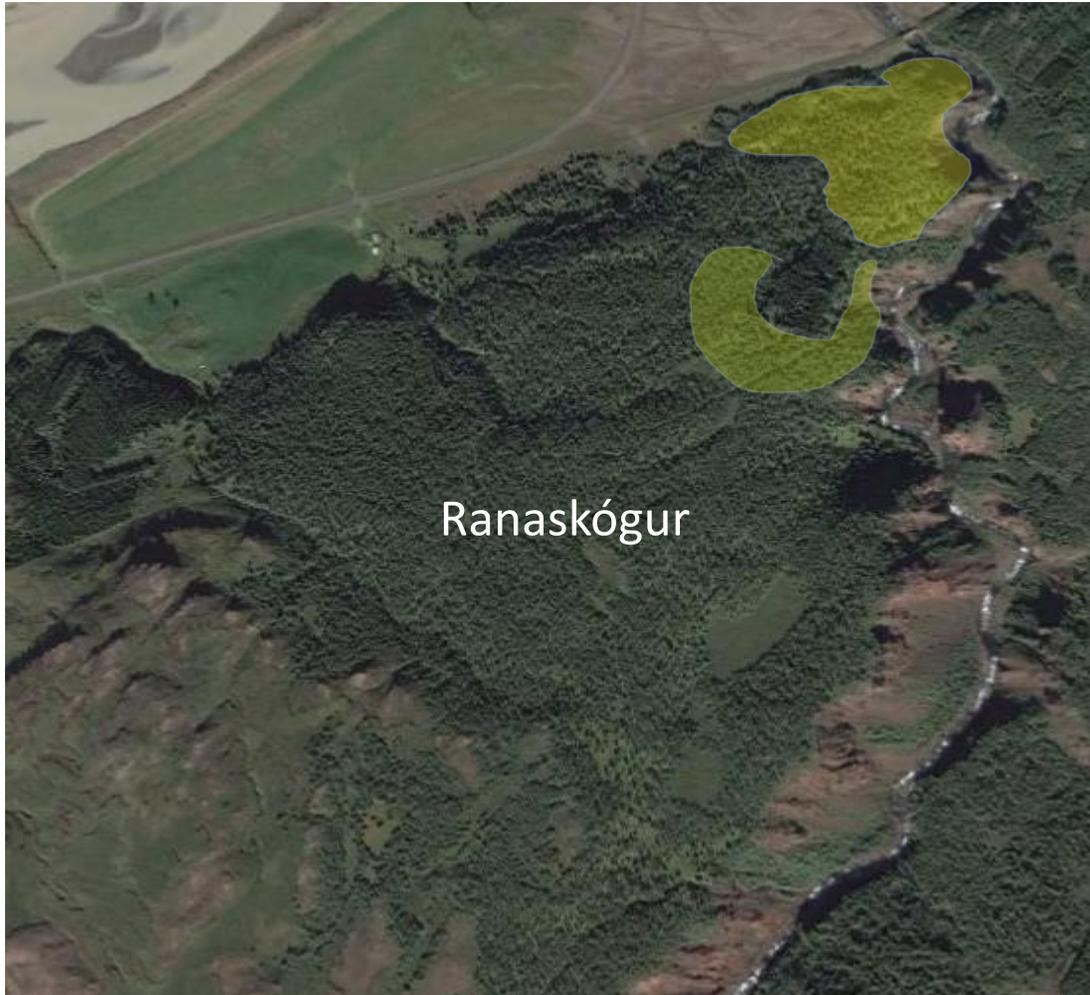


2011

Degradation of Sitka Spruce (*Picea sitchensis*) along the Miklabraut in urban Reykjavík



Case study: Ranaskógur East-Iceland



Mynd tekin árið 1903

Líklega tekin þar sem birkið á Skógarbala er núna



Mynd: Christian E. Flensburg, skógfræðingur

Tree rings in rowan and birch

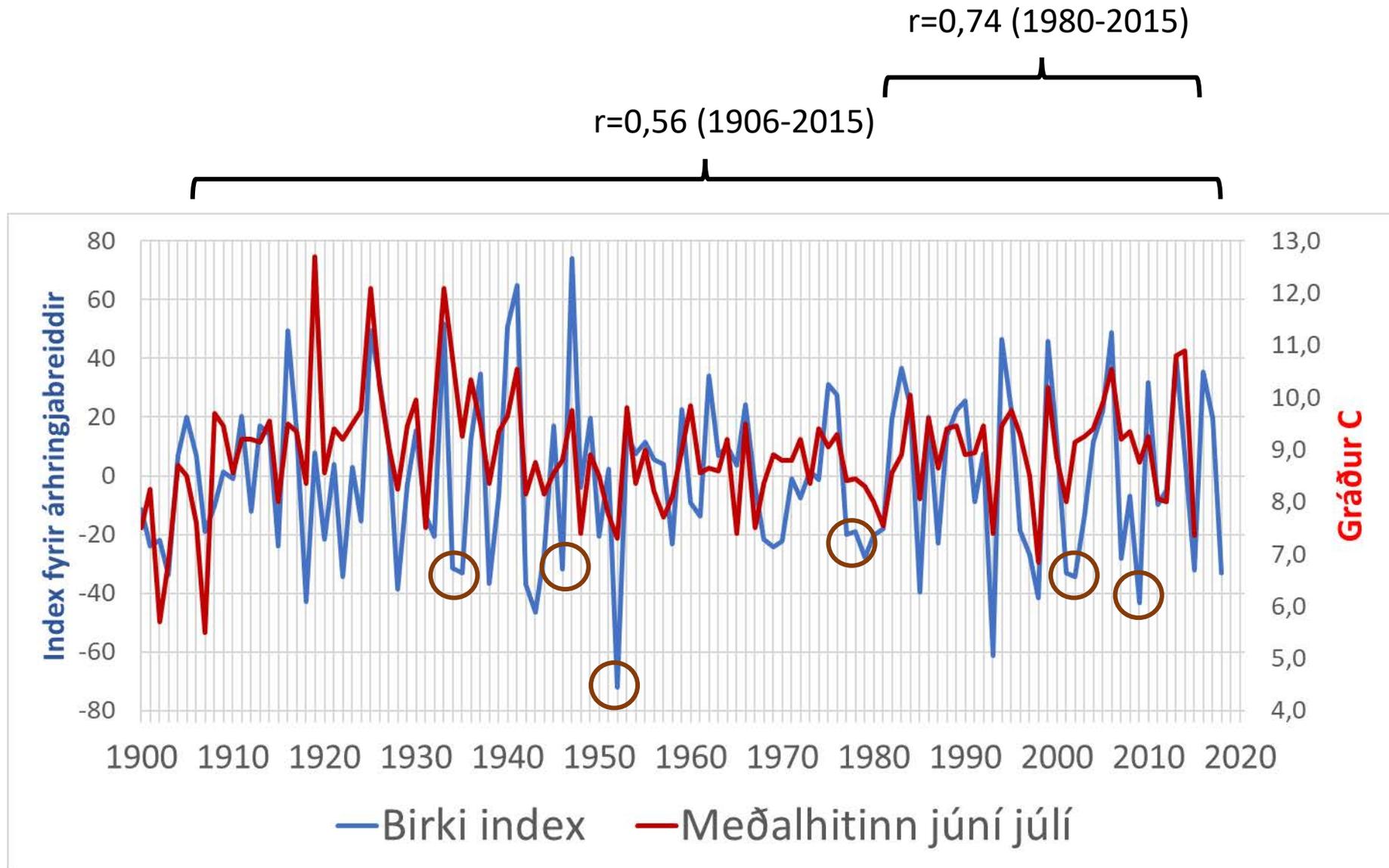
Reyniviður



Birki



Tree rings and climate for Birch (Betula)

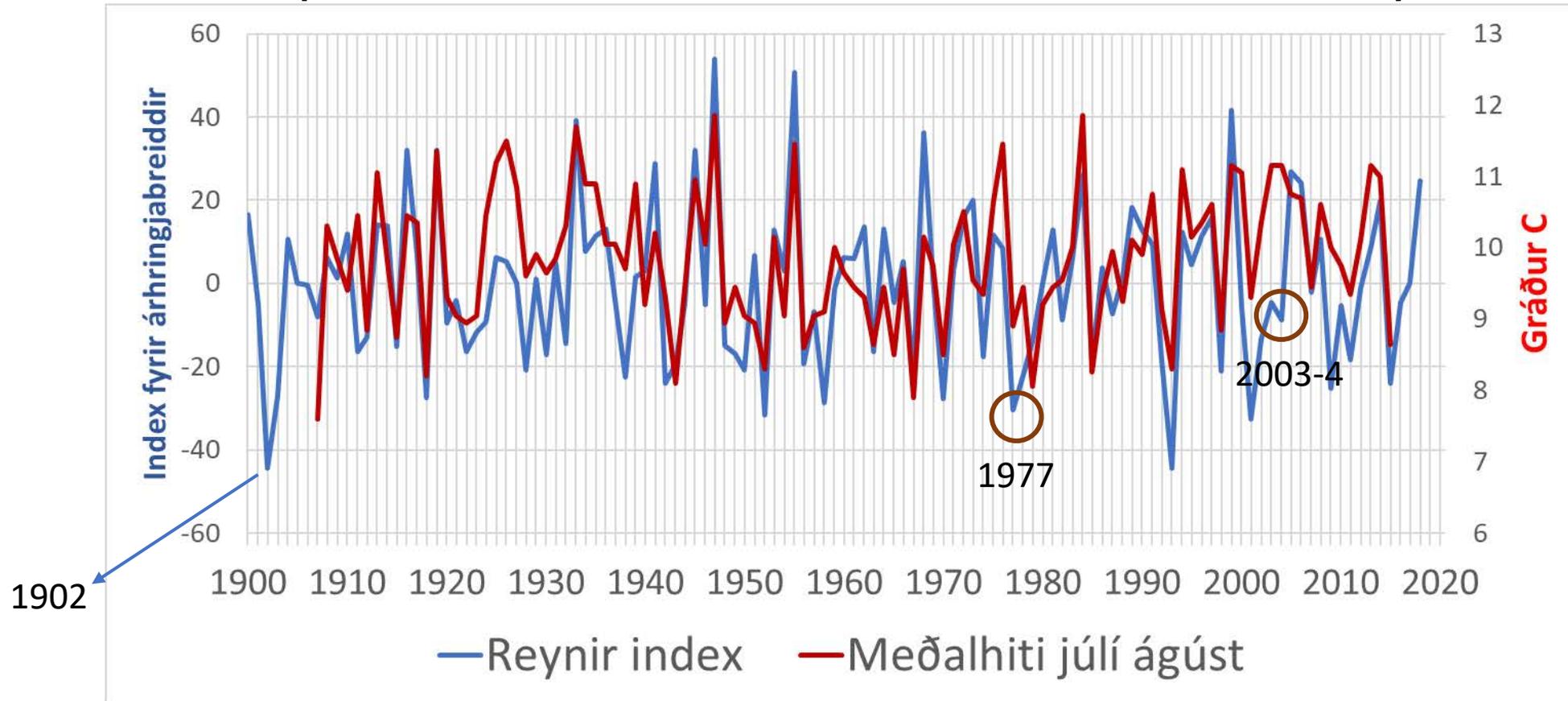


Helstu „maðkaár“ í Hallormstaðarskógi voru á árunum 1915-1916, 1934-1935, 1946-47, 1952, 1977, 1998 og 2001-2006.

Tree rings and climate for Rowan (Sorbus)

$r=0,74$ (1930-1990)

$r=0,68$ (1906-2015)

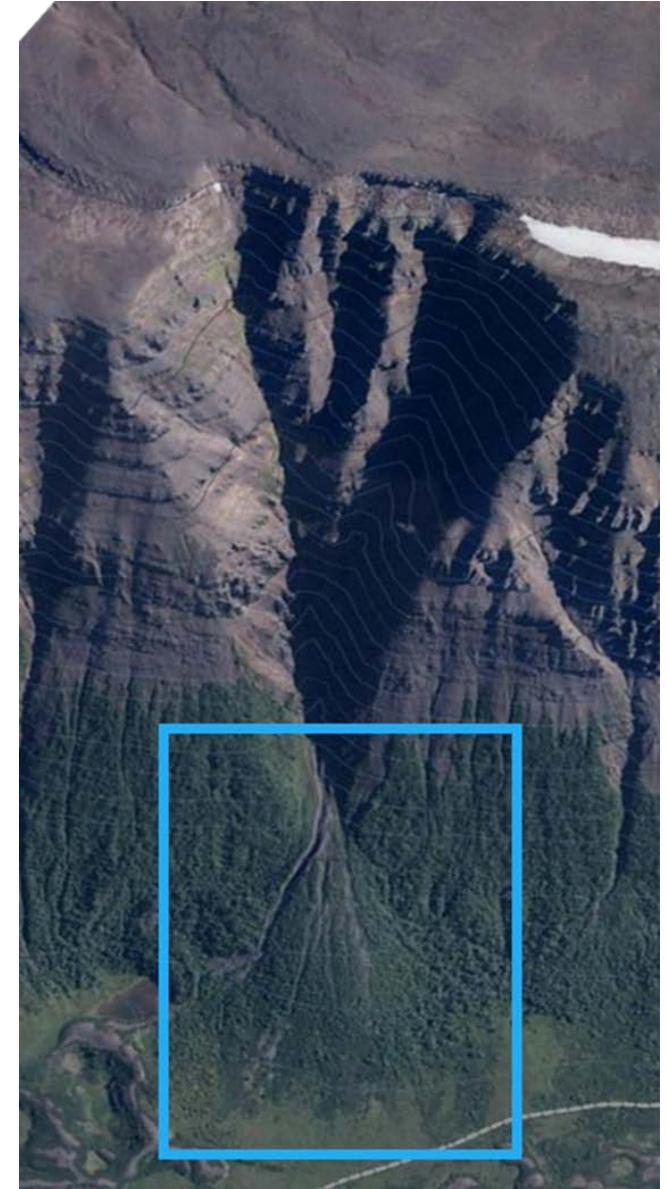


Application of dendrochronology in geomorphological studies, an example of snow avalanche study in Iceland

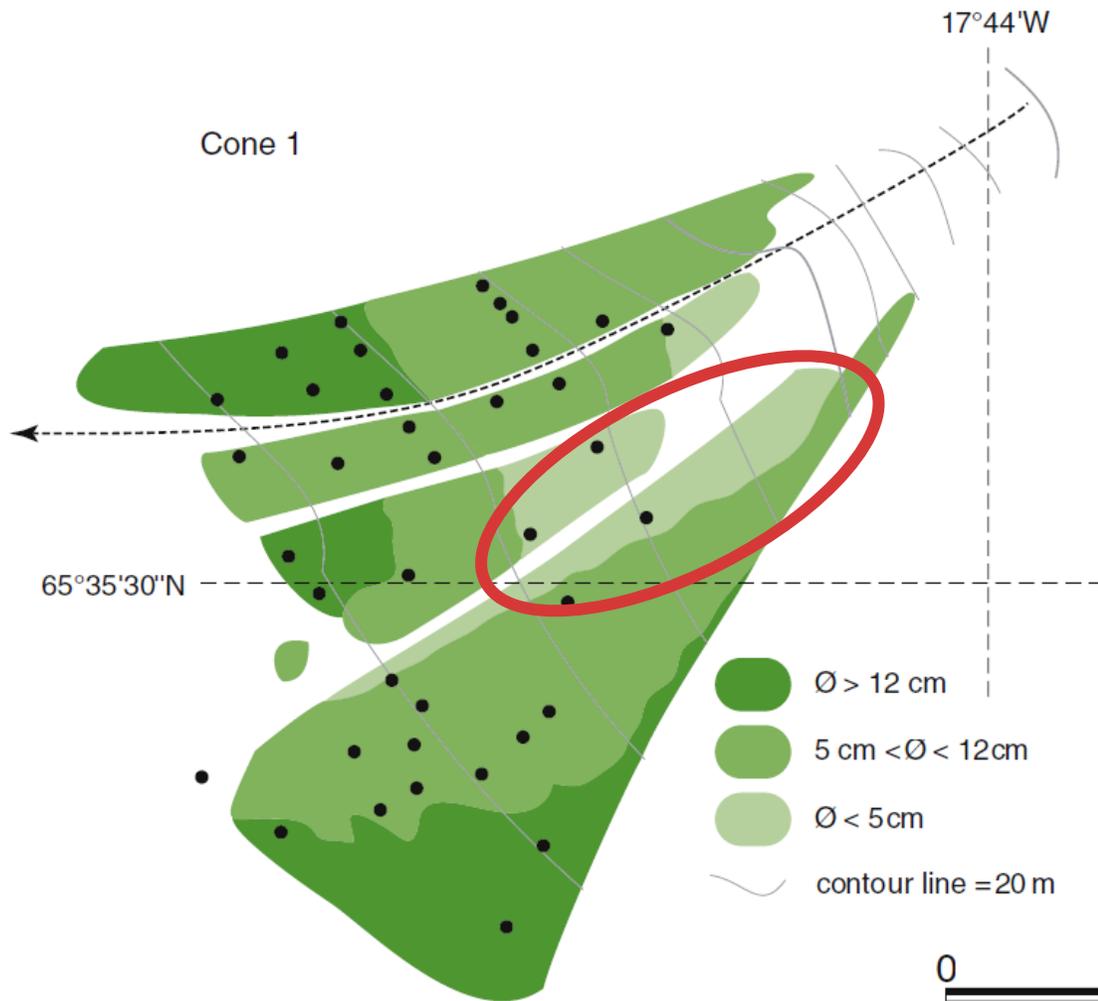


Fnjóskadalur N-Iceland

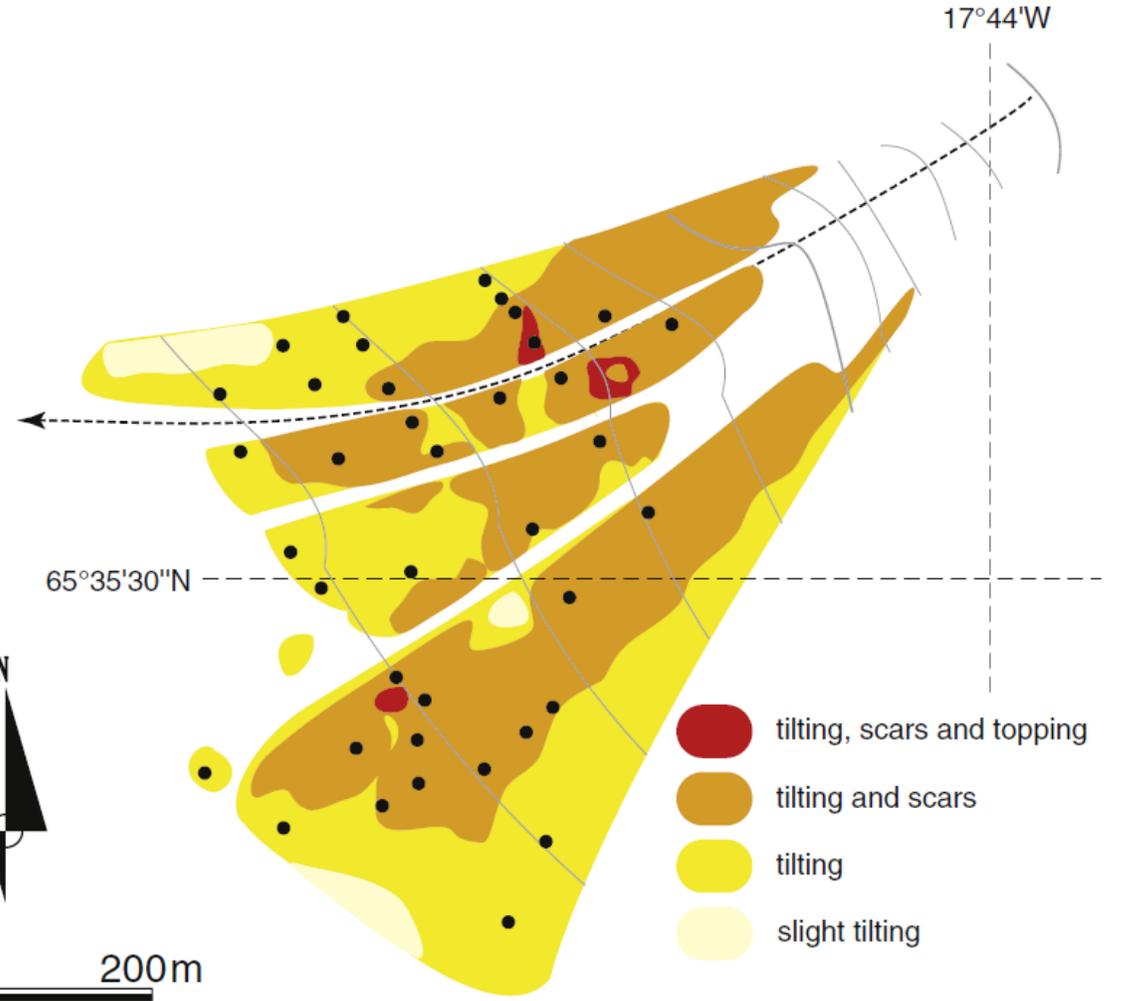
Alluvial Cone



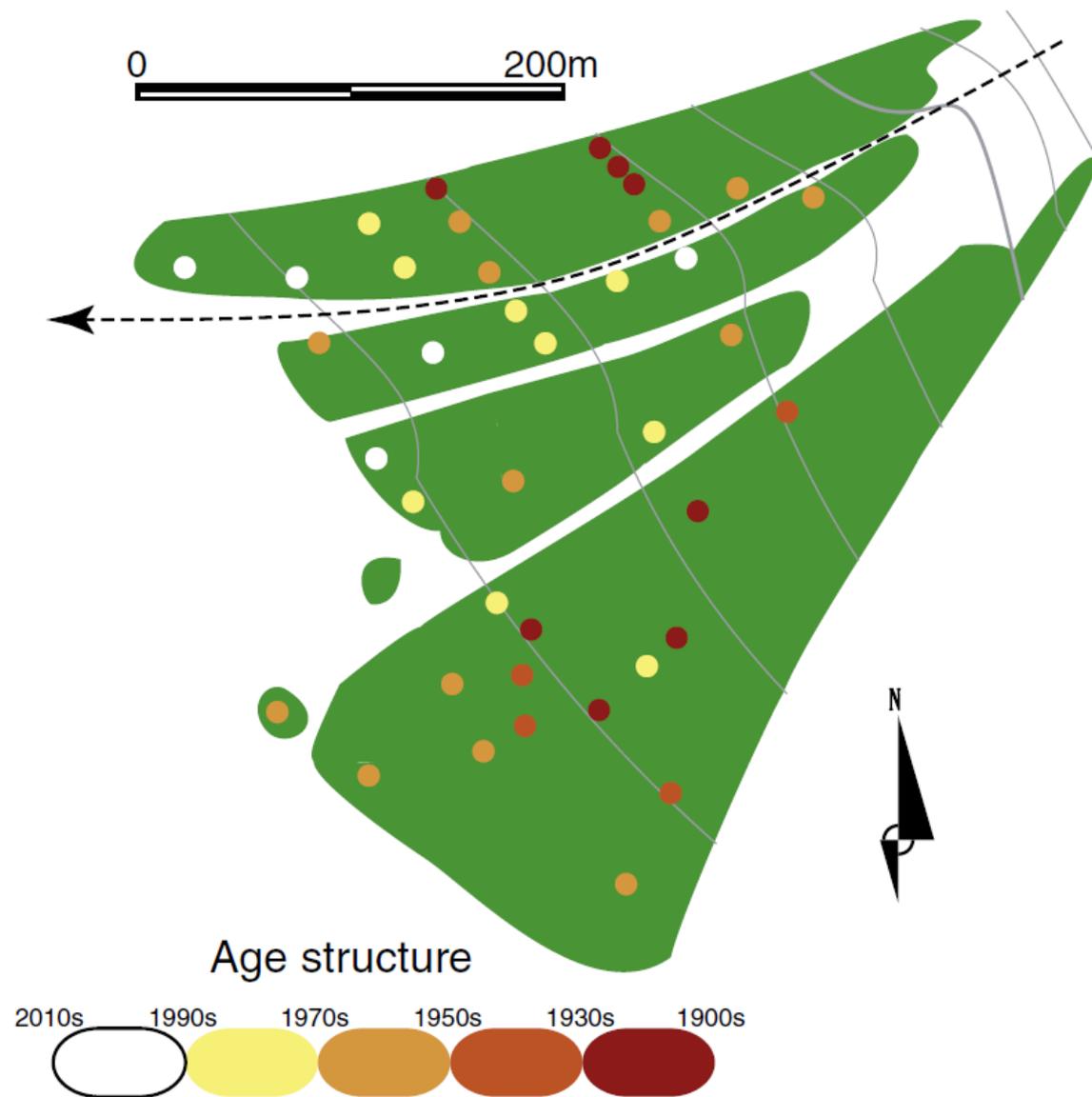
Dominant diameters of the trunks



Damages on trees



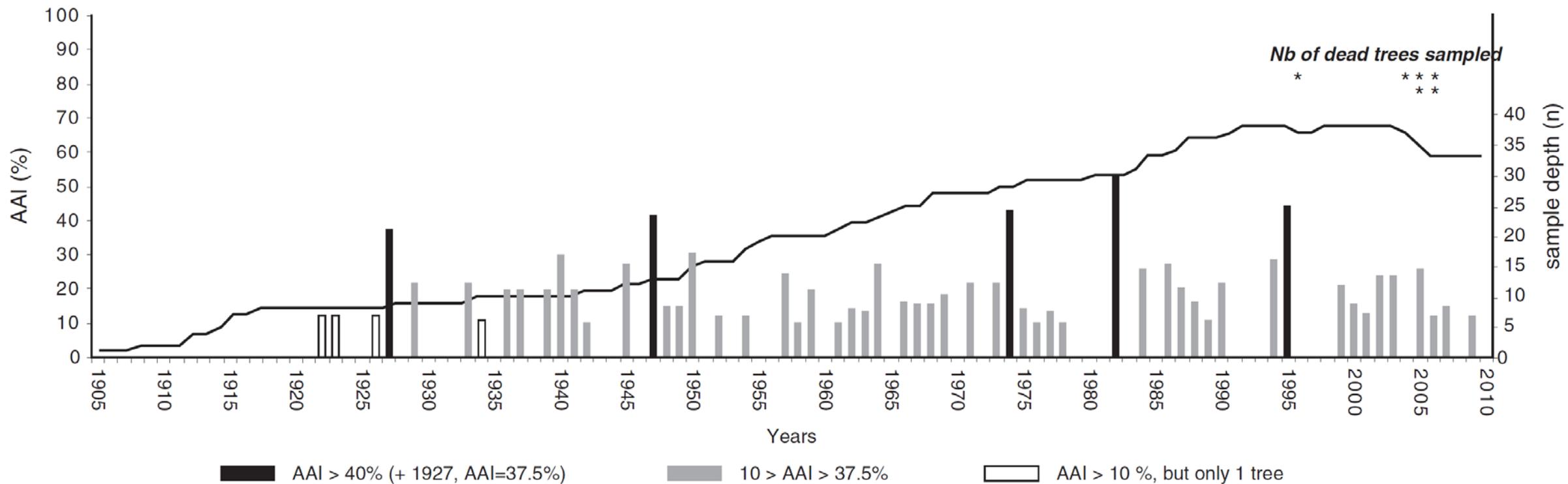
Age structure



Age of avalanche induced growth response from the cone í Fnjóskadal

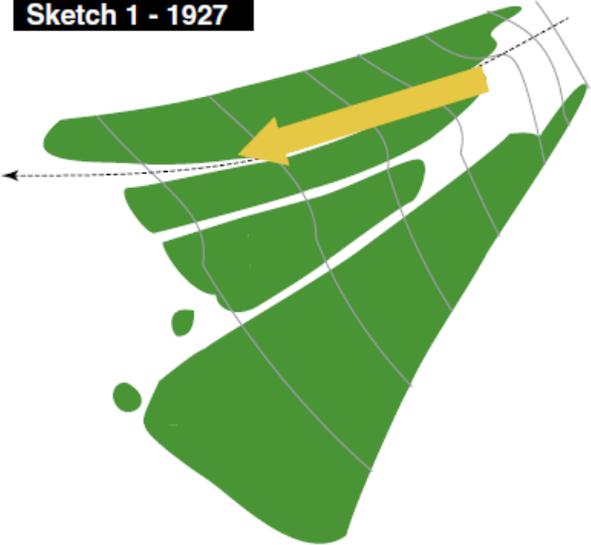
Years with more than 40 % of trees damaged in black are shown in black.

(1927, 1947, 1974, 1982, 1995)

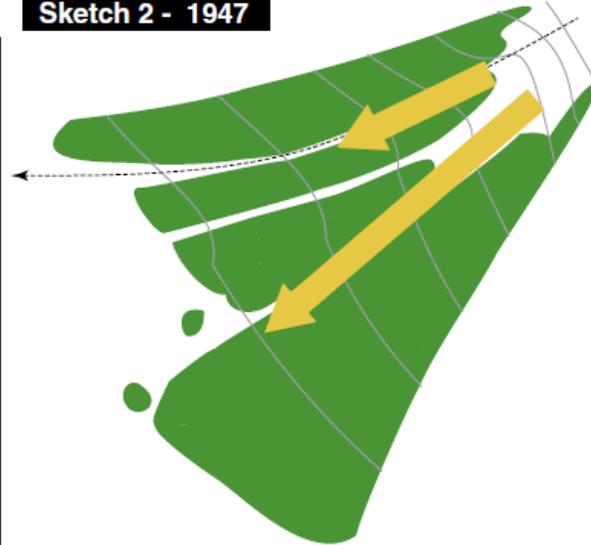


Sketch showing the rout of the avalanches

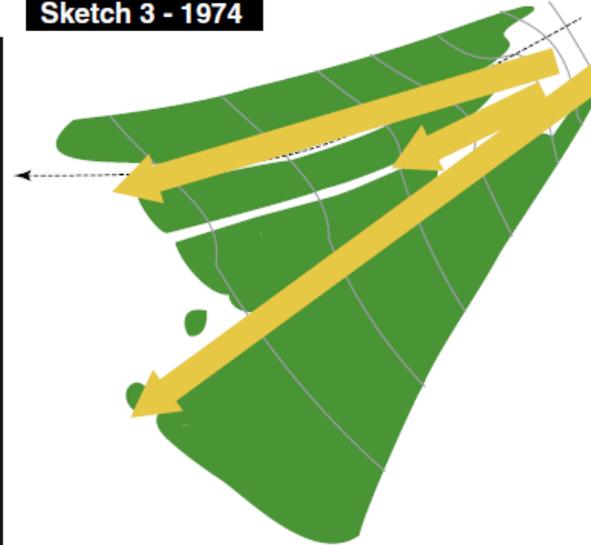
Sketch 1 - 1927



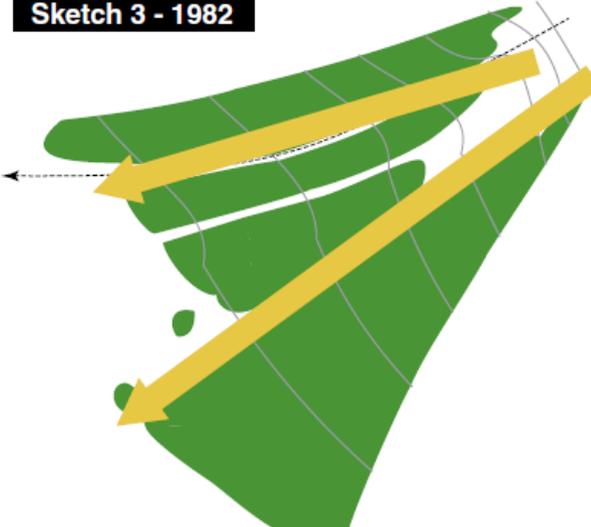
Sketch 2 - 1947



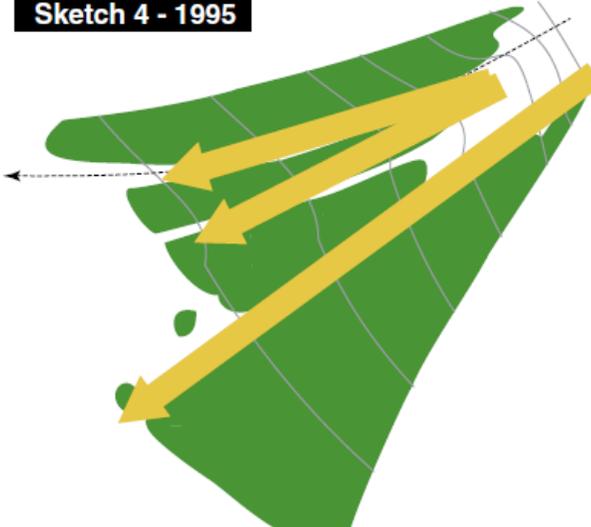
Sketch 3 - 1974



Sketch 3 - 1982

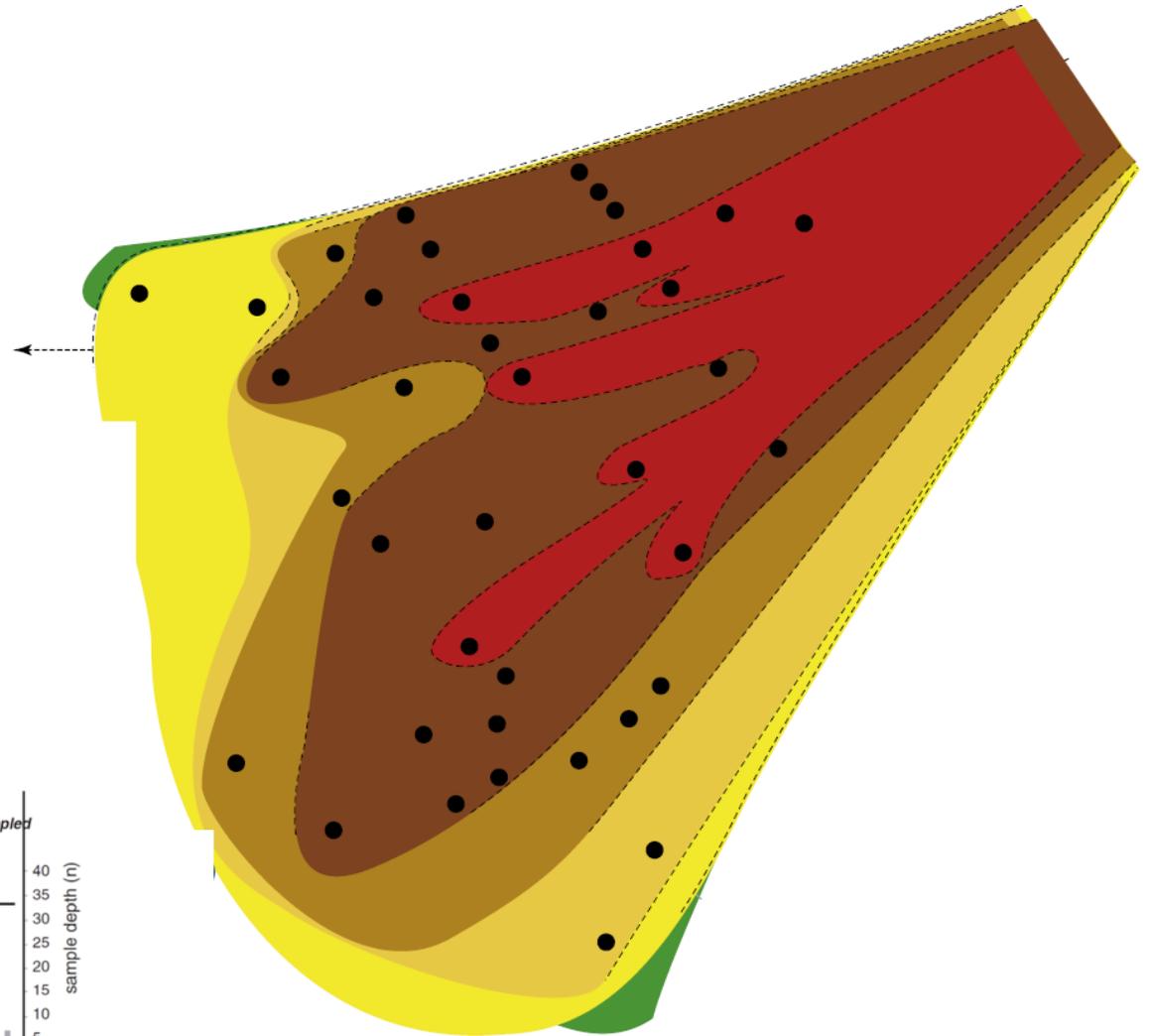
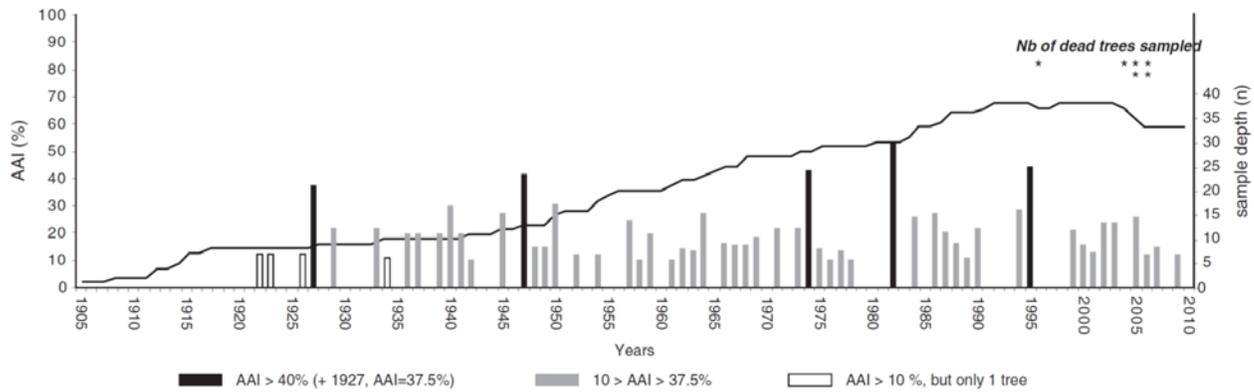
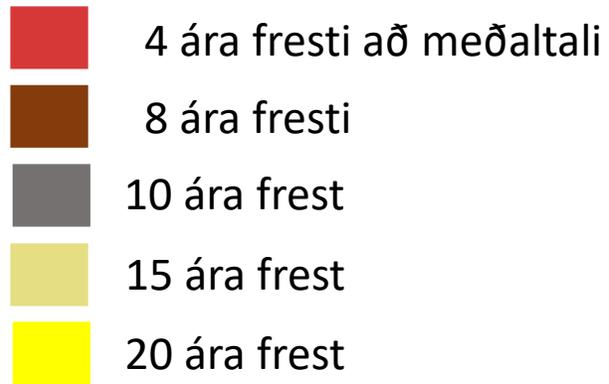


Sketch 4 - 1995



Return period

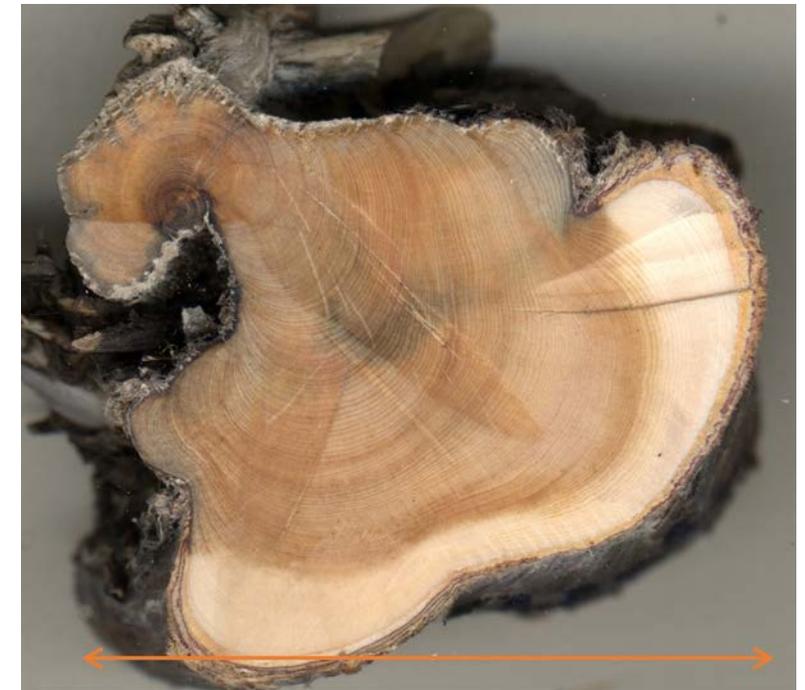
(Endurkomutími)



Juniper in the decertified land of Hólasandur, North Iceland.

The junipers have managed to survive in the area caused by centuries of unsustainable land use.

More than 280-year-old trees, good potential for tree-ring studies



3 cm

Takk fyrir

questions?