

Physical Geography Overview

Webinar 2 available at <https://bit.ly/22Web2FireAndIce>

NCGE- GeoCamp Iceland 2022

Originally Created by: Dr. Dawna L. Cerney
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Agenda

Travel Questions

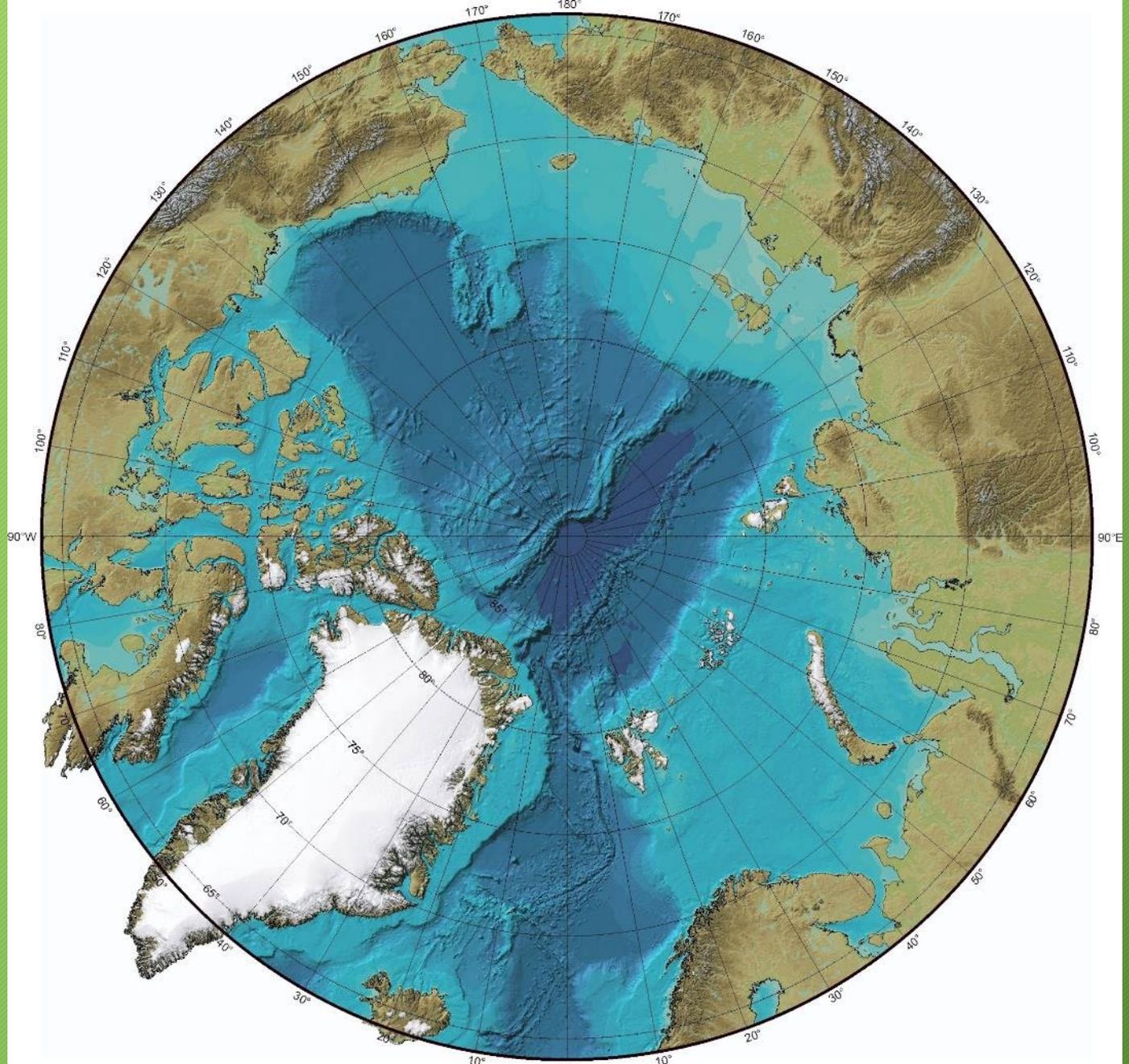
Land of Fire and Ice, and Sunlight

GeoInquiry

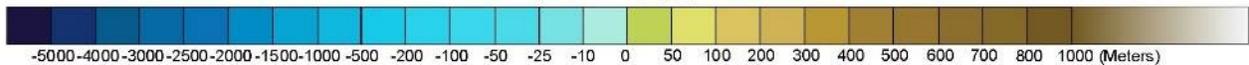
Reflection/Flipgrid

Teaser for Next Time...





Bathymetric and topographic tints



<https://geology.com/world/arctic-ocean-bathymetry-map.shtml>

Location

- Nordic island nation
- 64.9631° N, 19.0208° W
- High latitude = large volume of sunlight change over a year
 - <https://www.suncalc.org/#/63.9683,-22.5751,11/2022.06.29/13:23/1/0>
 - 29 June - 20h51m37s daylight
- Total Area 103,000km²
- Gulf Stream



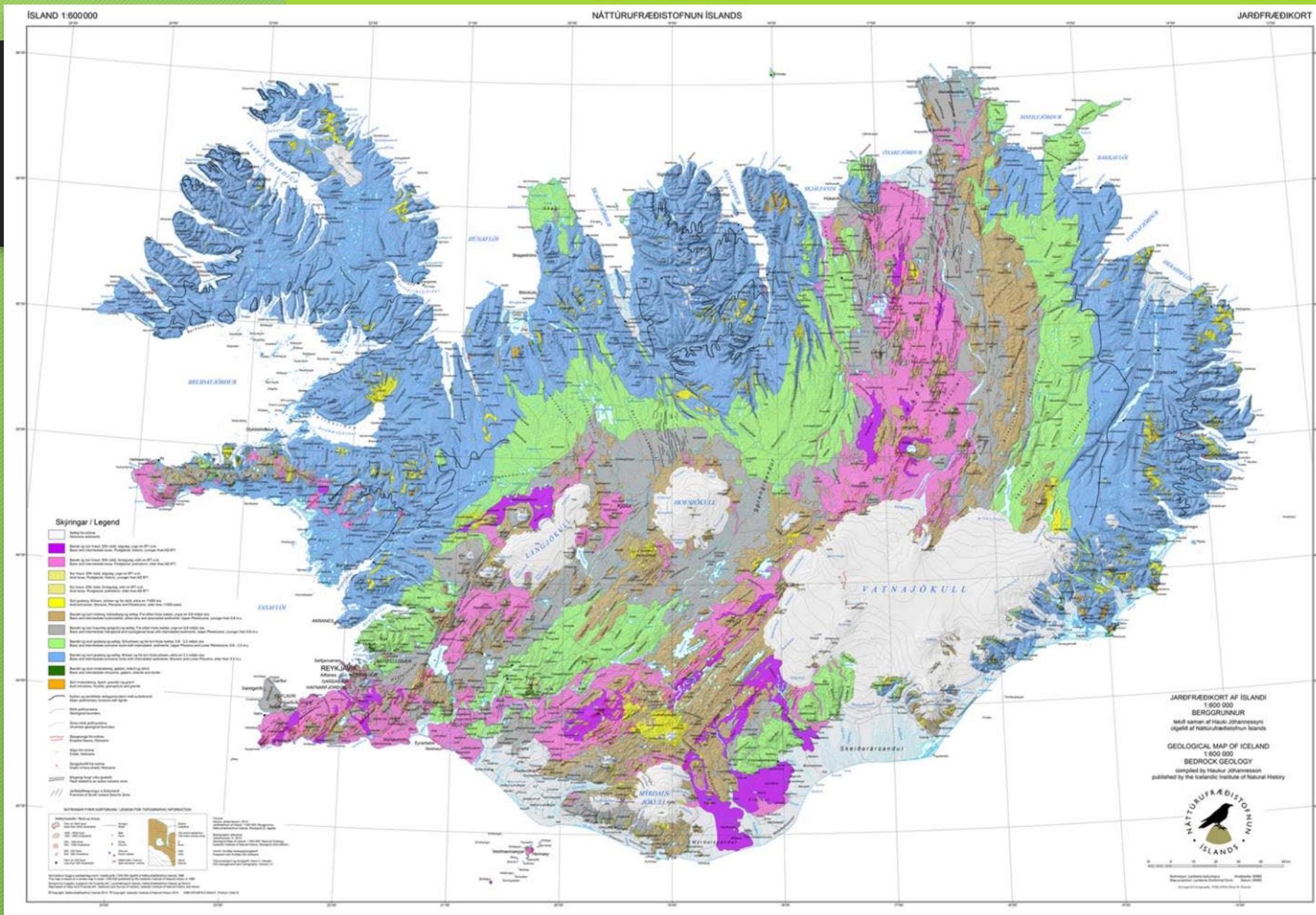
Topography

- Rifting
- Volcanism
- Glaciation



Geology

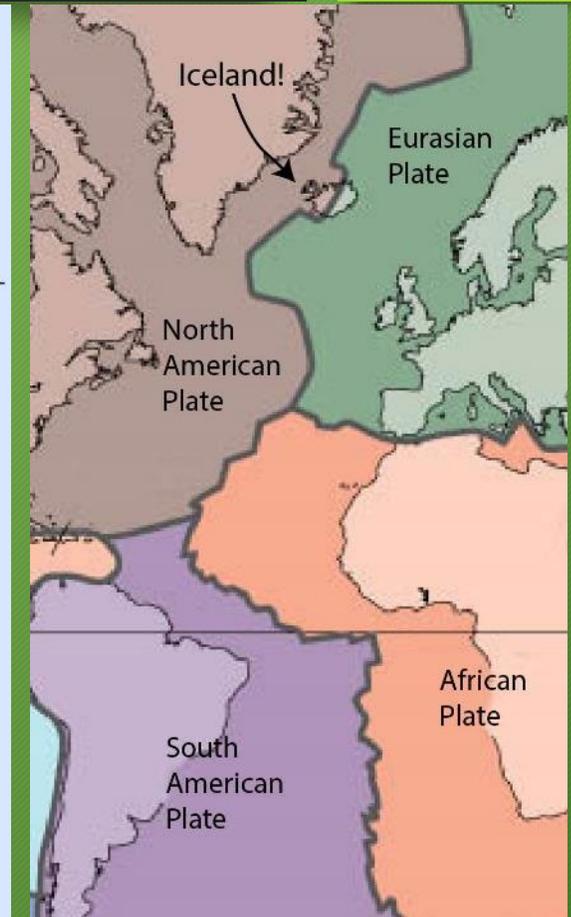
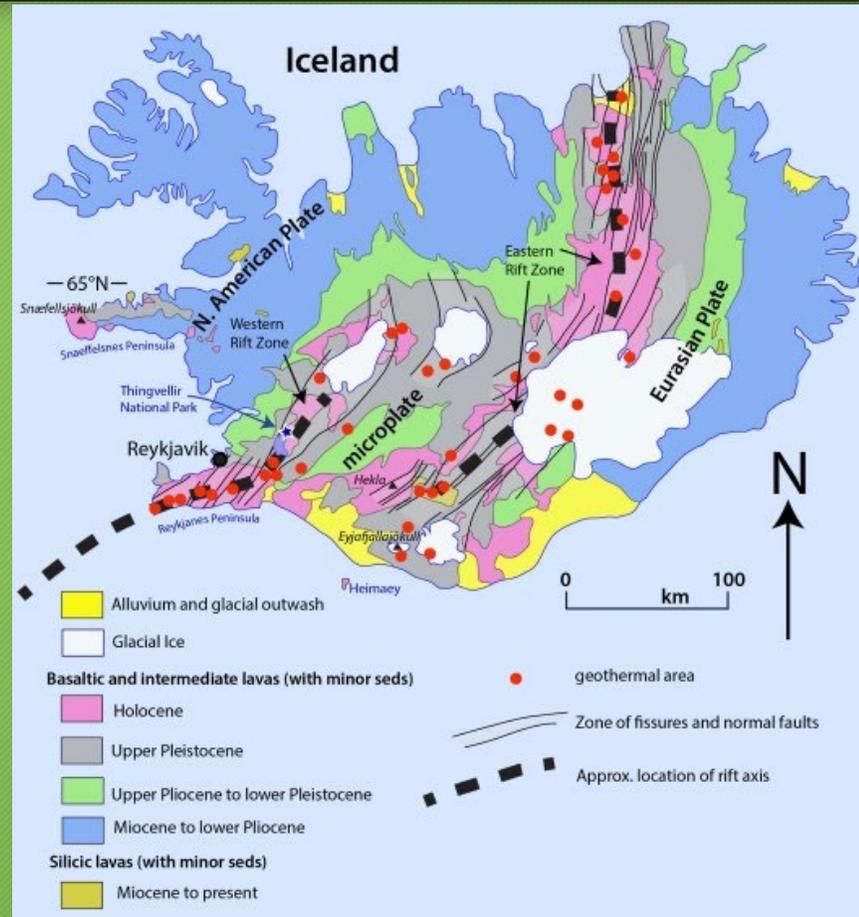
- Endogenic - Volcanism, metamorphism, earthquakes, crustal warping, folding and faulting.
- 11 Geologic provinces
- Generational development



Bridge Between Continents

The Mid Atlantic Ridge

- Plate Tectonics
 - Major rifting zone
 - Two rift areas
- Very “Active Rifting”

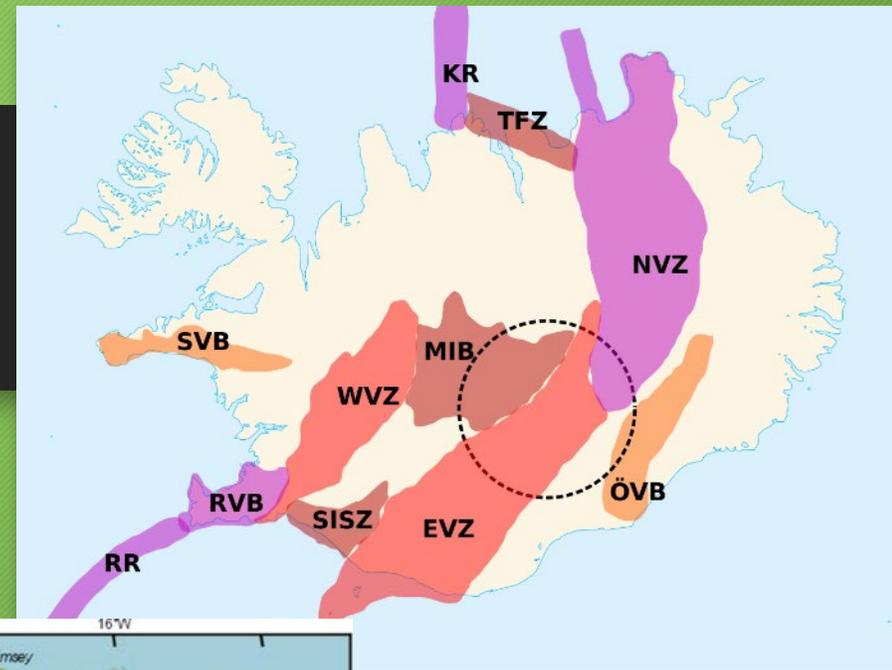


<https://geologictimepics.com/2018/09/30/iceland-where-you-can-walk-a-mid-atlantic-rift-and-some-other-geology-photos/>

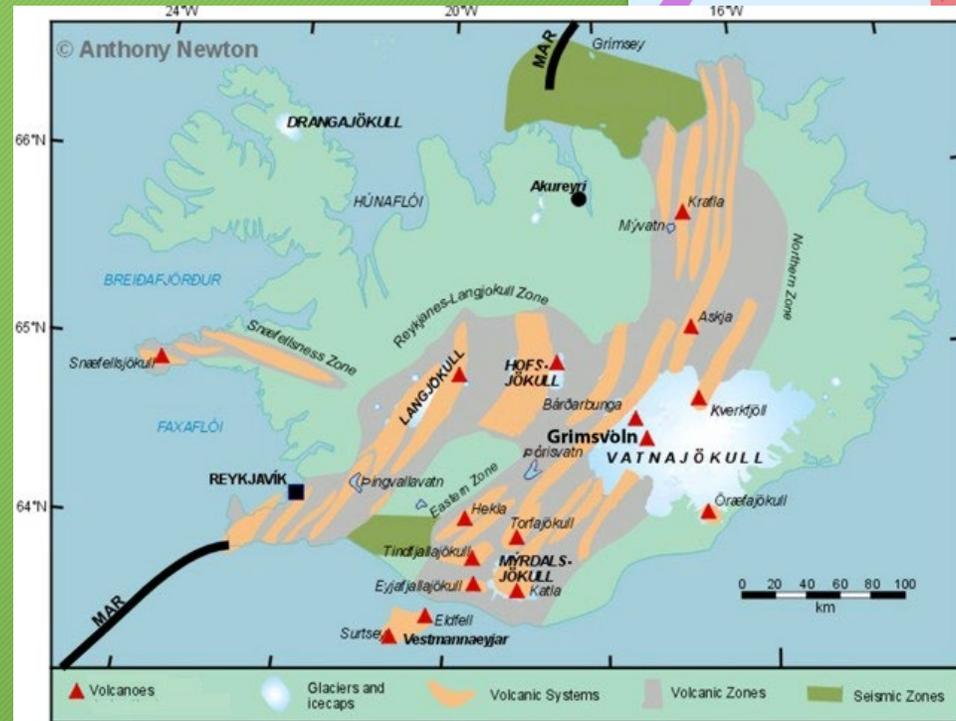
<https://geologictimepics.files.wordpress.com/2018/09/plates.jpg>

11 Active Volcanic Zones

- The dotted circle hypothetical hot spot of Iceland.
- Reykjanes Ridge (RR)
- Reykjanes Volcanic Belt (RVB) Kolbeinsey Ridge (KR)
- Tjörnes Fracture Zone (TFR)
- North Volcanic Zone (NVZ)
- East Volcanic Zone (EVZ)
- West Volcanic Zone (WVZ)
- Mid-Iceland Belt (MIB)
- South-Iceland Seismic Zone (SISZ)
- Öræfi Volcanic Belt (ÖVB)
- Snæfellsnes Volcanic Belt (SVB)



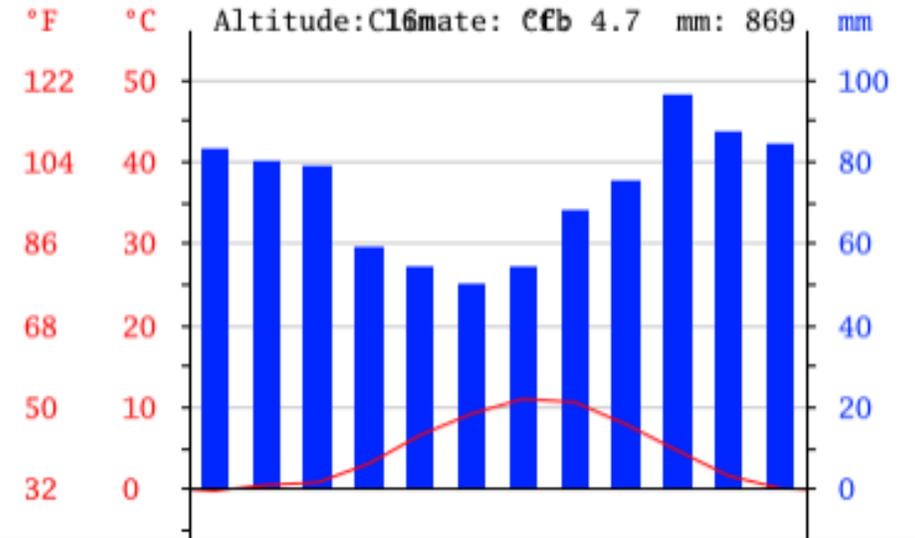
https://en.wikipedia.org/wiki/List_of_volcanoes_in_Iceland



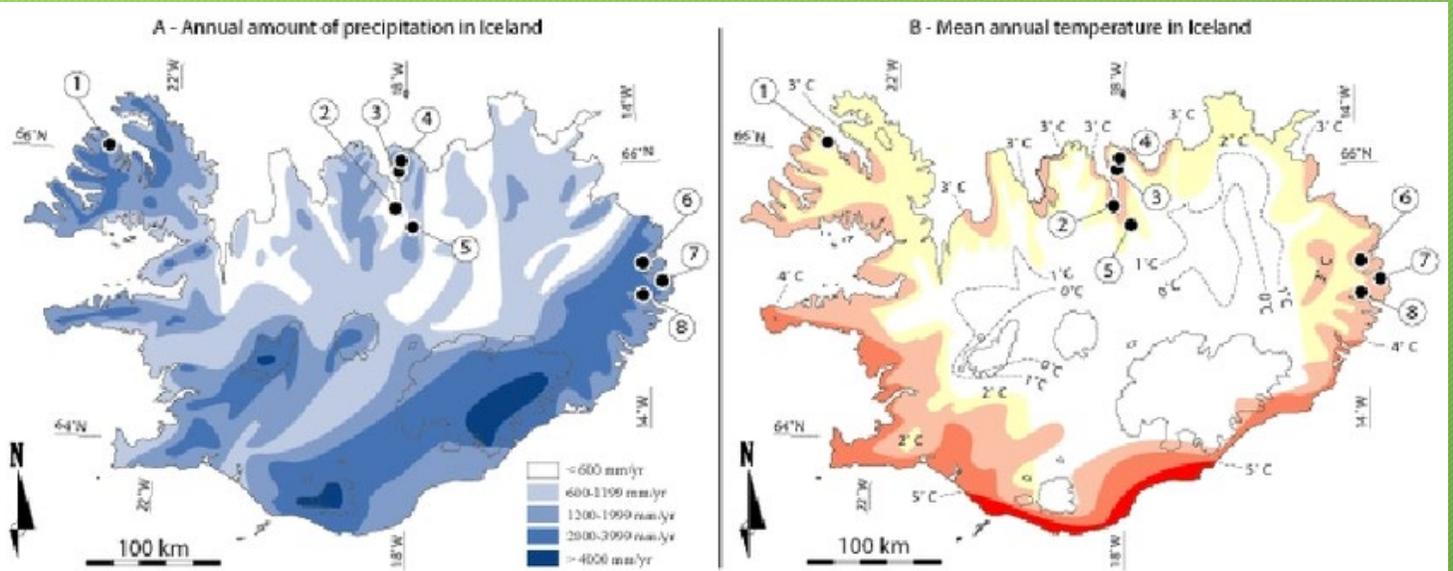
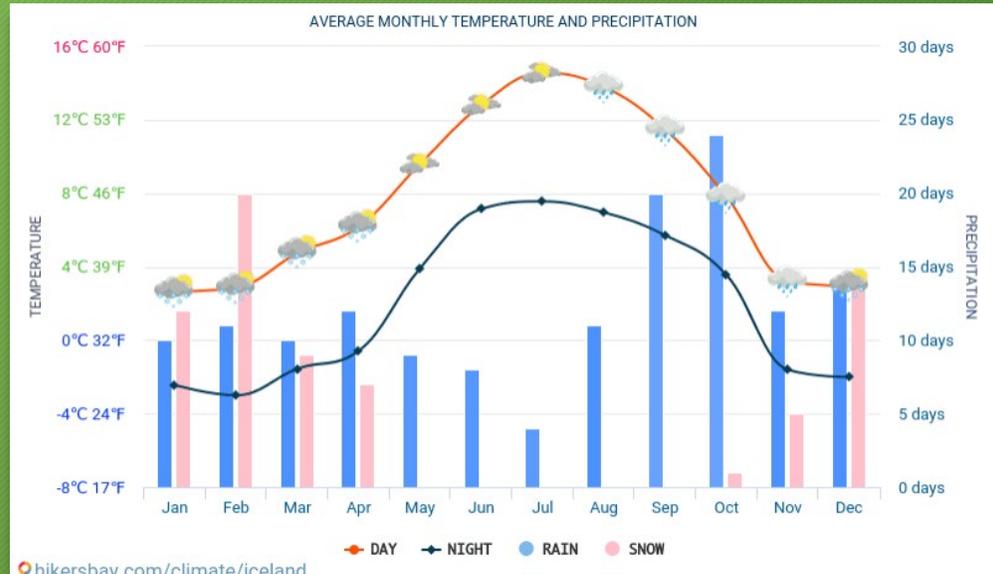
<https://volcano.si.edu/showreport.cfm?doi=10.5479/si.GVP.BGVN201106-373010>

Weather and Climate

Reykjavik



Iceland



https://www.researchgate.net/publication/255595598_Meteorological_triggering_factors_and_thresh_old_conditions_for_shallow_landslides_and_debris-flow_activity_in_Iceland/figures?lo=1&utm_source=google&utm_medium=organic

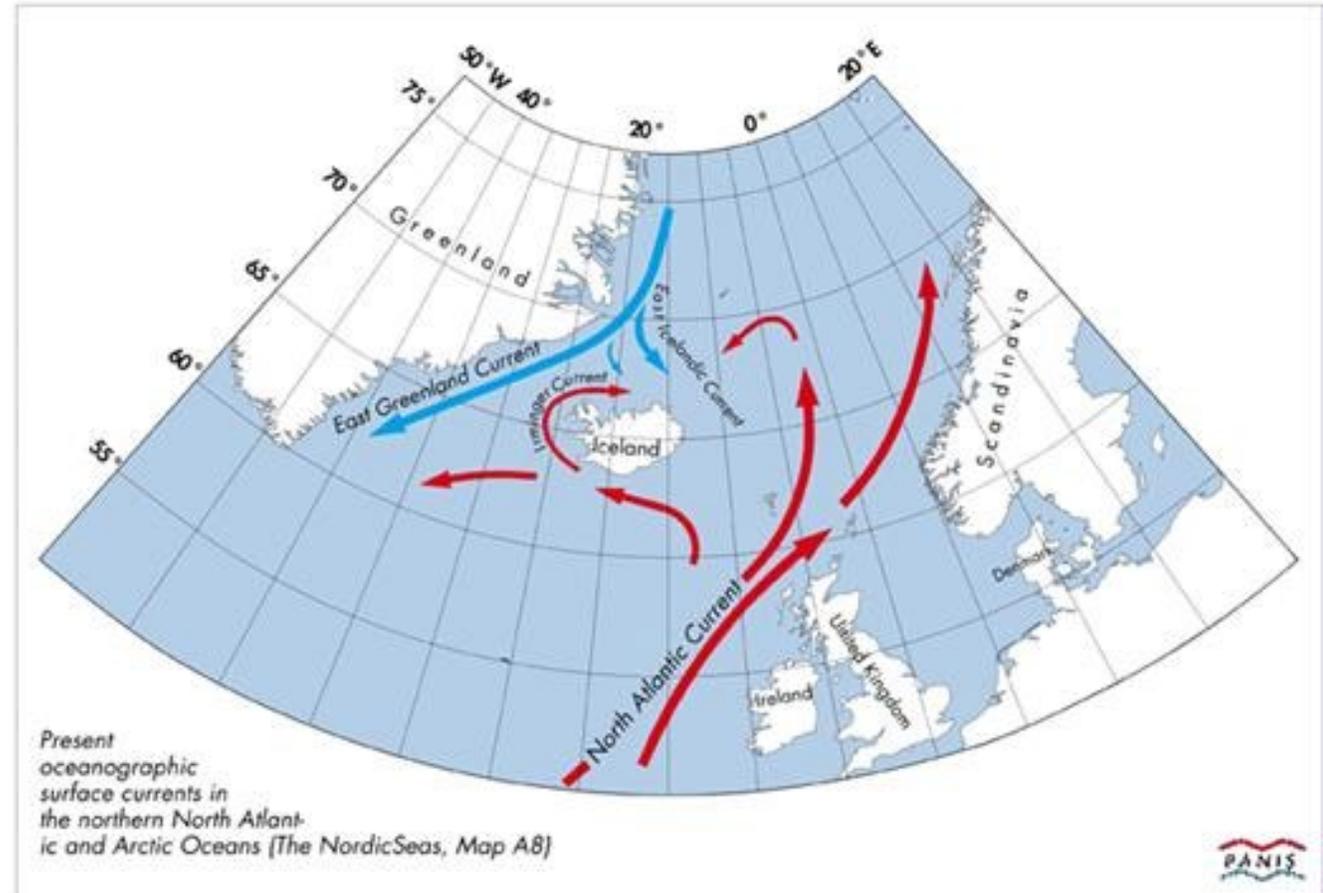
<http://hikersbay.com/climate/iceland?lang=en>

<https://en.climate-data.org/europe/iceland/reykjavik/reykjavik-764736/>

Gulf Stream

- A strong Gulf Stream warms the North Atlantic Drift along the southeast coast
 - Keeps the west side of the island a few degrees warmer than the northeast side
- Iceland and Greenland Ocean Currents
 - Cool Northwest Iceland
- Fluctuations in the strength of the Gulf Stream determine how much affect the Arctic flows will have on all of Iceland's climate.

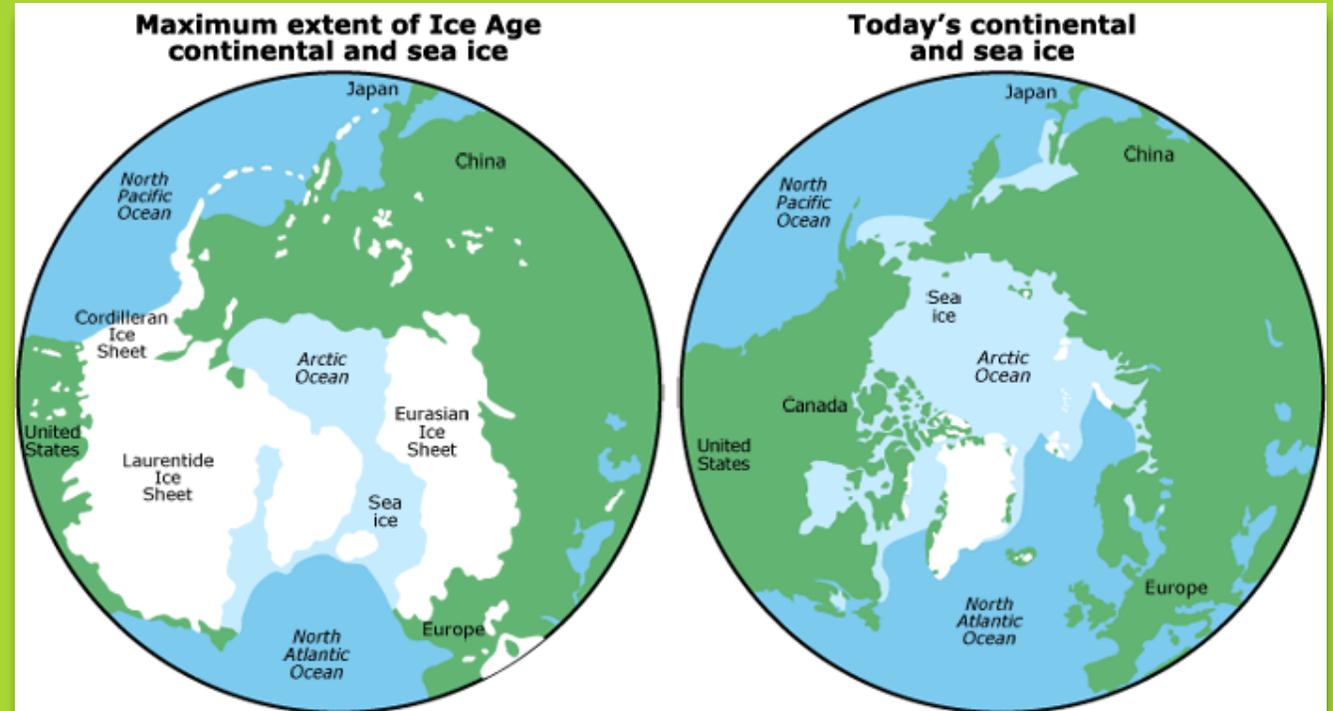
Surface circulation



https://notendur.hi.is/oi/climate_in_iceland.htm

IceAge

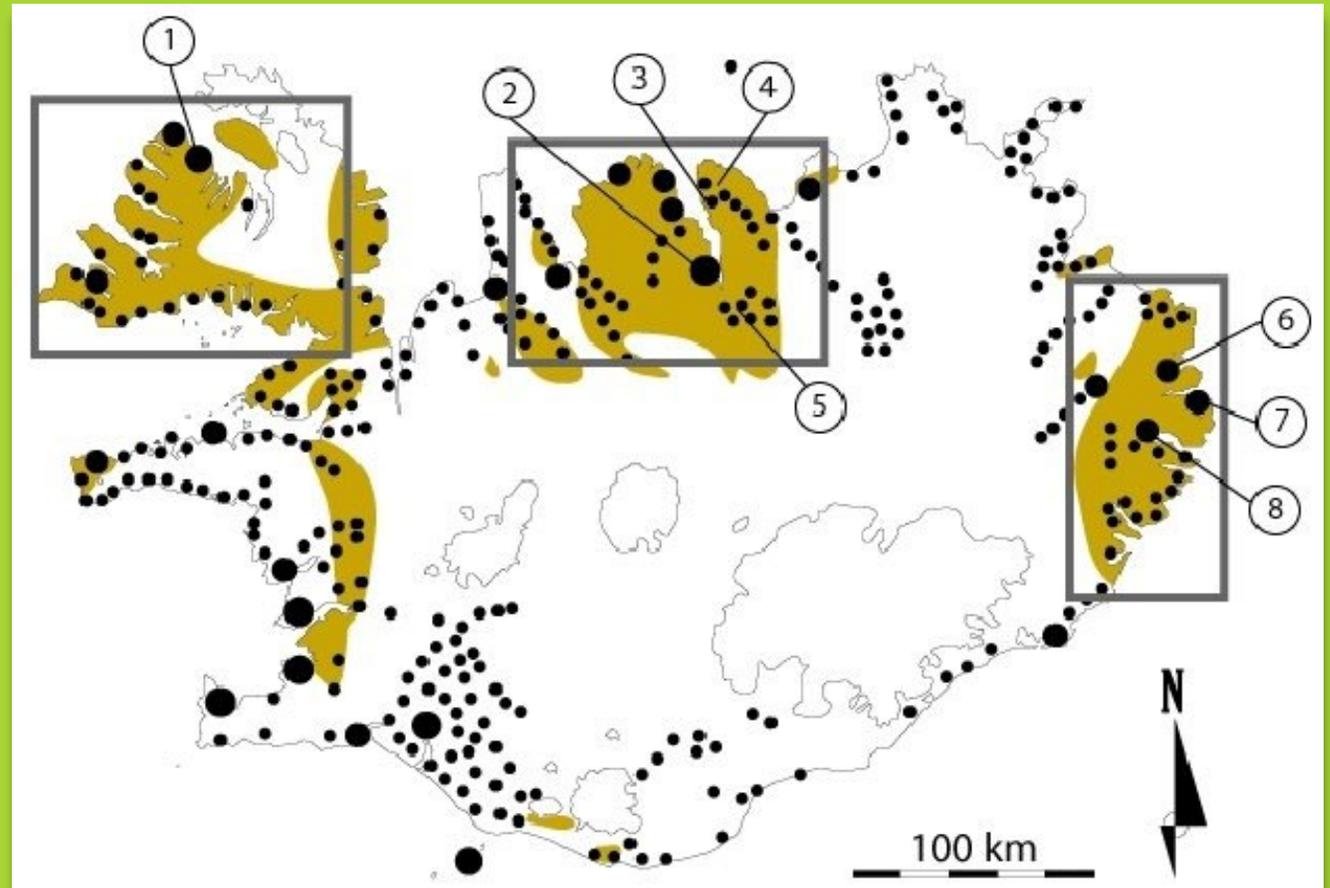
- 3M BP
 - 30 warm and cool periods
- Last cool period - 1.6 M BP
 - beginning of the Quaternary period
- Continental ice sheets withdrew from North America and Europe ~ 10,000 years ago (end of the Pleistocene epoch)
 - Quaternary Ice Age is not over yet



<https://www.cdm.org/mammothdiscovery/wheniceages.html>

Active Geomorphology

- Exogenic
- Thermal (sunlight)
- Gravity
- Wind
- Water
- Biota



https://www.researchgate.net/publication/255595598_Meteorological_triggering_factors_and_thresh_old_conditions_for_shallow_landslides_and_debris-flow_activity_in_Iceland/figures?lo=1

Glaciation - Geomorphology

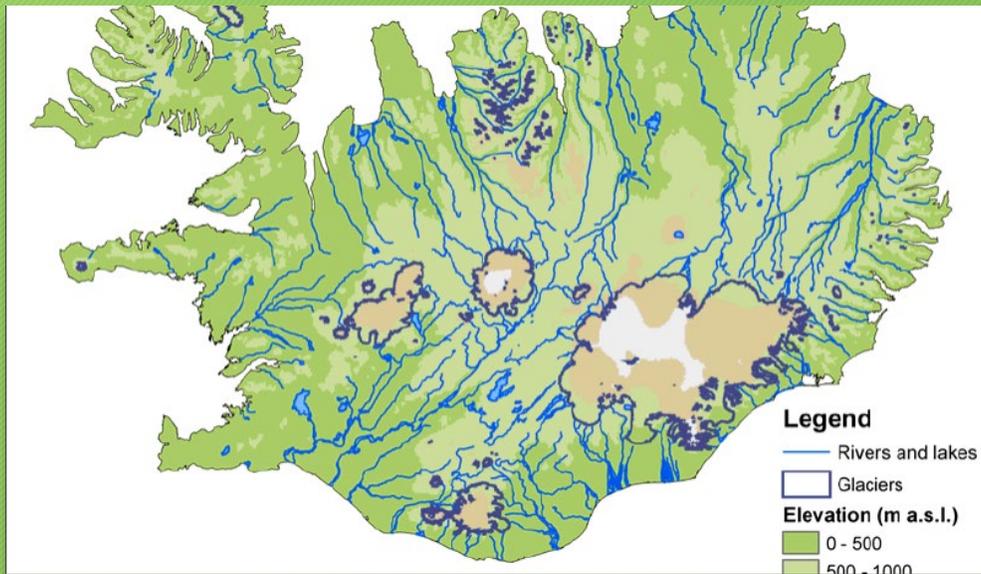
- Exogenic
- Glaciers
- Outlet glaciers
- Glacial lagoons



<https://www.glaclerguides.is/blog/top-5-glaciers-iceland>

Fluvial Features

Braided streams and deposits



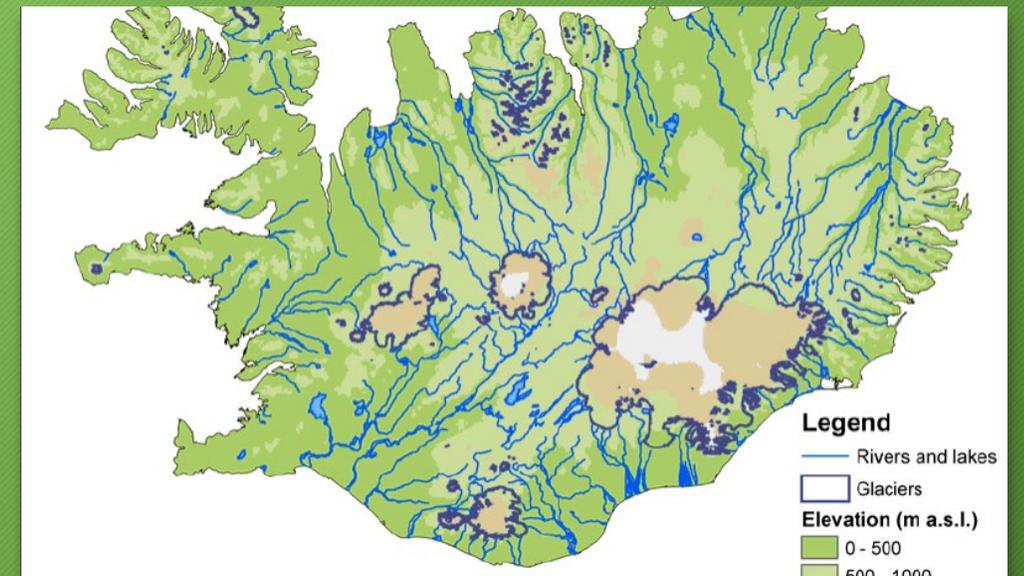
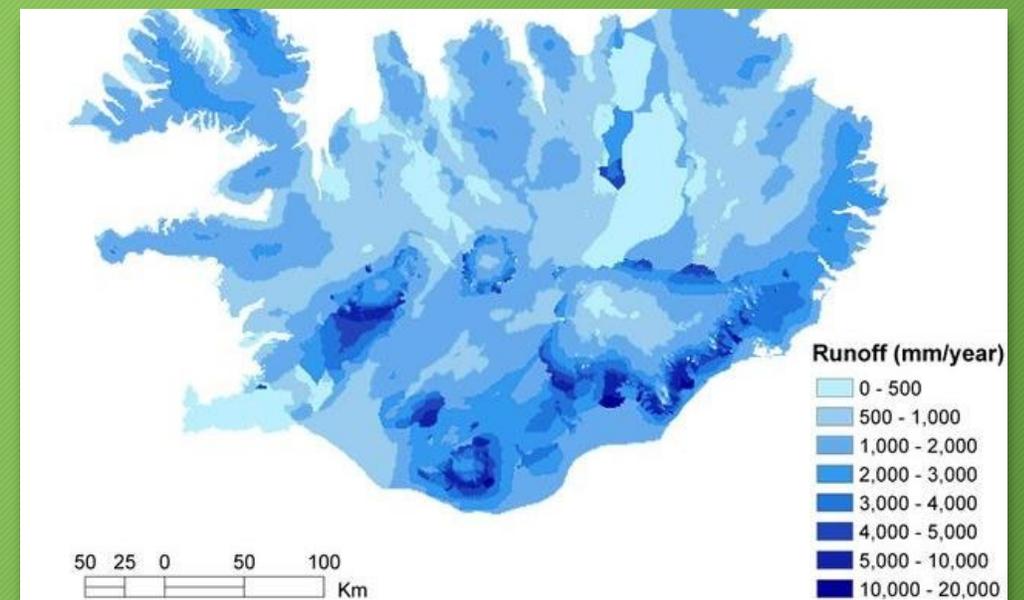
Fjords



Annual Runoff and Rivers



Foster. (2021). Gullfoss.



https://www.researchgate.net/publication/239789531_A_runoff_map_based_on_numerically_simulated_precipitation_and_a_projection_of_future_runoff_in_Iceland Une carte d'écoulement basée sur la précipitation numériquement simulée et un scénario du futur e/figures?lo=1&utm_source=google&utm_medium=organic

Fluvial Features

Braided streams and deposits



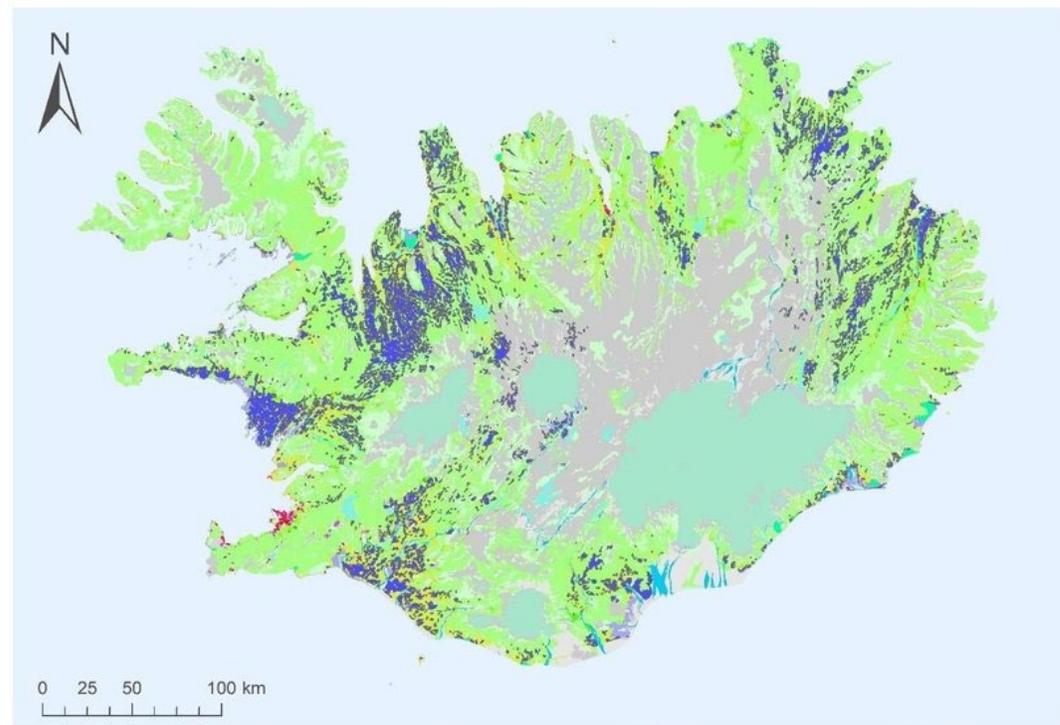
<https://guidetoiceland.is/travel-info/flights-to-iceland>

Glaciers



Foster (2021) Solheimajokull

Land Cover

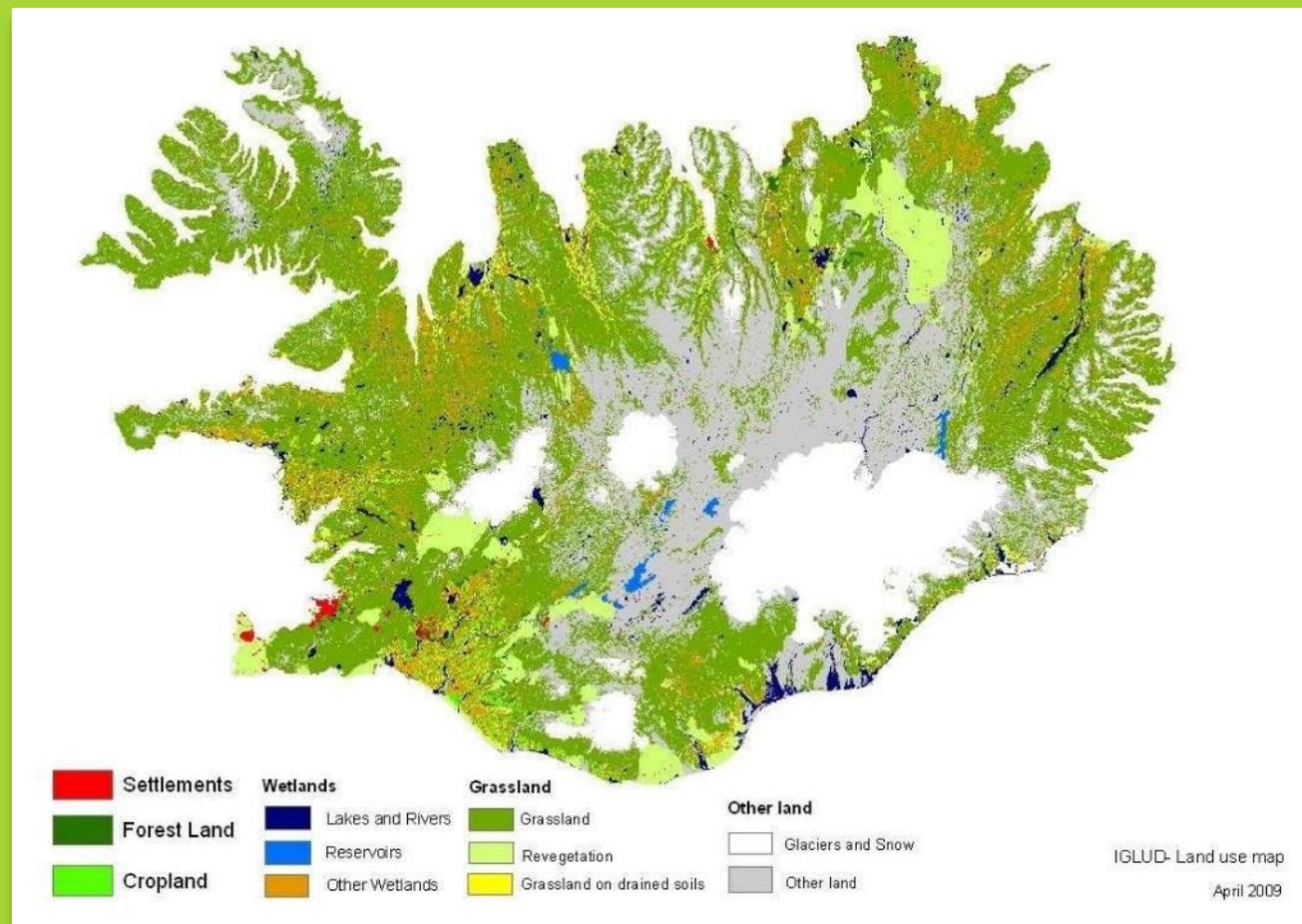


LULC

■ Discontinuous urban fabric	■ Green urban areas	■ Natural grasslands	■ Peat bogs
■ Industrial or commercial units	■ Sport and leisure facilities	■ Moors and heathland	■ Salt marshes
■ Road and rail networks and associated land	■ Non-irrigated arable land	■ Transitional woodland-shrub	■ Intertidal flats
■ Port areas	■ Pastures	■ Beaches, dunes, sands	■ Water courses
■ Airports	■ Complex cultivation patterns	■ Bare rocks	■ Water bodies
■ Mineral extraction sites	■ Broad-leaved forest	■ Sparsely vegetated areas	■ Coastal lagoons
■ Dump sites	■ Coniferous forest	■ Glaciers and perpetual snow	■ Estuaries
■ Construction sites	■ Mixed forest	■ Inland marshes	■ Sea and ocean

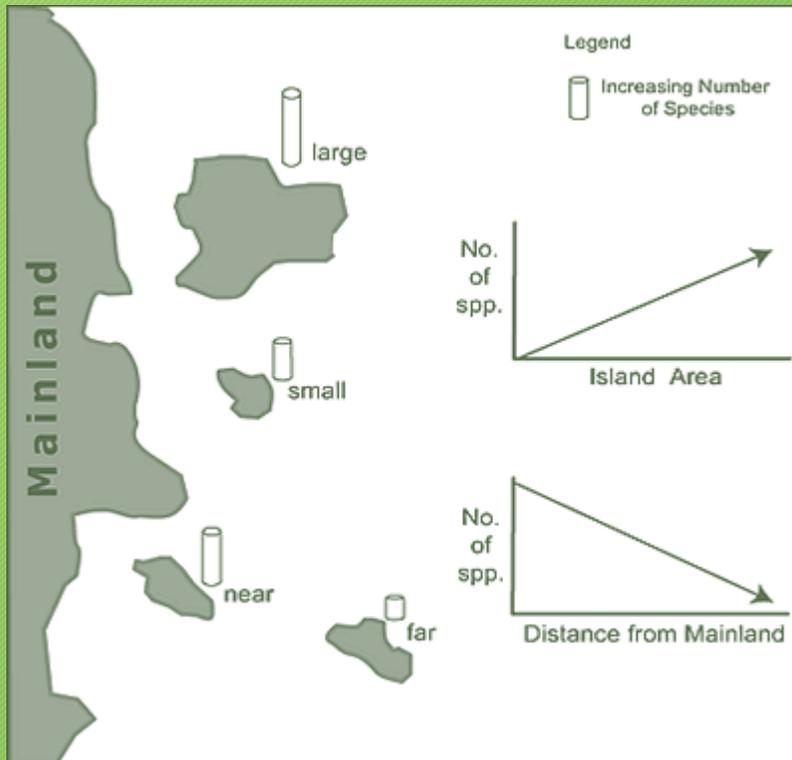
https://www.researchgate.net/publication/331315415_Assessing_evolution_of_ice_caps_in_Sudurland_Iceland_in_years_1986_2014_using_multispectral_satellite_imagery/figures?lo=1&utm_source=google&utm_medium=organic

Land Cover

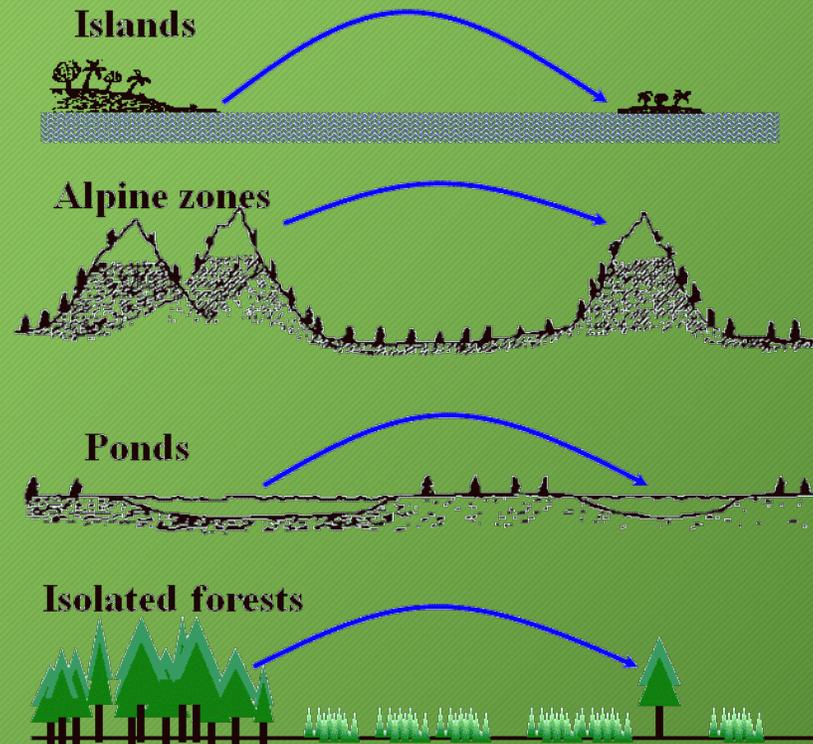


[Researchgate.net/publication/260088178_National_Inventory_Report_Iceland_2009_Submitted_under_the_United_Nations_Framework_Convention_on_Climate_Change/figures?lo=1&utm_source=google&utm_medium=organic](https://www.researchgate.net/publication/260088178_National_Inventory_Report_Iceland_2009_Submitted_under_the_United_Nations_Framework_Convention_on_Climate_Change/figures?lo=1&utm_source=google&utm_medium=organic)

Island Biogeography



<http://www.labiotheque.org/2011/07/biodiversity-on-islands-ii-island.html?m=1>



<http://hosho.ees.hokudai.ac.jp/~tsuyu/top/dct/island.html>

Native Species

- 330 Bird Species recorded
- Arctic Foxes (only land mammal)
- Whale and Dolphin (20 species)
- Seals
 - Harbour, grey, harp, bearded, hooded and ringed
- Polar Bears (humm... Guests)



Landscape Change

- The uninhabited landscape was around 60% covered with birch forest and woods
- The earliest sagas state (agriculture)
 - "At that time, Iceland was covered with woods, between the mountains and the shore [...]" insinuating that, at the time of writing, Iceland's forest cover was already diminishing.
- Hydroelectric dams
- Aluminum smelters
- Greenwashing?



Reflection/FlipGrid

Join the FlipGrid Group at:



Participate in the Web2 Reflection at:



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