

Reindeer and tundra in a changing world: threats and opportunities

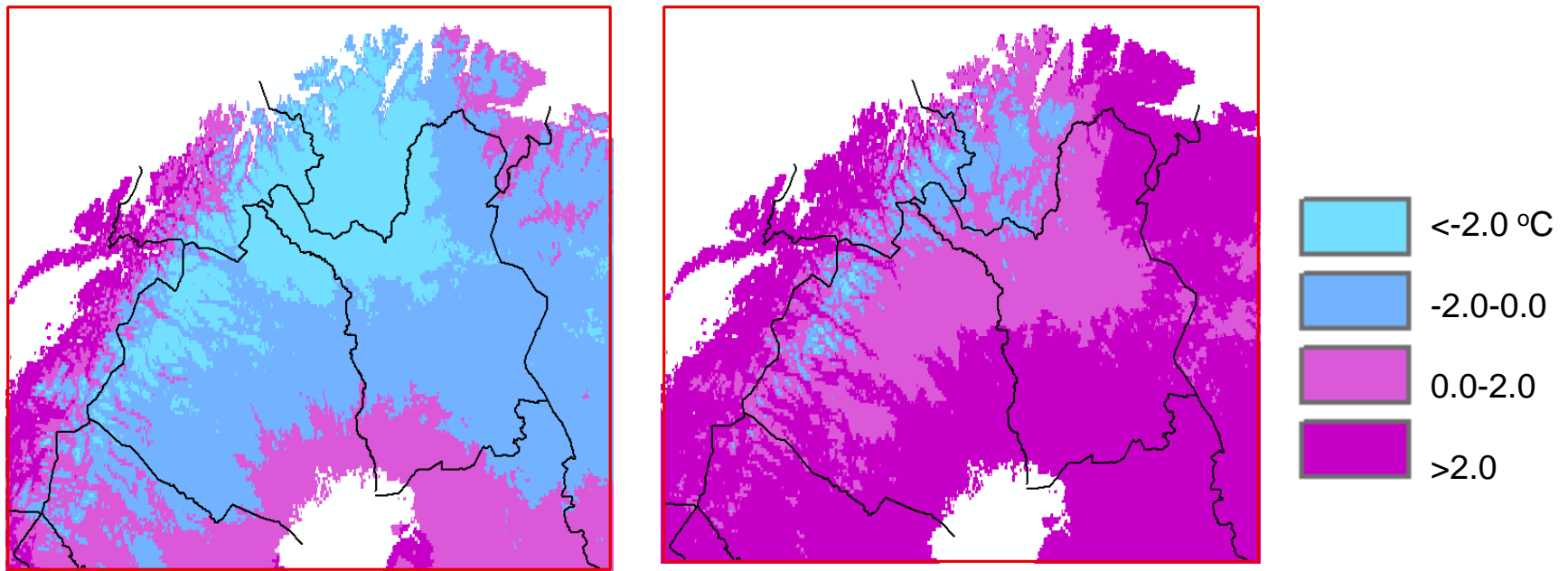
Boazu ja duottar rievdamis máilmmis –
uhkidusaid ja vejolašvuodaid



The threat: climate is warming

Uhkidus: dálkkádat liegganišgoahtá

Mean annual temperature in Lapland/Sápmi
Gaskamearalaš jagitemperatuvra Sámis



today
otne

2050

From Sonja's presentation

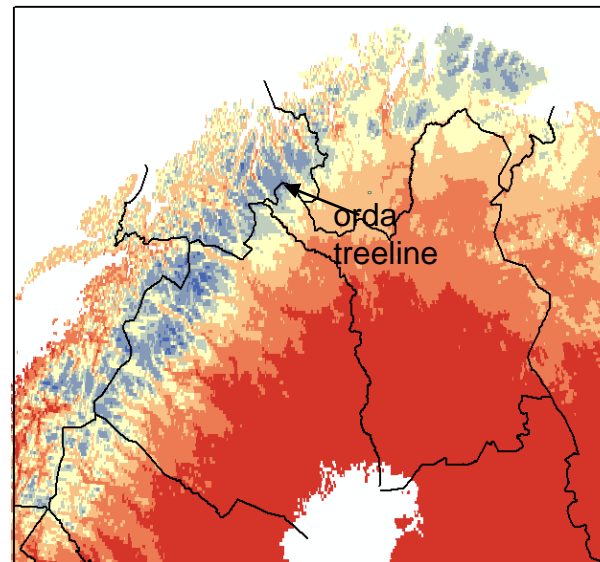
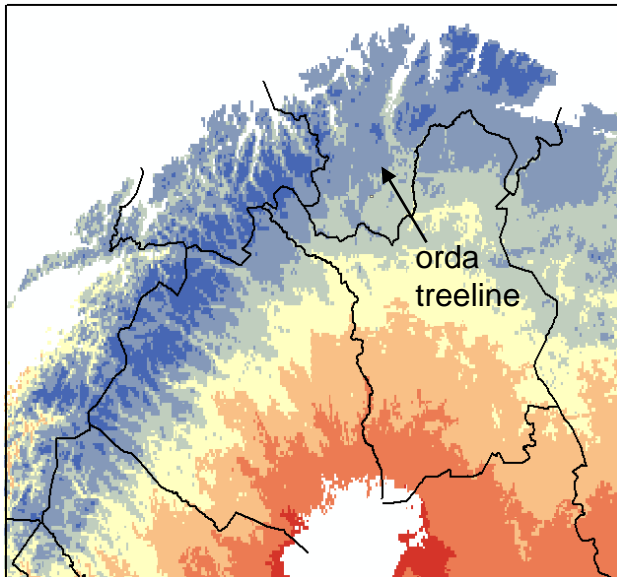
Climatic treeline: summer cooler than + 10°C

Orda dálkadaga mielde: geassi čoaskab go + 10°C

otne / today

2070 jus RCP = +2.6 W/m²

if RCP = +2.6 W/m²



Muihte: dat lea
optimistalaš
"niehkuskenario"

Remember: this is
the optimoistic
"dream scenario"

If tree line follows climate change, the Fennoscandian tundra will almost vanish even if CO₂ emissions would be strongly reduced

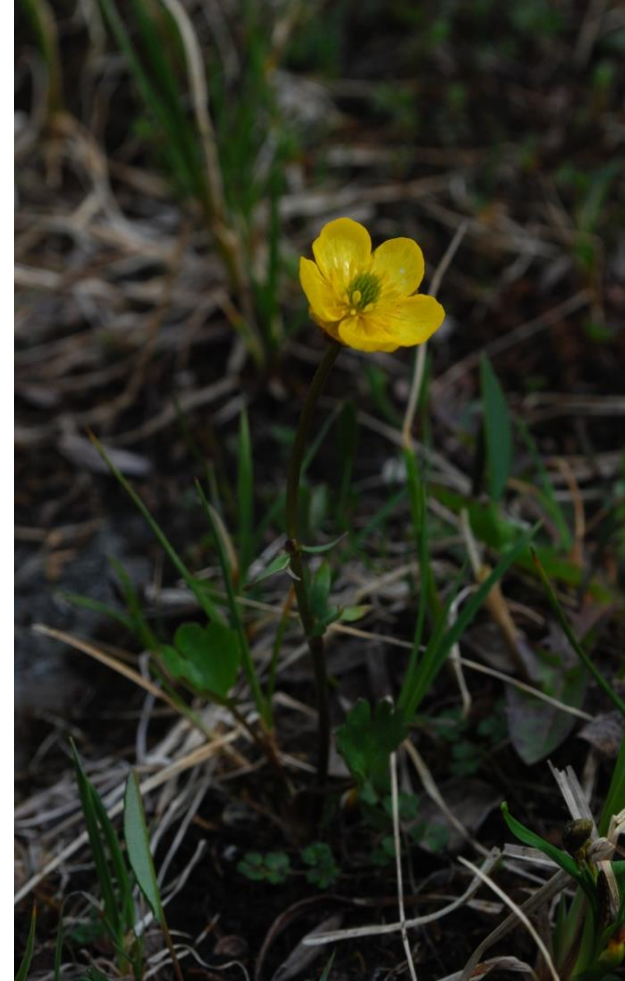
Jus orda čuovvu dálkadaga, Sámi duottar measta jávkka, berosgcahtta man bures mi nágodat gáržžit CO₂ njuoskadeami

What will be left is mainly rocks and boulderfields,
unsuitable for tundra plants and animals

Dušše ráššat ja báljis rávdat bázet ⇒
birgemeahtun dilli duottara ealidje ja rássidje



Goodbye?? Báhcet dearvan??



If tundra vanishes, global warming will be even faster

Jus duottar jávka, dálkkádatrievdan manná vel jođáneappot



Open tundra reflects solar radiation back to space, forest changes it to warmth
Rábas duottar speadjalasta beaivesuotnjariid ruovttoluotta gomuvuhtii, vuovdi fás rievdá suotnjariid liekkasvuođain

Snow melts earlier in forest \Rightarrow large increase in absorbed radiation
Vuovdi bievla árat go duottar \Rightarrow bievla geasuha beaivesuotnjariid



**Growing trees fix
carbon -
something
positive anyway?**

**Muhto muorat
válddet hiilla
áimus go
ráhkadat álčččet
runjnut – igo dat
lea buorre?**

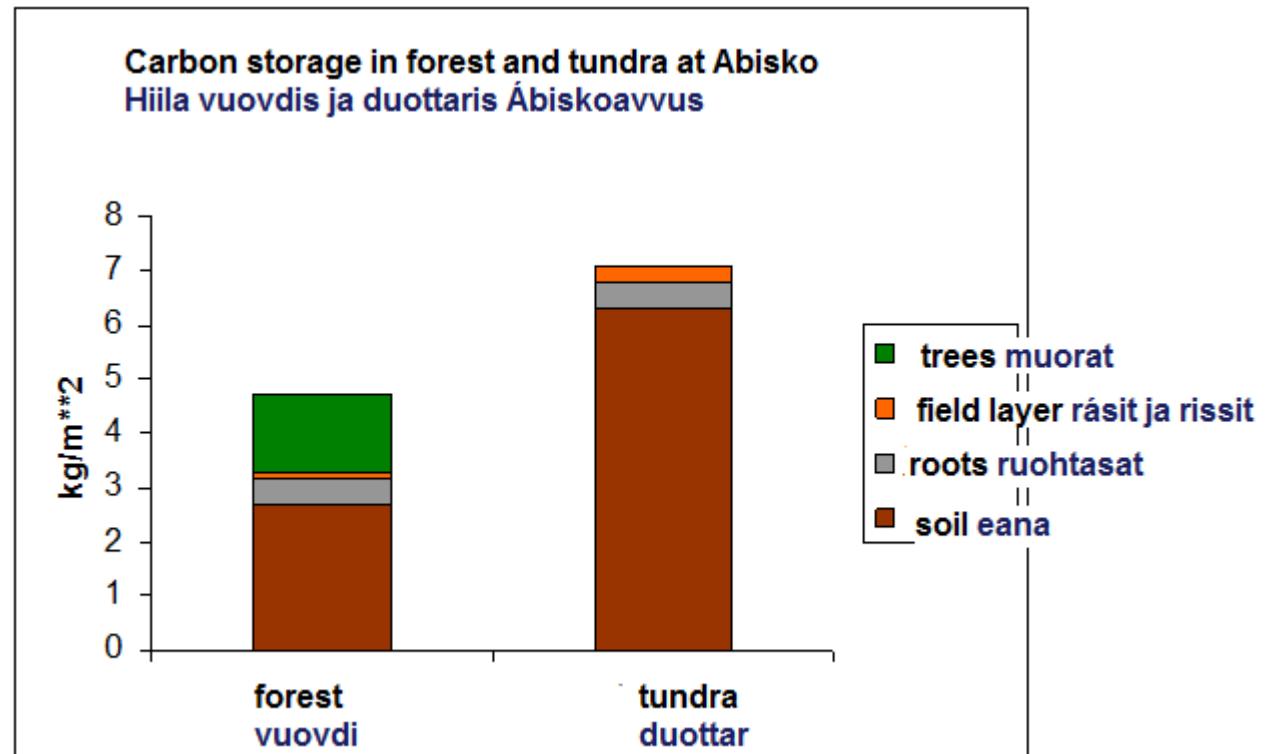
So it seems: above ground plant biomass increases if the tundra becomes forest but...

Nubat sáhtta doaivut. Vumin lea gal eambo hiila oainusin, muhtto...



in north, most of carbon is in soil; decomposition is faster in forest
davviguovlluin hiila lea eanes oassin eatnamis, «decomposition»
dáhpuhuvvá jođáneappot vuomis

Forest advancement would thus mean large net release of CO₂
Vumiid lassáneapmi máksá dánin áhte ollu hiila (karbona) beassa áibmui



But: tundra has rather expanded in Sápmi Muhto: duottar lea lassánan Sámis

When I was young, I could only see birches in this place
Mu nuoravuodas dás i oaidnan šat eara go soagid



because the tundra has also defenders
dáningo duottaris lea maidai bealusdeajit



Moths kill birch trunks – small mammals and reindeer eat up recovery shoots
Lastamáđut goddet sogiid, sáhpanat ja bohccot borret ođđa soahkenáđđuid

**After a moth outbreak in summer grazed areas,
only birches with high surviving branches recover**

**Máhtojagi máŋŋil dušše dat soagit seilot,
main leat eallimin alla oavssit**



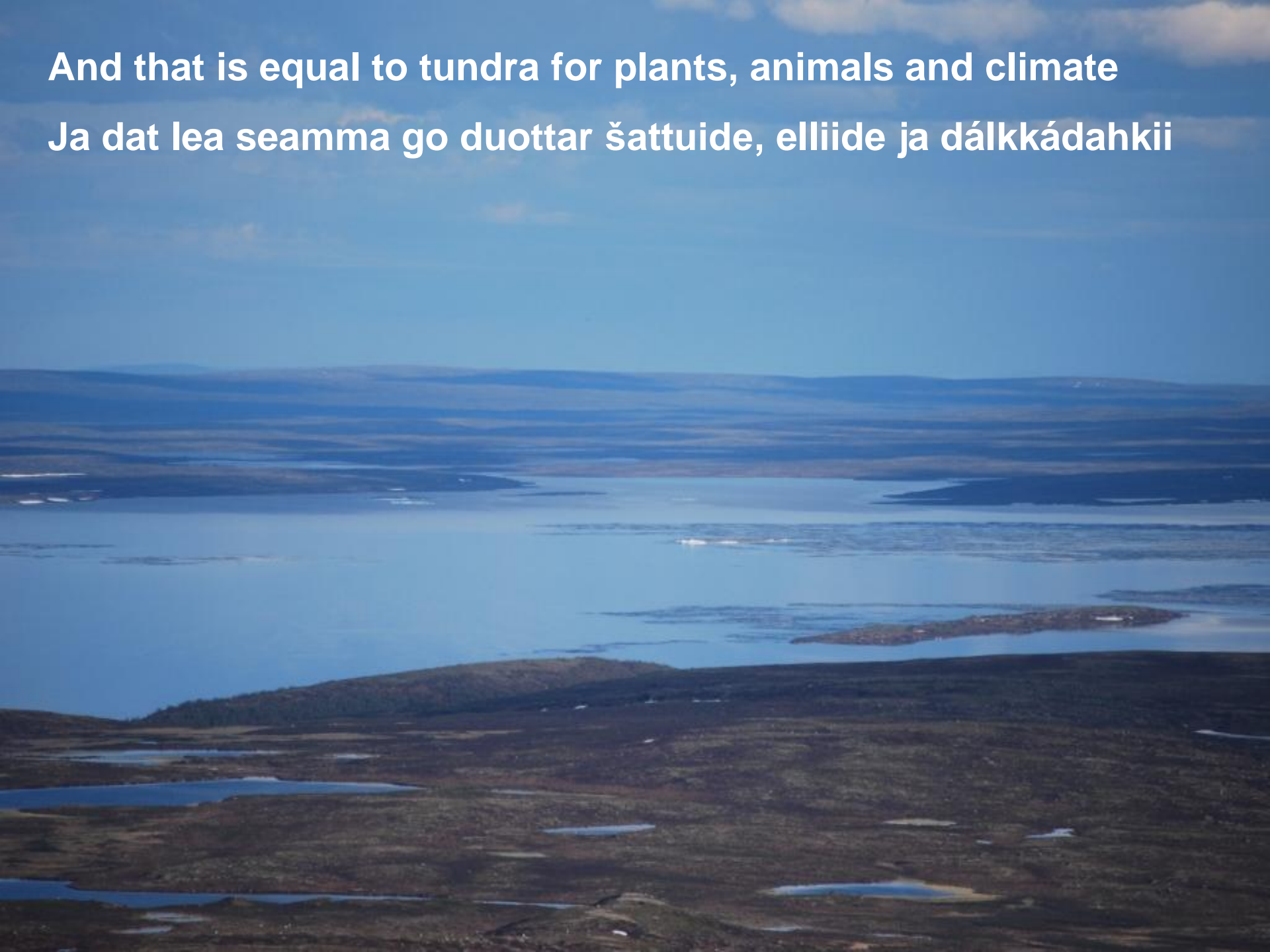
The result is a kind of "birch savanna"
Boađus lea juogalágan "soahke savanna"



such sparse woodlands do not harm for tundra plants or influence climate

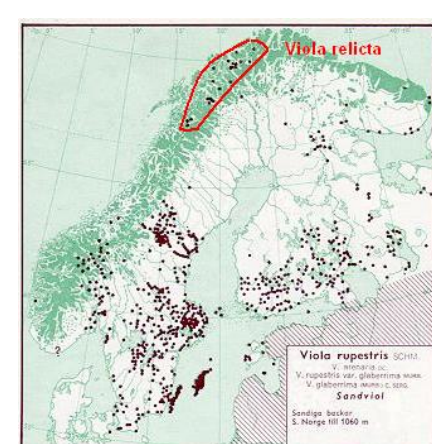
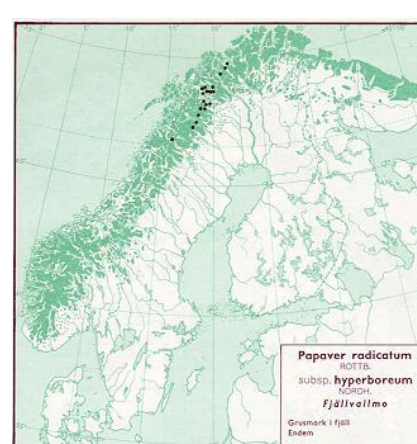
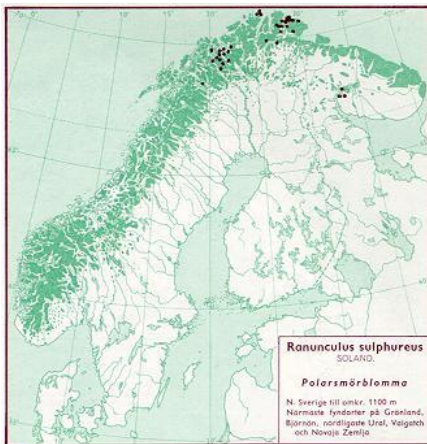
And that is equal to tundra for plants, animals and climate

Ja dat lea seamma go duottar šattuide, elliide ja dálkkádahkii



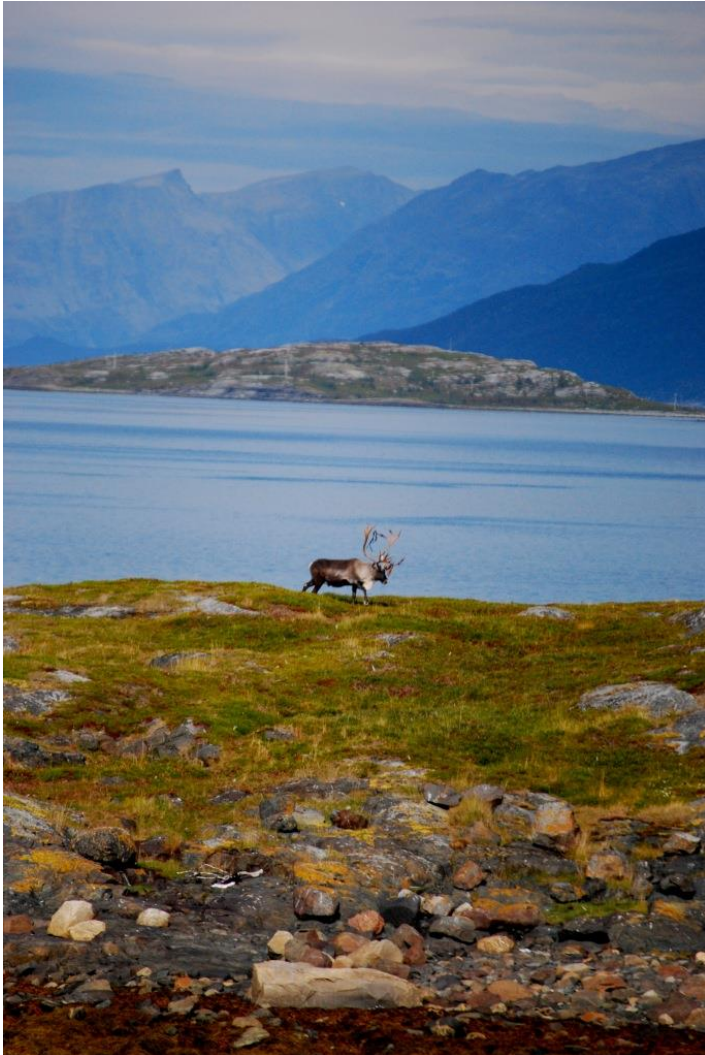
Many rare arctic plants also require disturbed ground

Guohtun lea maidai njuolga ávki máŋga árktalas rásiide



We can save the tundra in spite of global warming

Mii sáhttit sealluhit duoddara váikko dálkkádat liegganišgoahtá



But then reindeer grazing is needed – just voles and moths do not do it alone

Muhto dálle lea dehalaš ahte bohccot guhtot- sáhpanat ja lastamađut eai okto šat nagot



And reindeer must be there in early summer
when birch leaves are tasty

Ja bohccot fertejit leat doppe guohtume
gidđageasi, go soahkelasttat leat njálgát



But: grazing during snow-free season damages lichen grounds

Muhtto: guohttun bievllaáigis duolmma jeagileatnamid



Lichens are important winter forage and have also high albedo

Jeagil lea dehalaš dalvebiepmu ja jeagilist lea alla "speadjalastanfábmu"



Problems are not trivial – but remember: reindeer can cover long distances

Ollu váttisvuodaid– muhtto muihte: boazu johtta guhkis mátki jus lea dárbbu



The future of the tundra can be bright IF the big societies understand the importance of reindeer in protecting it and act accordingly

Duoddara boahhteáigi sáhttá leat čuovgat JUS stuorraservvodagat ipmirdit bohcco dehálašvuoda ja váldet dan vuhtii

Our job is to start the process!

Galga fá! barganisgoahttit!