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Climate-driven changes in pollinator assemblages during the last 60 years in an Arctic mountain region in Northern Scandinavia

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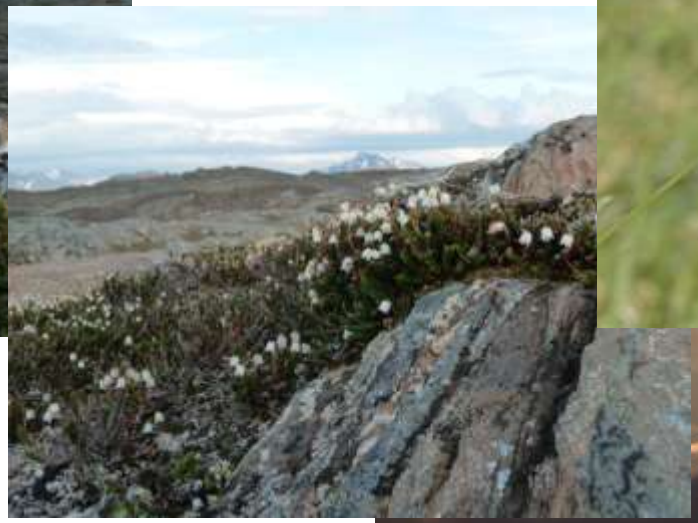
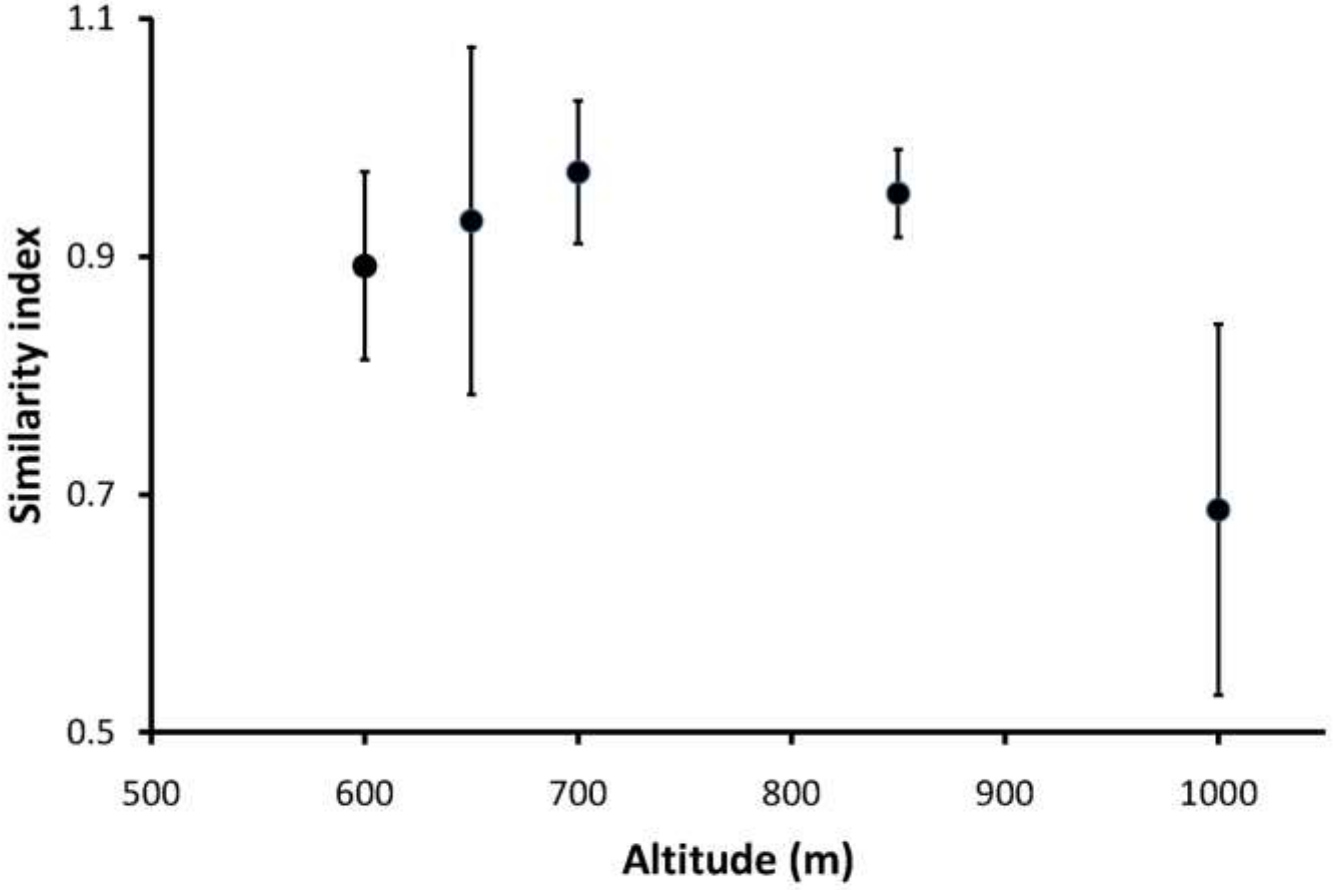


Methods

- Padjelanta National Park
- Very remote, protected alpine/Arctic area (800 masl)
- 5 localities
- Butterflies, macro-moths and bumblebees
- Comparisons beween 1945 and 2000
- Habitat changes 1890 - 2010

Results

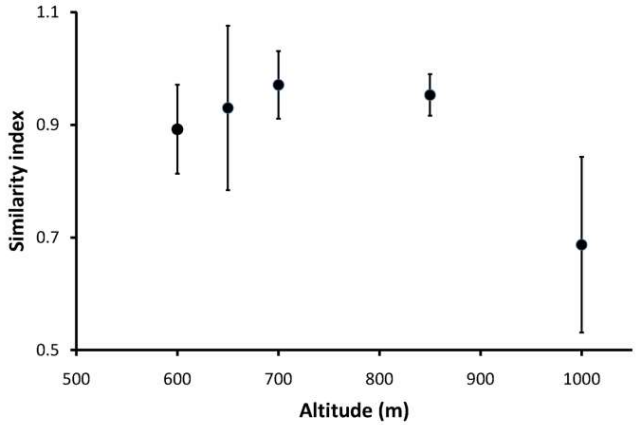
- 26 butterflies
- 42 macromoths
- 16 bumblebees

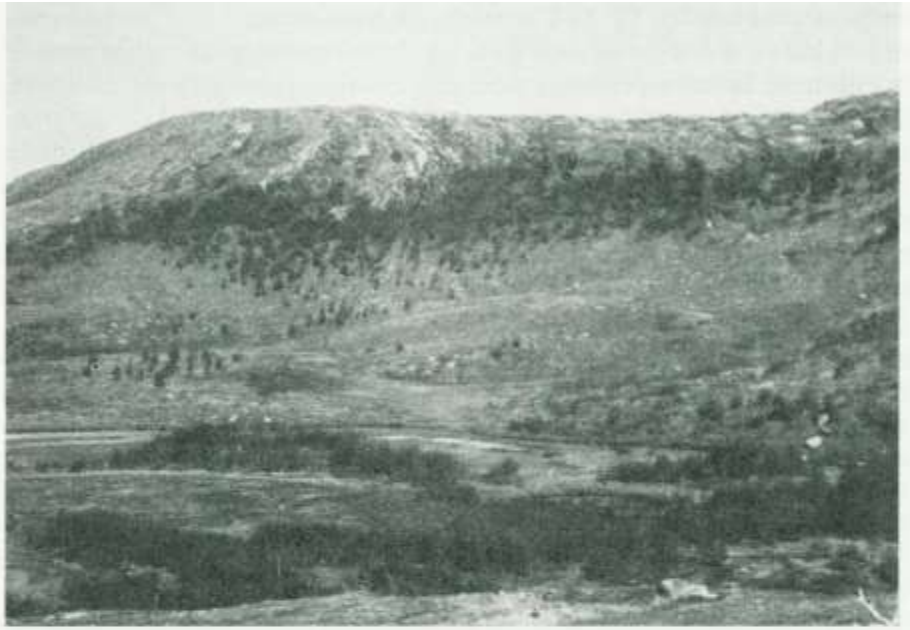


Franzén & Öckinger J. Insect Cons. 2012

Lower altitudes (500 masl)

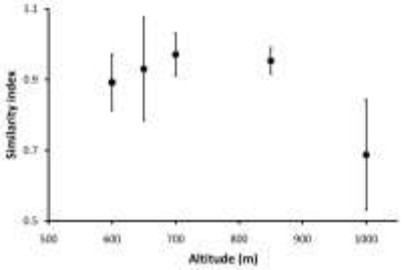
- Species are colonising
  - *Erebia ligea*
  - *Polyommatus icarus*
  - *Lycaena hippothoe*





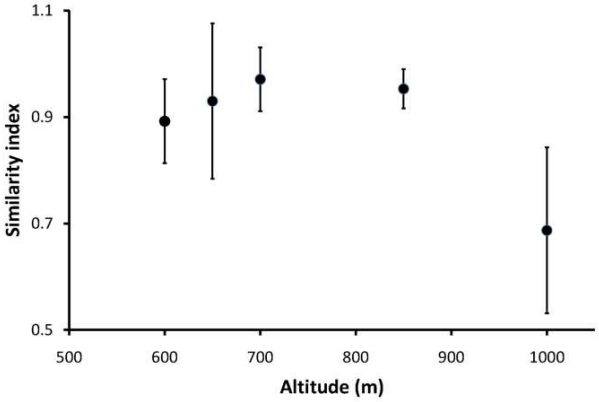
g. 7. The Unna Titir from the south. The birch wood on the slope (the dark belt) is the veloped wood within the Virihaure area. Scattered birch groups are also visible in Ketjokk valley in the foreground. August 3rd.

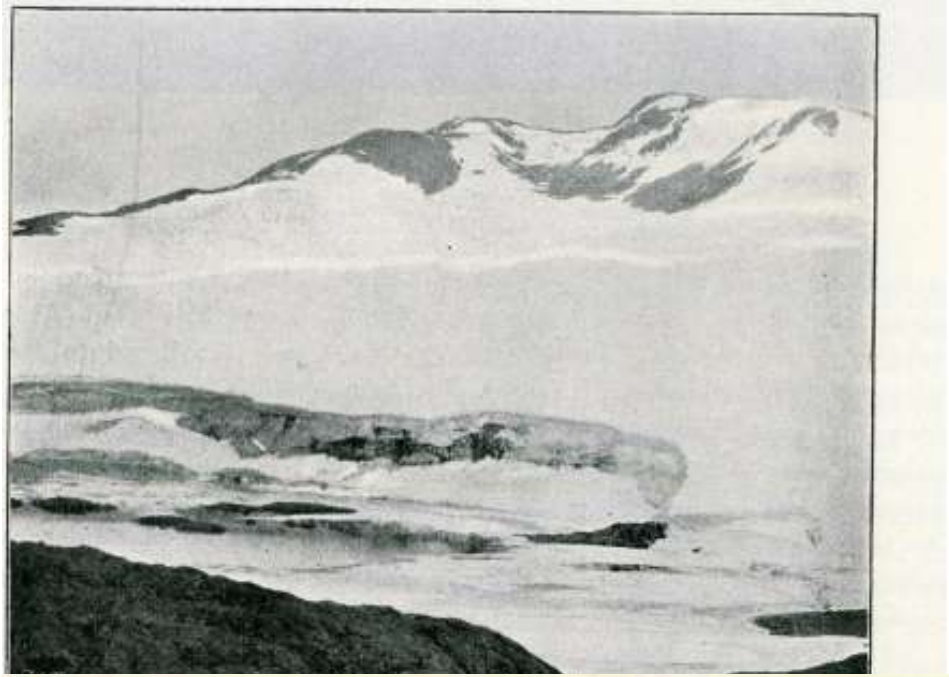
na Titer från S Brinck, Wingstrand, fig 7, s. 16 67183578 1642549



Higher altitudes (> 1000 masl)

- Species are colonising
  - *Clossiana chariclea*
  - *Psychophora sabini*
  - *Polia richardsoni*
  - *Euphydryas iduna*
  - *Colias hecla*
  - *Agriades aquilo*



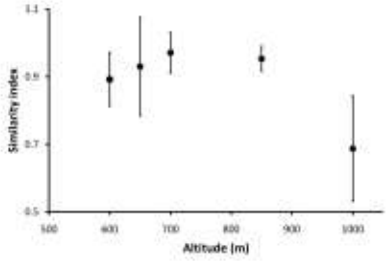


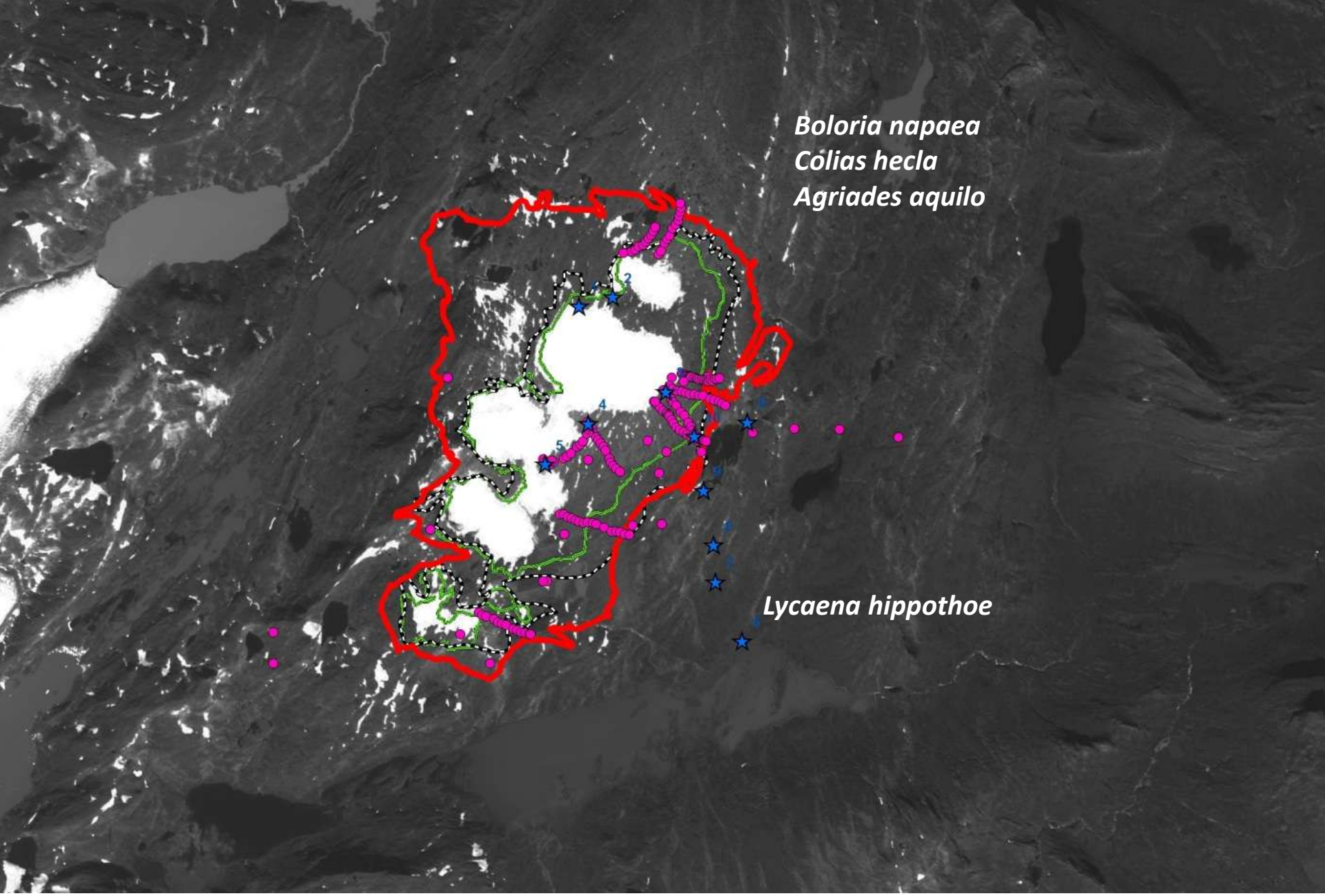
22 km^2

(1898)

4 km^2

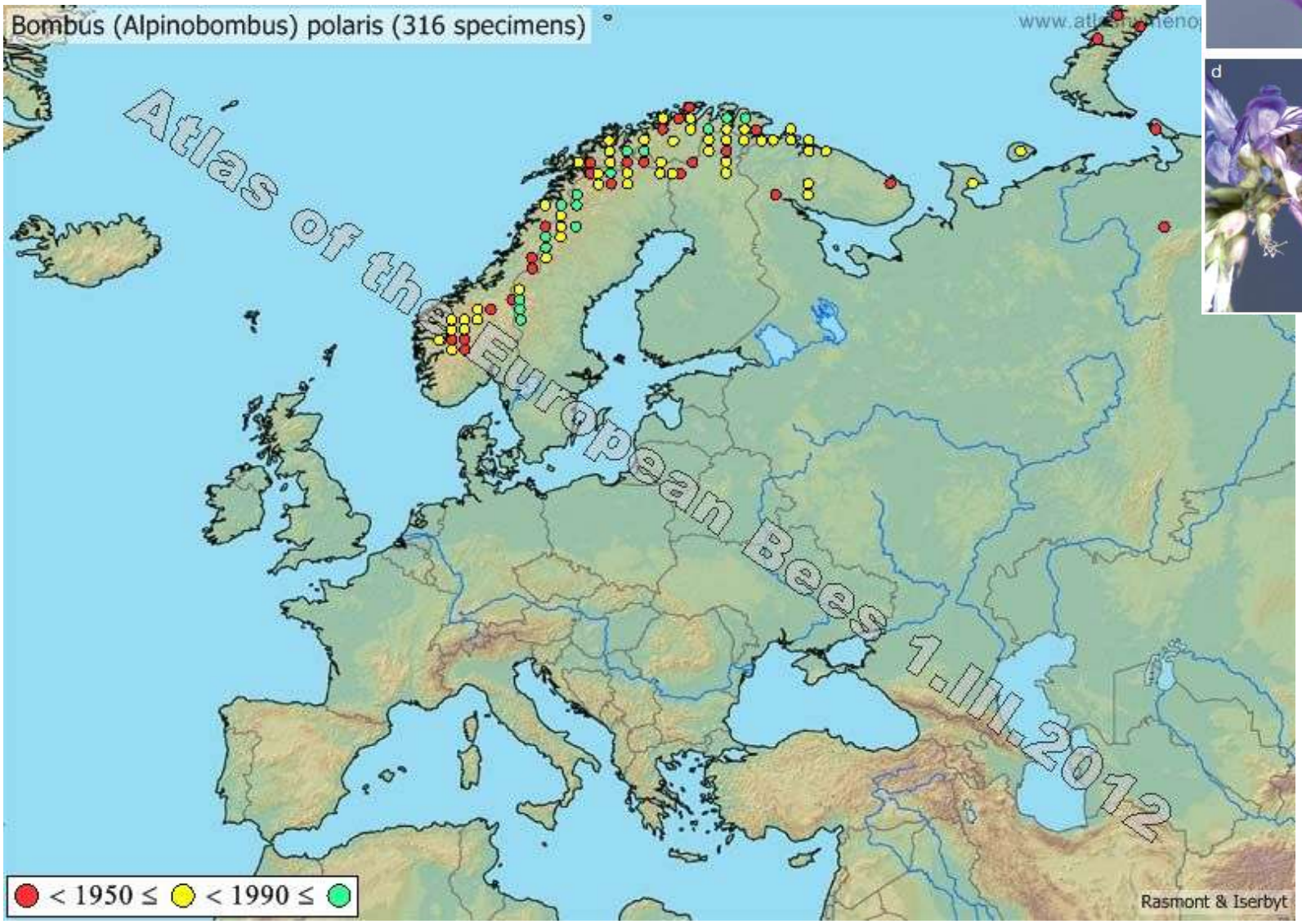
(2010)



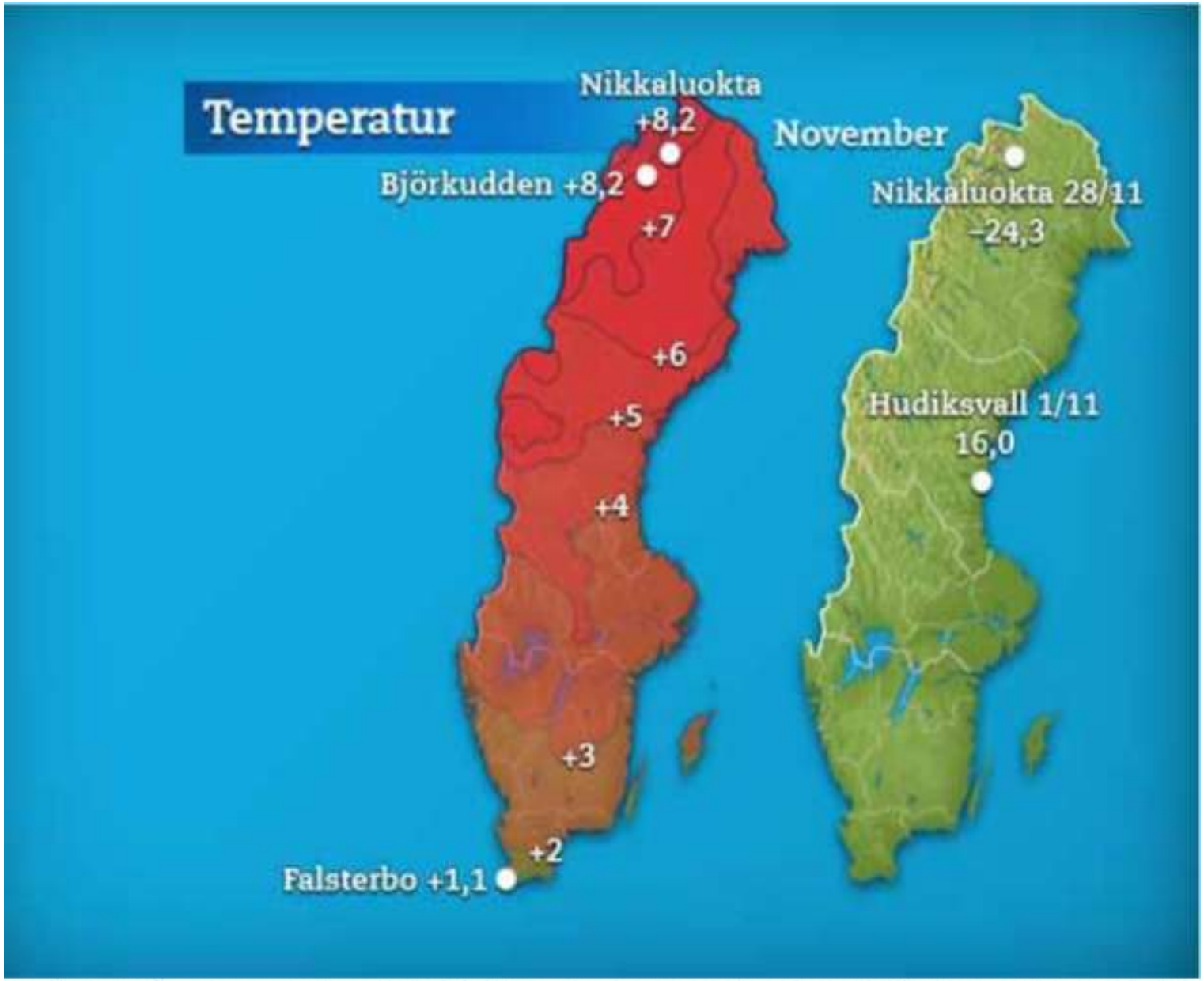

Boloria napaea
Colias hecla
Agriades aquilo
Lycaena hippothoe
1 km

Altitudes in between (800 masl)

Bombus flavidus, B. polaris
Decreasing?



atlas hymenoptera *http://zoologie.umh.ac.be/hymenoptera/*



Till vänster månadens medeltemperatur jämfört med referensperioden 1961-1990 (och de stationer som fick störst/minst över/underskott). Till höger månadens högsta och lägsta temperatur. Källa: SMHI. Bild: SVT.

- Lower altitutes - vegetation is closing - birch forest
- Moderate altitudes are rather stable
- Higher altitudes becomes climatically suitable and colonised
- Species composition and habitats are changing also in remote and protected ares
- Bumblebees might respond early to warming (more sensitive compared with butterflies?)

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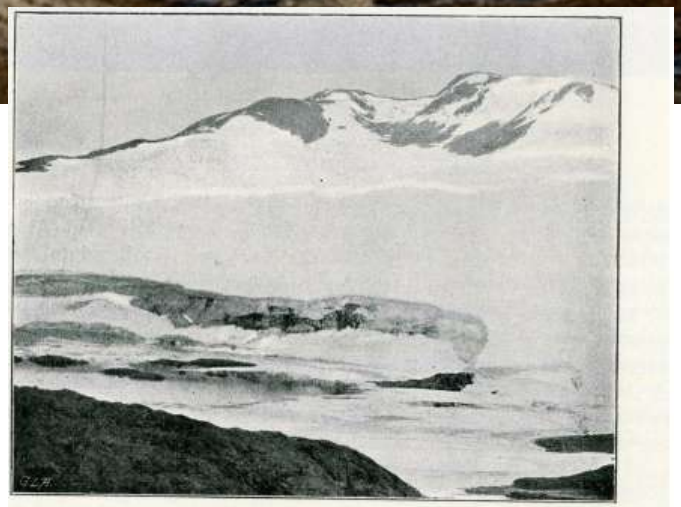
Thank you

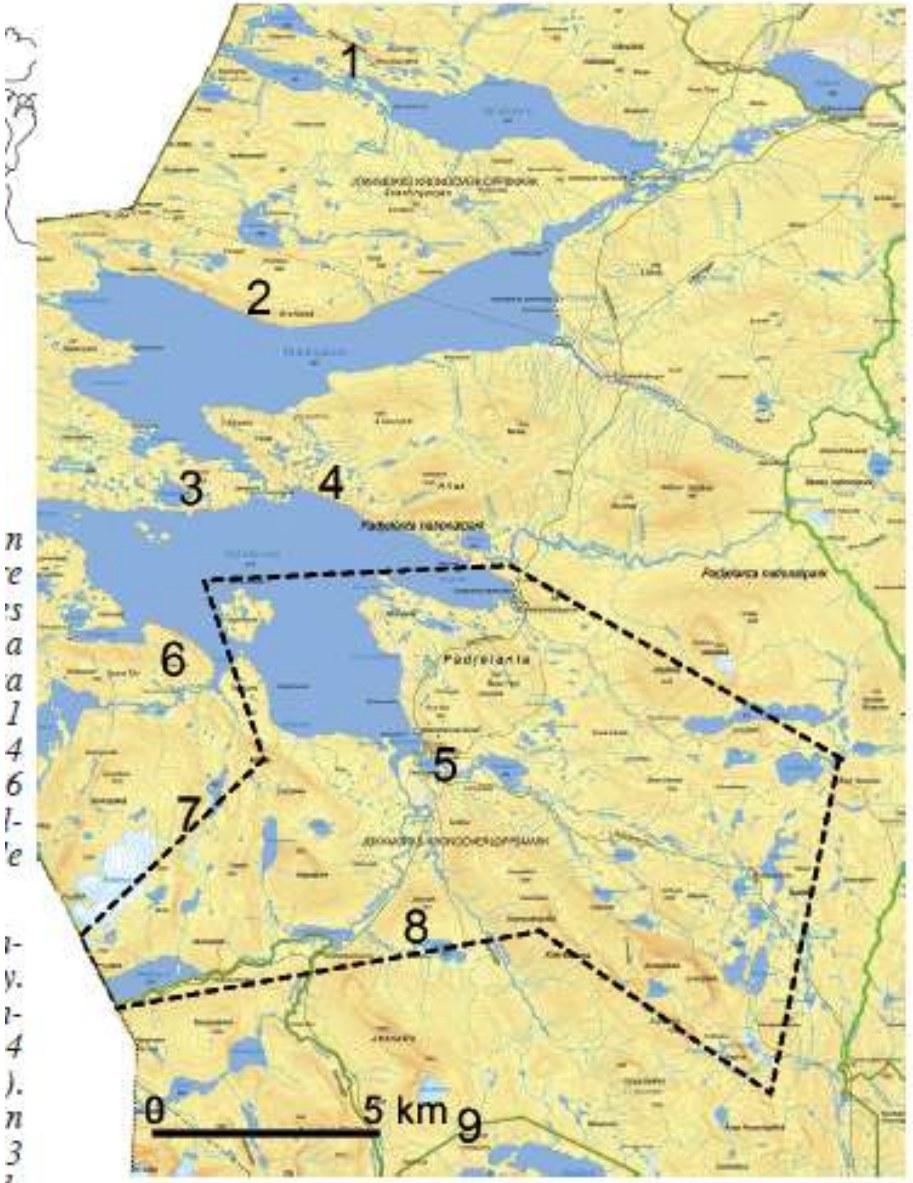
Formas
Stiftelsen Olle Engkvist byggmästare


Marmo
Abode



5. Das östliche Ende der einzigen Eiswand des Ålmajalosjekna vom Aufnahmepunkt XII gesehen (30 Juli 1898).


Norway
Finland
Sweden


1
2
3
4
5
6
7
8
9
0
5 km