

Irena Hubálková

# Výzkumné aktivity v KRNAP

Richtrovy boudy, 24. - 25. října 2015



# KRKONOŠSKÁ TUNDRA A ZMĚNY KLIMATU

INTERACT

ITEX

ILTER

GLORIA

EHP fondy



# INTERACT



- fondy EU → švédská Královská akademie věd
- síť pozemních terénních stanic v arktických a horských oblastech severní polokoule
- monitoring životního prostředí, vliv klimatických změn na arktickou oblast
- tisíce odborníků z celého světa



## ■ FIELD SITES

NORWAY (2)

SVALBARD (1)

SWEDEN (2)

FINLAND (4)

RUSSIA (6)

ALASKA (2)

CANADA (9)

GREENLAND (4)

ICELAND (1)

FAROE ISLANDS (1)

SCOTLAND (1)

OBSERVER STATIONS (37)



● Partner Stations  
● Observer Stations

The Field Sites of INTERACT

# INTERACT



## Aktivity:

1. Posílení mezinárodní výzkumné sítě
2. Výměna informací
3. Provázanost výzkumných aktivit
4. Nadnárodní spolupráce (výměnné pobyty)



# TARFALA



Tarfala research station, Sweden in the summer. Photo: Gunhild Rosqvist

Image 19 of 30



Taking GPS measurements on the highest peak in Sweden, Kebnekaise south peak, near Tarfala research station. Photo: Gunhild Rosqvist

Image 14 of 30



# ARCTIC STATION

Methane measurements conducted near Arctic Station, Greenland. Photo: Louise Berg

Image 27 of 30



Permafrost drilling near Arctic Station, Greenland. Photo: Louise Berg

Image 29 of 30



# KRKONOŠE/ KARKONOSZE

## STATION NAME AND OWNER

Krkonoše (CZ)/Karkonosze (PL) Mountains National Parks are state properties of the Czech Republic and Poland. The parks are a trans-boundary UNESCO Man and Biosphere Reserve. Two Observer Stations, a Czech station called Krkonoše and a Polish station called Karkonosze, are situated in the park. Because of their location within the same mountains, this catalogue gives a combined description of the two stations.

## LOCATION

The area is known for its high biodiversity in four altitudinal vegetation belts, from sub-montane to alpine. The Krkonoše/Karkonosze Mountains National Parks (NPs) are situated on both sides of the Czech/Poland state border and form the highest part of the Hercynian mountain system in Central Europe. The stations are situated in the tundra which covers the subalpine/alpine belt of both NPs. The mountain belt is densely occupied by mountain chalets. Nearest towns are Karpacz (PL, 8 km to the north) and Vrchlabí (CZ, 10 km to the south).

## BIODIVERSITY AND NATURAL ENVIRONMENT

The tundra – above the *Picea abies* tree line – has the unique character of a relic island of the sub-arctic-alpine tundra (thanks to its isolation from Scandinavia, the Alps and the Carpathians since the end of Pleistocene). Three zones are distinguishable within it: 1. "stony-lichen tundra" with a mosaic of lichens, bryophytes, low grasses, and bushes on alpine peaks, 2. "grassy tundra" with grasses, subarctic mires, and shrubs of *Pinus mugo* (vicariance of *Betula nana* and *B. czerepanovii*) in the lower plateaus, and 3. "flower rich tundra" with tall herbs and grasses in the lee of the glacial corries. The area exhibits many plants and animal species with arctic-alpine distribution.

## HISTORY AND FACILITIES

The Polish Karkonosze Park Narodowy was established in January 1959 and the Czech Krkonoše National Park in 1963. However, scientific research in this area started already in 1786. At present, 400 different scientific projects are carried out each year on both sides of the border. We can offer local accommodation, high speed internet connection and several well equipped stores in the neighbourhood.

## GENERAL RESEARCH AND DATABASES

The research focuses on fauna, flora, lichens, bryophytes, algae, GIS, geology, geomorphology (waterfalls), environmental chemistry, climatology (avalanches), forest management, pedology, recreation, speleology, sociology (socioeconomic), former ore mining, agriculture, archaeology (history) etc. In addition, a lot of different databases containing data from animate (biotic) and inanimate (abiotic) nature are available.

## HUMAN DIMENSION

The Krkonoše/Karkonosze Mountains has been inhabited for a long time. Besides nature protection and research, the area is also used for forestry, agriculture, tourism, and sports. The Krkonoše/Karkonosze Mountains is a popular tourist destination for hikers and skiers with about 5-6 million visitors per year on the Czech and 2.5-3 million on the Polish side (2002).

## ACCESS

Krkonoše/Karkonosze Mountains can be reached by car, bus, and train. It will take around two hours by car from Prague airport to Vrchlabí and another 30 min from Vrchlabí to the tundra zone. Access from Poland is via Karpacz.



# ITEX

## International Tundra Experiment

- mezinárodní projekt zaměřený na dopady klimatických změn na rostlinná společenstva arktických ekosystémů
- KRNAP - oblast Labské louky / *Eriophorum vaginatum* L. / (od roku 2001 každoroční opakování)



**International Tundra Experiment**

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**Join ITEX**

It is easy to join ITEX, simply join the listserve and attend an ITEX meeting.

► **Attend the next ITEX Meeting**  
The next meeting will be:  
2015 September 16-18, Campus Uppsala, Swedish Agricultural University, Uppsala, Sweden.

► See **2015 ITEX Workshop** for more information

► **Join the ITEX listserve** send an email to: ITEX-LIST-REQUEST@LISTS.UBC.CA  
No subject line is necessary.

If you have changed your email address recently, please update the ITEX list.

**Welcome**

**ITEX Synthesis Papers**

Oberbauer et al. 2013. Phenological response of tundra plants to background climate variation tested using the International Tundra Experiment. *Phil. Trans. R. Soc. B*, 368, 20120481. DOI: 10.1098/rstb.2012.0481

Blumenturf et al. 2012. Global assessment of experimental climate warming on tundra vegetation: heterogeneity over space and time. *Ecology Letters*, 15:116-125.

Blumenturf et al. 2012. Plot-scale evidence of tundra vegetation change and links to recent summer warming. *Nature Climate Change* 2: 432-437. doi:10.1038/nclimate1244

The International Tundra Experiment is a network of researchers examining the impacts of warming on tundra ecosystems. Currently, research teams at more than two dozen sites throughout the world carry out similar, multi-year manipulation experiments that allow them to



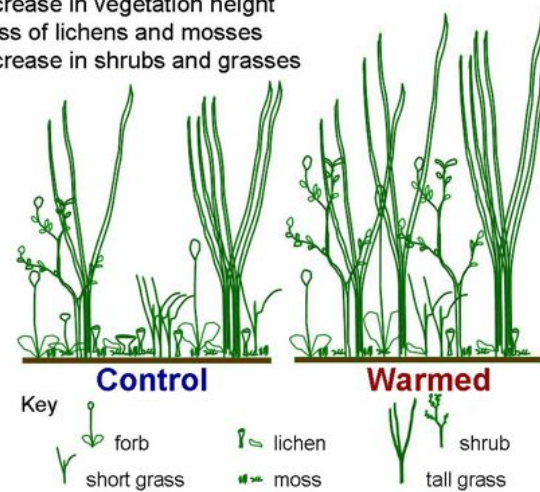




Foto: J. Štursa



- Increase in vegetation height
- Loss of lichens and mosses
- Increase in shrubs and grasses

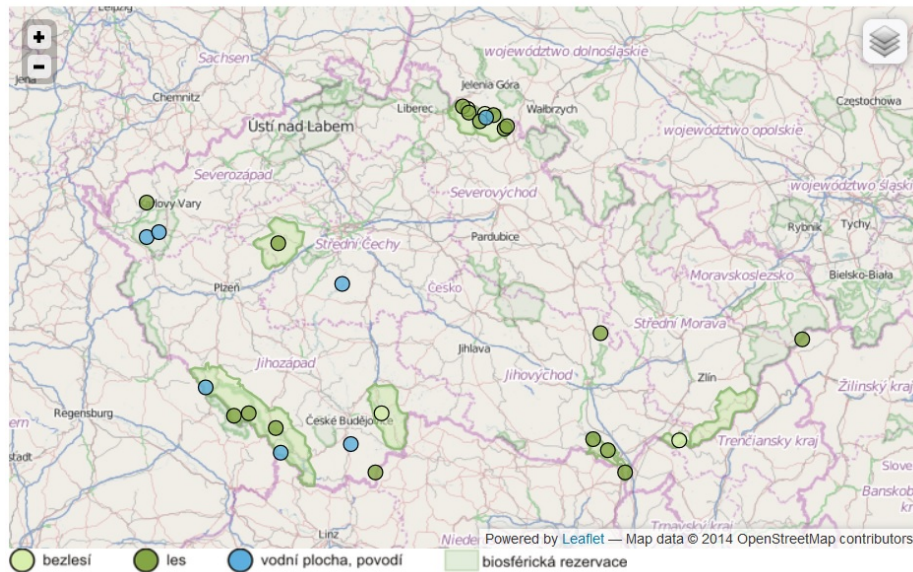


# ILTER programme

## International Long-Term Ecological Research Programme

- dlouhodobý výzkumný ekologický monitoring
- National Science Foundation USA, Environment Agency Austria
- koordinace aktivit: Akademie věd ČR
- KRNAP od roku 1995

ILTER plochy v ČR



ILTER



LTER Europe



DEIMS



MAB



# CZ LTER

plochy



# GLORIA

## Global Observation Research Initiative in Alpine Environments

- mezinárodní projekt a CZ-PL projekt v rámci Krkonoš
- KRNAP od roku 2008 – 5 alpských vrcholů Krkonoš
  - kontinuální měření teploty, mapování vegetace
- koordinace aktivit: University of Natural Resources and Life Sciences, Vienna





## GLOBAL OBSERVATION RESEARCH INITIATIVE IN ALPINE ENVIRONMENTS



Foto: K. Antošová (Ochrana přírody, Flousek 2011)



## BIOMONITORING / EHP fondy

Aktuální stav poškození lesních a vodních ekosystémů  
na území EVL Krkonoše



### 4 klíčové sub-projekty:

- I. Vývoj chemismu půd, atmosférické depozice, kritických zátěží síry a dusíku lesních ekosystémů v EVL Krkonoše
- II. Monitoring a vyhodnocení aktuálního zdravotního stavu lesních porostů na území EVL Krkonoše
- III. Monitoring epifytických lišejníků jako klíčové bioindikační skupiny pro zjištění aktuálního stavu a vývoje biodiverzity lesních ekosystémů na území EVL Krkonoše
- IV. Vyhodnocení acidifikace a aktuálního ekologického stavu vodních toků na území EVL Krkonoše



# Aktuální stav poškození lesních a vodních ekosystémů na území EVL Krkonoše



# SPOLUPRÁCE S UNIVERZITAMI

## věda a výzkum

- nabídka témat bakalářských a diplomových prací

- 3 okruhy témat:

**1. LESNÍ EKOSYSTÉMY** (přírozená obnova les. porostů, škody zvěří,...)

**2. OCHRANA PŘÍRODY** (botanika, dendrologie, zoologie, geomorfologie, ekonomika LH)

**3. SPOLEČENSKOVĚDNÍ OKRUHY** (dějiny, kultura, sociální a kulturní antropologie, etnologie, památky, výtvarné umění)





<http://www.lter.cz/index.php?lang=cs>  
<http://www.eu-interact.org/>  
<http://www.ipy.org/>  
<http://www.krnap.cz/>  
<http://ibis.geog.ubc.ca/itex/index.php>  
<http://www.navzduchu.cz>  
<http://www.tisicovsky.cz>



<http://www.krnap.cz/veda-a-vyzkum/>

[ihubalkova@krnap.cz](mailto:ihubalkova@krnap.cz)

tel. +420 499 456 215, mobil +420 733 677 401