MINUTES/FUNDARGERÐ

FORHOT – 2nd formal project meeting in Iceland

27. of March 2013

Attending:
ÁE = Ásrún Elmarsdóttir (Icel. Inst. Nat. Hist. / NÍ)
BDS = Bjarni Diðrik Sigurðsson (Agric. Univ. Icel. / LbhÍ),
ESO = Edda Sigurdís Oddsdóttir (Icel. For. Res. / Móg.)
EG = Elín Guðmundsdóttir (Agric. Univ. Icel. / LbhÍ)
ÚÓ = Úlfur Óskarsson (Agric. Univ. Icel. / LbhÍ)

Excused:
ÓA = Ólafur Arnalds (Agric. Univ. Icel. / LbhÍ)
BB = Brynhildur Bjarnadóttir (Univ. Akureyri / UAk)
KA-J = Kesara Anamthawat-Jónsson (Univ. Icel. / HÍ)

09:10 Opening, BDS and ESO were accepted as meeting moderator and secretary, respectively.

Agenda

1. The minutes from last project meeting revisited
2. The outcome of the 2012 application to the Icel. Res. Council – what to do?
3. Application sent to the Icelandic student fund
4. Status of different work-packages now.
5. Writing status from ForHot
6. What work will be done in 2013 (work plans)
7. Other issues

1. The minutes of the last meeting revisited

The only thing that has not taken place are the measurements of geothermal gases at the site (H2S, SO2, etc.). We don't think that this is a problem, but we should measure it none the less. BDS will try to borrow equipment from the Meteorological Institute in Iceland to do these measurements.

The participants also accepted a slight change in the official name of the project, adding "grasslands" into the name:
EN: ForHot - ***Natural soil warming in natural grasslands and a Sitka spruce forest in Iceland***
IS: ForHot - ***Áhrif náttúrulega hækkaðs jarðvegshita undir graslendi og sitkagreniskógi að Reykjum í Ölfusi***

We were successful in getting an infrastructure funding from the Icel. Res. Council in 2012, which enabled us to buy research equipment for 60.000 EUR for the ForHot project. The most expensive item was a minirhizotron-system for studying fine-root dynamics, but also dendromenters, soil temperature loggers, etc. etc.

2. **The outcome of the 2012 Icel. Res. Council (Rannis) application – and what to do…**
   We sent in the application on June 1st 2012. We did not get the answer from Rannis until late Feb. 2013 – but when it FINALLY came it was negative :o(. We, however, got a good evaluation; a) 22 and 23 points out of 25 in the formal scientific evaluation and b) the grade "*A.3 - Very strong with only some minor weaknesses*" from the "Expert panel". The "weaknesses" were basically that a) the "Expert panel" could not quite understand/believe how we could have done so much already without any local funding - and the scientific evaluation asked for a little more detailed information on the research questions asked by each of the PhD students and a plan about what to do if the geological warming would disappear. Since the Application form only allows very limited space for the general project description – we would need to add such fuller descriptions as (formally not allowed) Appendices.

   For our foreign partners it should also be stated that the Icel. Res. Council is really hurting now after the economic collapse of Iceland in 2008 – and they only funded 11 new projects in the whole field of Natural Sciences (ecology, meteorology, geology, glaciology, volcanology, physics, mathematics, etc.). Therefore they had to turn down many applications that got very good evaluation, including ForHot. The success rate for all research fields was ca. 25%, but it was much lower in Natural Science (ca. 12%).

   The decision of the Icelandic project meeting was that we should submit the application again before June 1st 2013 – with only some minor changes to meet the "weaknesses" stated in the former review. We would basically ask for the same things again and similar amounts. BDS will make a new draft-proposal and e-mail to other participants before May 15.

   BDS will also start to prepare for sending in a Marie-Curie application to EU in the late autumn (or when the next convenient deadline will be). What we would be most interested in is to apply for "Initial Training Network (ITN)" together with our foreign participants.

3. **Application to the Icelandic Student Fund (Nýsköpunarsjóður Námsmanna).**
   BDS will hire one Icelandic research assistant to be permanently placed at the ForHot research sites this summer (May 15 –Aug 15). This will be **Elín Guðmundsdóttir** (who did the fieldwork for her M.Sc. at the ForHot sites last autumn on vegetation changes in forest and grassland). BDS has just enough project money to hire her 60%, but they sent in an application for the remaining 40% to the Icelandic Student Fund, who funds research-related summer work (1-3 months) for Icelandic university students. Answer will come in April.

4. Status of different work packages now

First – the full formal participant list of the ForHot project is as follows for 2013:

Agric. Univ. of Iceland	***Basel University, Switzerland***
• Prof. Bjarni D. Sigurdsson (coord.)	• Prof. Kristian Körner
• Prof. Olafur Arnalds	• Armando Lenz (Ph.D. student)
• Dr. Úlfur Óskarsson	***Vrije Univerity, Amsterdam, Holland***
• M.Sc. Helena M. Stefansdottir	• Prof. Peter van Bodegom,
• Elín Guðmundsdóttir (M.Sc. student)	• James T. Weedon (Ph.D. student)
Icelandic Forest Research – Mogilsa	***NIIO-KNAW, Holland***
• Dr. Edda S. Oddsdóttir	• Anne Daebeler (Ph.D. student)
Univ. Akureyri	***Univ. Eastern Finaland***
• Dr. Brynhildur Bjarnadóttir	• Dr. Marja Maljanen
Univ.of Iceland / Univ. of Oslo	• Heli Yli-Moijala (M.Sc. student)
• Prof. Kesara Anamthawat-Jónsson.	***Lund University***
• Ella Thoen (M.Sc. student)	• Prof. Håkan Wallander
Icelandic Inst. Nat. Hist	• Prof. Erland Bååth
• M.Sc. Ásrún Elmarsdóttir	• Stephanie Reischke (PhD student)
	• Magnus Ellström (PhD student)
Univ. of Antwerp - Belgium	***METLA, Finland***
• Prof. Ivan Janssens	• Prof. Leena Finér
• Niki Leblans (Ph.D. student)	
• Katherine Vande Velde (M.Sc. student)	**In total:**
• Lieven Michielsen (M.Sc. student)	**16 researchers/postdocs**
• James T. Weedon (Post-doc)	**10 post graduate and PhD students**
• Dr. Freja Dreesen	

The practical work within the project that started in 2011/2012 and were planned to start in 2013 (with funding from Rannis) can be divided into 14 work packages.

Nr	NAMES		SUB-PROJECT
INFRASTRUCTURE AND ECOSYSTEM STRUCTURE			
	Basic infrastructure		
I	Bjarni D. Sigurðsson	LbhÍ	
	Edda S. Oddsdóttir	Móg.	Mapping and monitoring of soil temperatures, air temp., soil water
	Helena M. Stefánsdóttir	LbhÍ	content. Building of infrastructure as walking bridges, etc.
	Úlfur Óskarsson	LbhÍ	
	Niki Leblans		
	Tree growth		
II	Armando Lenz*	UB	Aboveground tree growth. AL is a PhD student and did his work on
	Christian Körner	UB	aboveground diameter and height tree growth and TNC status along
	Brynhildur Bjarnadóttir	UAk	the soil T transect in October 2011 (2005-2011 responses), (publ.
	Bjarni D. Sigurðsson	LbhÍ	expected in 2012/3). CK is his supervisor. BDS and BB are then planning to continue meas. of the forest growth.
	Vegetation composition		Changes in ground vegetation structure (community) as soil
III	Elín Guðmundsdóttir*	LbhÍ	becomes warmer + compare what happens in forest understory to
	Úlfur Óskarsson	LbhÍ	treeless heathlands outside as they become warmer. EG is a M.Sc.
	Ásrún Elmarsdóttir	NÍ	student at LbhÍ and ÚÓ and ÁE are her supervisors. Time: 2011-2013.

	Soil characteristics		
IV	Ólafur Arnalds	LbhÍ	Changes in soil morphology and composition as it becomes warmer.
	Helena M. Stefánsdóttir		
PLANT/SOIL INTERACTION			
V	*C-N-P cycle in plants and soil*		Changes in the ecosystem C, N and P cycle as soil temperature increases in the forest and in the heathlands outside. NL is a PhD student and IJ and BDS are her supervisors. Time: 2012-2015 (all fieldwork in Iceland). The final PhD project plan is still under construction.
	Niki Leblans*	UA	
	Ivan Janssens	UA	
	Bjarni D. Sigurðsson	LbhÍ	
	Litter decomposition		Litter-bag study measuring litter decomposition. A pilot project was started in October 2011 – plan to increase this in 2013.
VI	Edda S. Oddsdóttir	Móg	
	Helena M. Stefánsdóttir	LbhÍ	
	CO2 fluxes from soil		Continuous measurements of soil respiration and GPP/NEE of ground vegetation along the soil temperature gradient. 12 automated flux systems from ADC. Start in spring 2012.
VII	Bjarni D. Sigurðsson	LbhÍ	
	Helena M. Stefánsdóttir		
SOIL ECOLOGY			
	Microbial community structure		Measurements of soil microbial community structure along the soil temperature gradient using DNA/RNA extracts. JTW is a PhD student and PvB is his supervisor. This work will take place in April 2012 (publ. in 2012/2013).
VIII	James T. Weedon*	VU	
	Peter van Bodegom,	VU Móg	
	Edda S. Oddsdóttir	LbhÍ	
	Úlfur Óskarsson		
	Microbial and fungal production		Measurements of the growth of soil microbial and fungal decomposers and community shifts along the soil temperature gradient. Use of mesh bags, DNA/RNA analysis and PLFA patterns. Time: Spring to autumn 2012 (publ in 2013).
IX	Erland Bååth	Lund	
	Edda S. Oddsdóttir	Móg	
	Úlfur Óskarsson	LbhÍ	
	Håkan Wallander	Lund	
	Nitrification by NH4-ox archaea		AD is a PhD student who has been doing her studies the past 3 years in a nearby grassland/heathland area which has experienced a long-term soil heating (not just 3 years like ForHot). She will repeat her measurements of archae existence and NH4 oxidation (in lab).
X	Anne Daebeler	NIOO-KNAW	
	Ectomycorrhyzal community		Measurements of ectomycorrhyzal community and quantity on Sitka spruce along the temperature gradient. ET was a graduate student and ESO and KA-J her supervisors. She already did her thesis in autumn 2011, but ESO/UO plans to continue this work. Time: 2012.
XI	Ella Thoen*	UO	
	Edda S. Oddsdóttir	Móg	
	Úlfur Óskarsson	LbhÍ	
	Kesara Anamthawat-Jónsson	HÍ	

* These are graduate or post-graduate students. LbhÍ = Agric.Univ.Icel, Móg. = Icel.For.Res., UB = Univ. Basel, Switcher land, NÍ = Icel. Inst. Nat. Hist., UA = Univ. Antverp, Beglium, VU = Vrije Univ., Netherlands, UO = Univ Oslo, Norway, HÍ = Univ. Iceland. Lund = Lund Univ., Sweden, NIOO-KNAW = Netherlands Inst. Ecol.

Nr	NAMES		SUB-PROJECT
	Tree physiology and dendrometers		
XII	Brynhildur Bjarnadóttir	UA	Measurements diurnal/seasonal diameter growth and of photosynthesis, respiration and transpiration of trees along the Ts gradient. BDS and BB are planning to add these meas. We have already scaffolding waiting to be installed at the site to reach the canopy (ca. 10-15 m tall trees).
	Bjarni D. Sigurðsson	LbhÍ	
	Fine root turnover		
XIII	Edda S. Oddsdóttir	Móg	Measurements of fine root growth and turnover along the Ts gradient using ingrowth-bags. ESO is planning to add these meas. in 2012 or 2013 – LM is interested to assist and cooperate…
	Lena Finér	Metla	
	N2O and NH4 fluxes		
XIV	Marja Maljanen	UEF	Measurements of N2O and CH4 fluxes along the Ts gradient

Metla = The Finnish Forest Research Insitute, Joensuu, Finland; UEF = Uinv. E-Finland, Kuopio.

Before giving a quick overview on the status of different packages, then there are some good news from the ForHot project: Prof. Ivan Janssens got a 4-year full funding for the PhD student Niki Leblans from a national research fund in Belgium to do her doctoral research in Iceland (autumn 2012 – autumn 2016). Co-promoter was BDS and she is registered as joint PhD student between Univ. of Antwerp and Icel. Agric. Univ.

Niki Leblans started her work within ForHot on September 15th, 2012 – and in connection with her PhD project a third research site has been installed in the ForHot project. It is a warmed grassland site, which was already warm before the 2008 earthquake (ca. 3 km from the other ForHot sites) and also she has installed a 2nd grassland site which got warm in the 2008 earthquake. So with her additions to the ForHot study there are three ecosystem types that can be compared; 1) old grassland (warm during many decades, at least) 2) young grassland (warm since 2008); 3) young forest (warm only since 2008). All with 5 replicated transects.

So the status of different work packages:

I – Infrastructure. Niki has installed five transects in each of the three ecosystem types with five temperature levels in each (+0 °C, +1°C, +3 °C, +5 °C, 10 °C). Altogether this is 75 "stations" (3 eco x 5 trans x 5 Tlevels). At each station Niki has installed 2x2 m plots in the grasslands and 1x1 m plots in the forest (that should not be disturbed in any way – but destructive sampling can be done around these plots). Each plot (75) has continuous soil-T measurements at 10 cm depth since spring 2013. All data are 24 measurements per day. This is where we also encourage the ForHot participants to locate their future studies.
BDS read off his and Armand's soil-T loggers in Dec. 2012. There is data available from various points within the forest both about soilT changes at 10 cm depth for Nov 2011-Dec 2012. Also there are three profiles with soilT at 1cm, 10 cm and 30 cm depth.

II – Tree growth. Armando and BDS measured in October 2011 annual height increment 2006-2011 on 50 Sitka spruce trees at five different temperature levels. Armando also took samples of current shoots for N and TNC analysis from all trees and cored the trees to get the diameter increments before and after the start of the warming in 2008. All data has been measured but writing has not yet been done.

III – Vegetation composition. Elín did the fieldwork for her M.Sc. thesis in August/September 2012, where she measured both non-vascular and vascular plant cover and species composition on four transects with 11 temperature levels in both forest and young grassland as well as soil temperature, soil water content and "overstory shading". The data is being analyzed now and the thesis is expected within 2013.

IV – Soil characteristics. Nothing done because lack of local funding – but this activity will mostly be taken over by Niki's PhD project.

V – C-N-P cycle in plants and soil. This work was prepared in 2012 by installing 75 new research plots in three ecosystem types (see earlier) – the measurements start in April 2013 (see later).

VI – Litter decomposition. A 1 year pilot project with spruce needle litter in four temperature levels (+0, +2, +4 and +7 °C) in the forest, using both fine litter bags and litter bags where soil animals were allowed to access. The data looks really good (100% increase in decomp constant between 0 and +2 °C – and then gradual increase in decom at higher temperatures). Larger litter-bag study planned in 2013 (see later).
BDS also incubated "litter-tea bags" containing red and green tealeaves for 90 days in forest soil (for standardized TBI-values) at different soil temperature levels. The data has not been looked at yet.

VII – CO2 fluxes from soil. BDS ran the automated ADC-Ace systems (Soil repiration, Ts, PAR and Soil_water at 30-min intervals) at 5 soil temperature levels in the forest and three in the young grassland. There are some good data for some weeks during the summer (first in early June), but because of nobody being working permanently at the site last year, there are many periods with missing data when system ran out of electricity, etc. Data has not yet been fully analysed.

VIII – Microbial community structure. James Weedon came in May 2012 and sampled soil in four transects in the forest and in the young grassland with 10 temperature levels each. He then used this data for DNA extraction and Illumina paired-end sequencing of the V3 region of bacterial 16S rRNA. The data on the microbial community looks extremely interesting and explains very well his observed (lack of) responses in microbial community in "his" warming experiments in Abisco in N-Sweden.

IX – Fungal (or microbial) community and production. Håkan Wallander and his PhD student Magnus Ellström came in late May 2012 and inserted ingrowth bags in 4 transects in the forest, each with 10 soil temperature levels. Two types of ingrowth bags were used, with pure sand and with C4 litter (maize). ESO removed half of the bags in the autumn 2012 and went to Sweden and helped/got introduced to the lab-work at the Microbial. Ecol. Dept. at Lund Univ. At the same time in spring 2012 the second PhD student from Lund, Stephanie Reischke, took soil samples in the same transects and temperature levels as James Weedon in the forest and the young grassland. BDS has not got any report from Stephanie about the status of her analyses – but encourages her to take contact with him :o).

X – Nitrifing bacteria and archaea. James Weedon took an extra set of soil samples from the forest and young grassland for Anne Daebeler at NIOO-KNAW in Holland. Apart of incubating the soil cores for CH4 oxidation and doing DNA-analyses to quantitate the amount of CH4-oxidizing bacteria and archaea, AD made pH measurements and gravimetric water content measurements on all her soil cores (40 from forest and 40 from young grassland). This data is available for all to use with her permission. AD was during the past three years been working close to the new "old grassland" site and has just published her first article from there:

Daebeler, A., Abell, G. C., Bodelier, P. L., Bodrossy, L., Frampton, D. M., Hefting, M. M., & Laanbroek, H. J. (2012). Archaeal dominated ammonia-oxidizing communities in Icelandic grassland soils are moderately affected by long-term N fertilization and geothermal heating. *Frontiers in Microbiology*, *3*.

We gratulate Anne on this publication and we would welcome some news about if she is going to publish the data she got from the ForHot sites soon :o)

XI – Ectomycorrhizal community. Ella Thoen in cooperation with EOS and KA-J and ÚÓ did a pilot study on ectomycorrhizal fungi on Sitka spruce in autumn 2011. This data is now being written up for publication in the ISI-journal *Icelandic Agricultural Sciences*.

XII – Tree Physiology and dendrometers. The dedrometers have been bought and will be installed in spring 2013 (see later), but putting up the scaffolding towers and doing more work on tree physiology is pending more local funding.

XIII – Fine root turnover. The equipment has been bought and will be installed in spring 2013 (see later).

XIV – N2O, CH4 and CO2 fluxes. Marja Maljanen came in May 2012 and started these measurements in both forest and young heathland. BDS continued and made two measurement campaigns in summer and autumn 2012. The data is really nice! More work will be done in 2013 (see later).

5. Writing process within ForHot

The coordinator wants to encourage all participants to publish their results as soon as possible, since that will help the whole project most – but never forget to say that your studies are part of the ForHot project :o). Also he wants to encourage that people within ForHot to cooperate and share data to improve their publications and please remember the ground-rules about permissions to use data from other and the obligation to offer them co-authorships (and allow PhD/M.Sc. to use data in theses) as stated in the Memorandum of Understanding of the ForHot project.

Currently I am only aware of two manuscripts that are being written up right now:

1. Ella Thoen et al. (201X). The effects of increasing soil temperature on ectomycorrhizal fungi on Sitka spruce (*Picea sitchensis*) roots in Iceland. Icelandic Agricultural Sciences XX (in prep).
2. James Weedon et al. (2013). Microbial community… Journal ??

We kindly ask other participants to notify BDS about their plans to publish their ForHot data in 2013/2014.

6. **Work plans for 2013**
    a. **Niki Leblans** arrived to Iceland on April 1st and she will stay until November. 2/3 of her PhD work in 2012-2016 will focus on plant-soil interactions and C/N/P fluxes and stocks along the temperature gradients in the three ForHot research areas. During this year she will mostly focus on measuring C/N/P stocks and aboveground and belowground productivity, but she will also do some measurement on changes in plant traits along the T-gradients, etc. In connection with her project dr. **Freja Dreesen** will stay at the site for couple of weeks in April and July. She will also have two M.Sc. students (**Katherine Vande Velde** and **Lieven Michielsen**) to do some of the fieldwork in 2013 from early July to August. A lot of activities from the Belgians – which is great!
    b. **BDS** (and Elín) will install the dendrometers on 50 trees in the ForHot forest in April 2013 and measure the height increment in 2012 (following Armando's measurements in 2011).
    c. ClimMani has given ForHot one more travelling grant!! Now it was for the soil biologist **dr. Krassimira Ilieva-Makulec** from Centre for Ecological Research at the Polish Academy of Sciences to come to Iceland in ca. 13-18 May 2013 and sample soil animals (mainly nematodes) in all the ForHot study areas.
    d. **Håkan Wallander** and **Magnus Ellström** will come in late May 2013 and extract the latter half of the ingrowth bags they installed one year ago. They are going to install new ingrowth bags and this time both in forest and grassland(s). We want to encourage them to use Niki's setup with 25 permanent plots at 5 different temperature levels in each of the three ecosystems (forest + young grassl + old grassl).
    e. **ESO** and **Janina Schröder** (Internship student at Mogilsa) will install the tubes for the minirhizotrons in spring/early summer 2013. Janina can also possibly help with other practical work within ForHot in 2013. **Dr. Ivika Ostonen** will be in Iceland late May/June for discussions with ESO on further collaboration on this topic. **Dr. Leena Finér** will also come to Iceland in late May, and will also be consulted on this topic.
    f. **Elín Guðmundsdóttir** will formally start 15th of May and work until August 15. Her work during 2013. Her main responsibilities will be:
        I. Assist visiting researchers with fieldwork at the ForHot sites and co-operate in the work of those other researchers that are more permanently working at the ForHot study sites.
        II. Be a scientific secretary at the Nordic workshop/conference that takes place on May 22-25.
        III. Make regular measurements (1x week) related to tree phenology (dendrometers)
        IV. Take care of 12 automated NEE/Re systems (ADC-Ace systems).
        V. Make regular soil water, GPP, Re and NEE measurements in all research plots in ForHot (1x three weeks)
        VI. Harvest vegetation and roots in the ForHot forest in July to get seasonal maximum numbers (together with Niki and the M.Sc. students).
        VII. Install litter traps in the forest in August 2013
    g. **Dr. Marja Maljanen** and her student, **Heli Yli-Moijala**, are coming on May 20th to continue with the work of measuring GHG-fluxes at the ForHot sites. Marja will leave after one week, but Heli will stay until middle of July for the field measurements. They are also encouraged to include the "old grassland" in their measurement protocol.
    h. BDS/BB will make tree growth measurements in autumn 2013.
    i. It would be appreciated if you could notify BDS if there are some measurements planned in 2013 that are not listed here.

7. **Other issues**

BDS/Elín/Niki should make a brochure about the ForHot areas, locations etc. – to be given to "visiting particpants".

Edda (ESO) and Úlfur (ÚÓ) want to discuss with KA-J about using the SEM microscope in their ectomychorrizal studies.

Úlfur (ÚÓ) has some very nice photographs of the ForHot sites since before the earthquake in 2008 taken from above (from the mountain). He will take a hike to up to the mountain and take new photos of the Forhot sites for comparison.

Dr. Jón S. Ólafsson, who is coordinating the aquatic biology project in cold and warm springs in the nearby Hengladalir (ca. 8 km) is interested to visit ForHot and look at the clear warm spring that used to be the cold-water intake for the greenhouses at Reykir but is now ca. 30 °C warm. It starts just at the side of the ForHot forest site.

Elín was encouraged to produce some tables or graphs with the basic plant data from the ForHot forest and young grassland (number of spp, mean cover, etc.) – especially from the "cold" areas, since this is basic data that would be used by all ForHot participants. She was also invited to become a co-author on the Icel. Agric. Sci. manuscript of Thoen et al., so this basic data could be published a.s.a.p.

Ásrún (ÁE) is interested to repeat the vegetation survey, but using Niki's permanent plots in the three ecosystems. This will be further discussed with Niki and Elín.

Bjarni (BDS) encourages all participants to send him notifications about all presentations (talks or posters) and their other products from the ForHot project to be installed in the project's database.

Bjarni (BDS) also encourages all ForHot participants to tell him about all primary and auxillary data that could be used by other participants, and preferably to send it to him. No data will be used for any publication without first notifying the data owner! (see Memorandum of Understanding)!

Meeting ended 11:40