



Volcanology in Iceland

2012 FIELD REPORT

Background Information

Lead PI: Professor Hazel Rymer

Project scientists: Iceland: Dave McGarvie (OU)

Report completed by: Rymer/Gillman/Erenler/Hughes

Period Covered by this report: February 2012: July & August 2012

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Research site: Iceland: The study area has expanded significantly from 2011 to 2012 to take in areas to the north, east and west, based on 2011 results

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The Open University

Faculty of Science

Department of Environmental,
Earth and Ecosystems Science,

The Open University
Walton Hall
Milton Keynes
MK7 6AA
United Kingdom

Tel +44 (0) 1908 653 012
Fax +44 (0) 1908 655 151
www.open.ac.uk

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Dear Volunteers,

Thank you for your contribution to the project this year. I can honestly say that we could not have achieved anything like as much as we did without you. I am always amazed at how much Earthwatch volunteers get done in the field and this year was no exception. You worked incredibly hard and I am very grateful for all your efforts.

At Masaya this year we deployed sulphation plates, measured microgravity and Bouguer gravity, established VLF and magnetic surveys and ran FLYSPEC profiles. We identified butterflies and surveyed plants within the park.

In Iceland we collected gravity and GPS data all over the active rift zone from south of Askja volcano right up to the northern coast around Husavik.

We are still hard at work crunching the data, but already we can see some important trends. In Nicaragua, the microgravity data suggest a shift in the sub-crater magma level since 2011, a surprising pattern in the colonisation of some species of 'air plants', and some previously unrecognised fractures which may indicate the build up of stress within the volcanic edifice. In Iceland, the gravity data will help us to identify the magmatic feeder system below the rift and the microgravity are already suggesting that the magma level at Askja is no longer rising.

As more results start coming through, we will keep you informed of progress, but do feel free to get in touch at any time to find out the latest - and if you are passing Milton Keynes in your travels, do please pop in and say hello.

Thank you once again for your hard work. It was a pleasure to work with you and I hope that we meet again on a volcano somewhere in the world.

Very best wishes,

Hazel

A handwritten signature in blue ink that reads "Hazel Rymer". The signature is written in a cursive style with a large, looping initial 'H' and a stylized 'R'.

Prof Hazel Rymer

SECTION ONE: Scientific research achievements

Top highlight from the past season

Nicaragua: We now have an inventory of the species in the Masaya volcano park and will now monitor them as the level of activity changes.

Iceland: The data is still being processed, so it is too early to provide any results from the research.

Reporting against research objectives

Nicaragua: The recording and sampling of bio-indicators of gas emissions continued and was expanded to include insect species as well as epiphytic plants.

Iceland: The data is still being processed, so it is too early to provide any results from the research, however the results of the volunteers efforts are an estimated 750 data points, about 2.5x the number collected in 2011. The plan is to produce a Bouguer gravity map of the Northern Volcanic Zone, which will enable me to produce a detailed structural model of the shallow crust to complement deeper structural models from GPS, INSAR & seismic studies. The high number of data points collected is way more than we could have hoped for and should allow a much more detailed analysis to be carried out.

SECTION TWO: Impacts

Partnerships

ECOLOGY - Ongoing work with Erico Tellez Jimenez (Park ranger, Masaya National Park). Mapping of butterfly species in the Park during the months when Earthwatch teams are not present.

- New collaboration with Dr Jean Michel Maes (Museo Entomológico de León, Nicaragua). Publication (online) of butterfly data recorded at Masaya National Park.

Contributions to conventions, agendas, policies, management plans

- **Local**

Gillman and Erenler produced a report in English and Spanish in January 2012 highlighting conservation priorities for Masaya National Park. This was an independently funded document but draws on observations made during the previous four years of work in the protected area. The report was presented to Liliana Diaz the current acting head of the Park.

Developing Environmental Leaders

Presentation given to Park Rangers and Park Management in February 2012 highlighting the environmental impacts of the observed increase in logging and illegal grazing within the Park. Rangers were encouraged to note suspicious activity, record dates and times and take images to enable the Park Management to enforce the statutory protection the Park enjoys.

Actions or activities that enhance natural and/or social capital

Conservation of Taxa

Our monitoring work of the insect fauna in Masaya National Park continues to highlight species that are of conservation interest and are nationally or globally important. For example, in late December 2011 during an independent visit to the Park, Gillman and Erenler recorded a single Godman's metalmark (*Behemothia godmanii*, Image 1). This butterfly is known from only a handful of individuals ever seen. Nothing is known about its larval food plant (the specific type of plant a female chooses to lay her eggs on) or its early stages of development. This is an important record for Nicaragua as well as for the Park



Image 1: *Behemothia godmanii*

In February 2012, Erenler noted the presence of a suite of Hymenoptera species that were nesting in the fine ash near Santiago crater at the centre of Masaya National Park. One of these, a velvet ant, which is a wasp (despite the name) from the family Mutillidae was later identified by a specialist as a male *Dasymutilla canina*. The species is described from female specimens only. This is the first male specimen that is known from anywhere in the world. The species is not rare, and has been recorded in the country previously (Maes, 1989), however a second species found at the crater edge (*Dasymutilla jalisco*) is a new country record. Further work to establish the community structure of these insects and their interactions with native flora is planned for 2013.

Ecosystem Services

The ecology part of the Nicaragua project has the ecosystem service of pollination at its core. The pollinating services of butterflies, bees and wasps are recognised as vital to ensure the continuation of native flora. Without pollination events, seeds are not set and wild plant populations may become threatened. Many of the butterfly and bee species we record

are specialists on a limited number of plants. The insects benefit from the nectar, pollen and (for a limited number of species) resins that are available within flowers. In collecting these resources, butterflies and bees transfer pollen from flower to flower thus facilitating pollination. We are currently at the stage of mapping species of butterfly that are seen only sporadically and are attempting to establish whether their food or larval plant resources are plentiful or scarce.

Local community activities

During 2012, a connection was made with the locally based members of the Leicester-Masaya Link Group.(<http://leicestermasayalink.org.uk/index.php/projects-in-nicaragua/>) Our continuing contact with these representatives provides a conduit for us to share our findings and get feedback on ideas about how the environmental aspects of the project may be extended in the future.

Dissemination of research results

Scientific peer-reviewed publications

Gillman, M., Erenler, H. and Tellez Jimenez, E. (2012) Butterfly diversity and distribution in Masaya Volcano National Park, Nicaragua. *Revista Nicaraguense de Entomologia* , **72**(1):. 1 - 28 (Earthwatch acknowledged)

Gillman, M., Erenler, H. and Tellez Jimenez, E. (2012) Sampling efficiency of butterfly families in a tropical dry forest and estimation of Neotropical species richness (under review - Earthwatch acknowledged)

Grey literature and other dissemination

Leicester-Masaya Link Group - Lecture to be given in Leicester (in November 2012) by Gillman/Erenler (Earthwatch to be acknowledged)

Erenler , H. (Jan. 2012)*Low technology nets exciting discoveries in Nicaragua*. :Ecology Blog, University of Northampton, Available at:

<<http://blogs.northampton.ac.uk/expertsatnorthampton/category/volcanoes/>> (Earthwatch link/tag provided)

Gillman, M., Erenler, H. and Tellez Jimenez, E. (2012) *Conservation priorities for Masaya National Park, Nicaragua, based on butterfly diversity and distribution / Prioridades para la conservación del Parque Nacional Volcán Masaya, Nicaragua, en base a la diversidad y distribución de mariposas* (Report in English and Spanish for Masaya National Park, Nicaragua)

Iceland: Poster presentations, VMSG conferences (2011 and 2012). Hughes, S & Rymer, H. *Structures of the rift zone in northern Iceland*. Rymer, H & de Zeeuw-van dalssen, E. *Geodetic data shed light on ongoing caldera subsidence at Askja, Iceland*