



## European volcanological supersite in Iceland: a monitoring system and network for the future

### Report

#### D4.2 – First publication of the “Icelandic volcano catalogue” as an open-access website

Work Package:	<i>Evaluation of known Eruption Source Parameters</i>	
Work Package number:	4	
Deliverable:	<i>First publication of the “Icelandic volcano catalogue” as an open-access website</i>	
Deliverable number:	4.2	
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Responsible activity leader:	<i>Evgenia Ilyinskaya</i>	
Responsible participant:	NERC	
Authors:	<i>Evgenia Ilyinskaya (NERC)</i>	

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	<i>Prototype</i>	<input type="checkbox"/>	<i>Other</i>	<input checked="" type="checkbox"/>
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	<i>Prog. Participants (FP7)</i>	<input type="checkbox"/>	<i>Confidential (consortium)</i>	<input type="checkbox"/>

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## 1. Introduction

The Catalogue of Icelandic Volcanoes (CIV) is an open web resource in English and is composed of individual chapters on each of the 32 Icelandic volcanic systems (active during the Holocene). It is an official publication intended to serve as an accurate and up to date source of information about active volcanoes in Iceland and their characteristics. The focus of the work over the last 12 months has therefore been two-fold: firstly, to collate and review the material about the Icelandic volcanic systems; and secondly to design and develop the web interface so that the material will be accessible and well-presented to the end-users. The web interface is shared with the Futurevolc database developed within WP2.

The CIV web resource was showcased at EGU in April 2015 where it received very high praise from the audience. It has subsequently been opened online at [futurevolc-www1.vedur.is](http://futurevolc-www1.vedur.is). This is a beta version of the web resource, which includes information on the most active volcanic systems – Katla, Hekla, Bárðarbunga and Grímsvötn. Information on the less active volcanic systems will be added in the next few months. The full version of the Catalogue and Futurevolc datahub (datahub developed within WP2) will be accessible on web address [icelandicvolcanoes.is](http://icelandicvolcanoes.is) from September 2015.

The objectives covered by Deliverable 4.2 are:

- O4.1: Compile a catalogue of volcanoes in Iceland, outlining known history of activity, eruption frequency, magnitude and the characteristics of the volcanic products. See in more detail in section 2.
- O4.2: Analyse variations in grain size distribution and geochemical properties for selected eruptions. The explosive eruptions were selected to represent a) the most frequent type of event in a given volcanic system, and b) the largest known events in Iceland. While grain size analysis was done for eruptions from a number of volcanic systems, the geochemical analysis of eruptive products focused on Grímsvötn, by far the most frequent producer of explosive eruptions in Iceland.
- O4.4: Define ‘eruption scenarios’ for key Icelandic volcanoes. Four scenarios describing events of escalating magnitude will be made for each of the volcanoes. The eruption scenarios are defined as Small, Moderate and Large based on the the volume of erupted material. The Largest known eruption for each volcanic system is also described in as much detail as the current state of knowledge allows.
- Note that O4.3 is covered by a separate deliverable (D4.1), completed in May 2014.

## 2. Description of the material in the Catalogue of Icelandic Volcanoes

The Catalogue is an open web resource in English. Each of the volcanic system is described in its own chapter. Each chapter includes detailed information on:

- The geology and structure of the volcanic system
- The eruption history, pattern and products. New tephra grain size data have been analysed and included in the Erupted products section, in order to cover a range of eruption types.
- The known precursory signals and current monitoring level
- Associated hazards
- Detailed descriptions of possible eruption scenarios based on eruption history of the last 1100 years (post-settlement, good eruption record). The eruption scenarios for each volcanic system are defined as Small, Moderate and Large according to the volume of erupted material. The Largest known eruption for each volcanic system is also described in as much detail as the current state of knowledge permits.

Eruption source parameters for individual eruptions can be accessed and downloaded via a database search (see more in section 3).

The chapters are illustrated with

- Interactive maps of tephra dispersion. These include the maximum range of tephra dispersal for the volcanic system, and isopach maps for individual eruptions. Eruption isopach maps are accompanied by grain size distribution where such information exists.
- Maps of lava flows with detailed information
- Number of photographs

We have also developed a new online tool to help end-users assess the activity level of each volcanic system. The tool accesses the seismicity database of the Icelandic Meteorological Office (IMO) and compares the 'current' level of seismic activity in a given volcanic system with historical levels since year 1991. For example, the number of earthquakes occurring today in Katla can be compared with an average daily value since 1991 (see demonstration in section 3).

The aviation colour code for each volcanic system (as set by the IMO) is also displayed live on the Catalogue web interface and will be automatically updated when it is changed by the IMO.

## 3. Using the Catalogue web resource

The Catalogue of Icelandic Volcanoes is accessible on [futurevolc-www1.vedur.is](http://futurevolc-www1.vedur.is) (beta version). The full version of the Catalogue and Futurevolc datahub (datahub developed within WP2) will be accessible on web address [icelandicvolcanoes.is](http://icelandicvolcanoes.is) from September 2015.

The 32 volcanic systems can be searched and sorted according to their activity level, aviation colour code, most recent eruption year, or simply alphabetically (Figure 1). Note that beta version of the web resource includes information on the most active volcanic systems – Katla, Hekla, Bárðarbunga and Grímsvötn. Information on the less active volcanic systems will be added by September 2015.

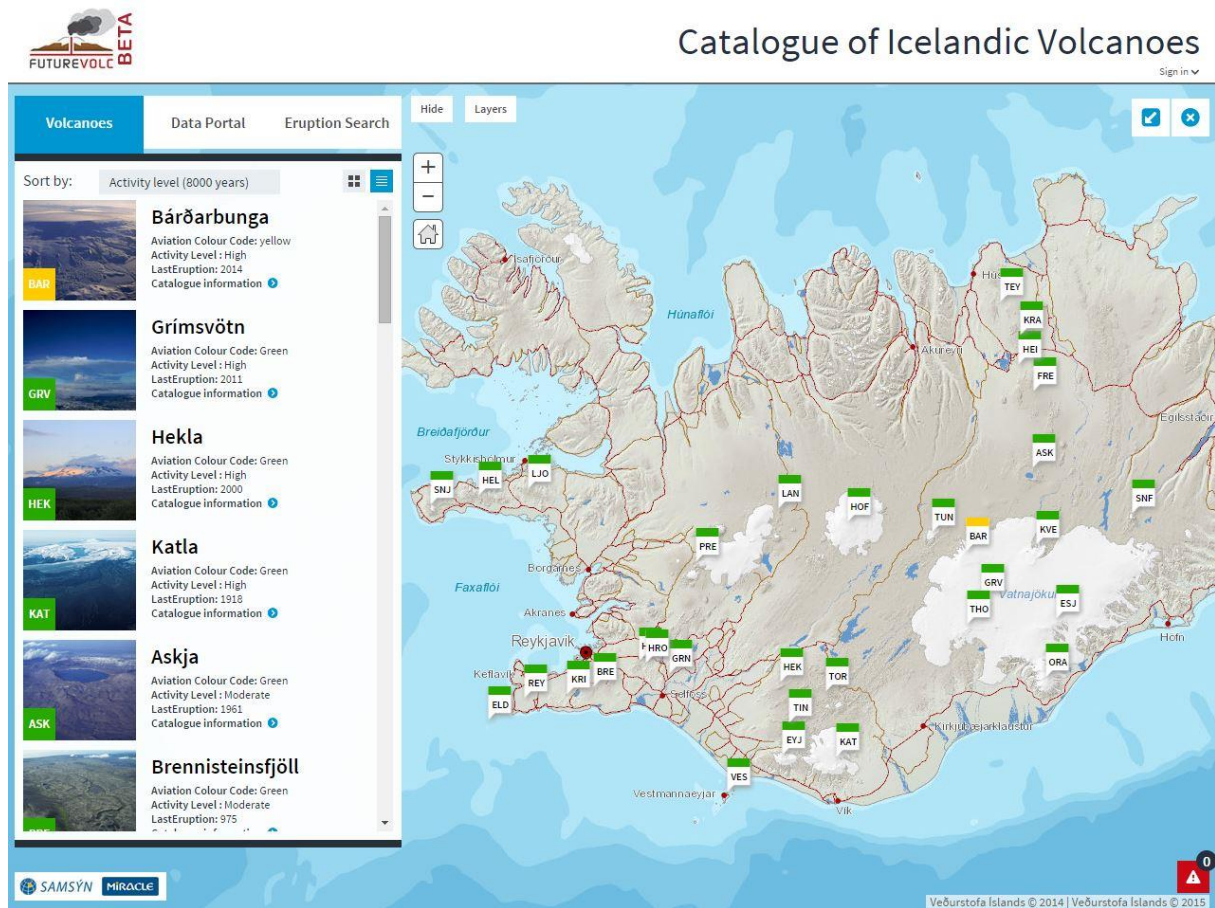


Figure 1.

A volcanic system can be selected either from the list on the left hand side, or by being clicked on the map. More detailed information appears on the right hand side. An overview of each volcanic system is given in a summary chapter (“Short Description”), followed by summary tables under “Central Volcano” and “Fissure Swarm”. Much more comprehensive information follows in detailed subchapters (Figure 2).

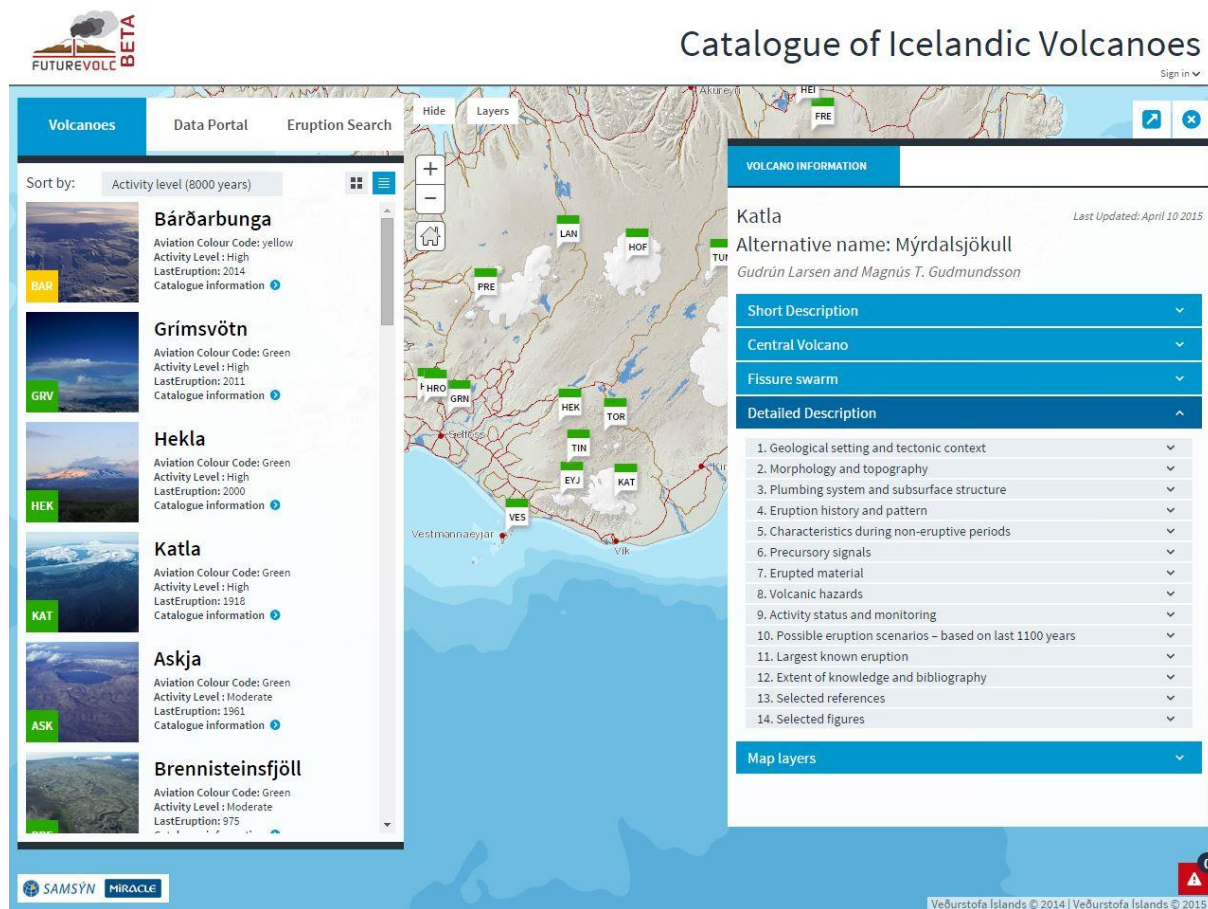


Figure 2.



Eruption types and erupted volumes have been statistically analysed for volcanic systems where data are of sufficient quality. The statistical analysis is visually displayed by graphs under “Selected figures” (Figure 3).

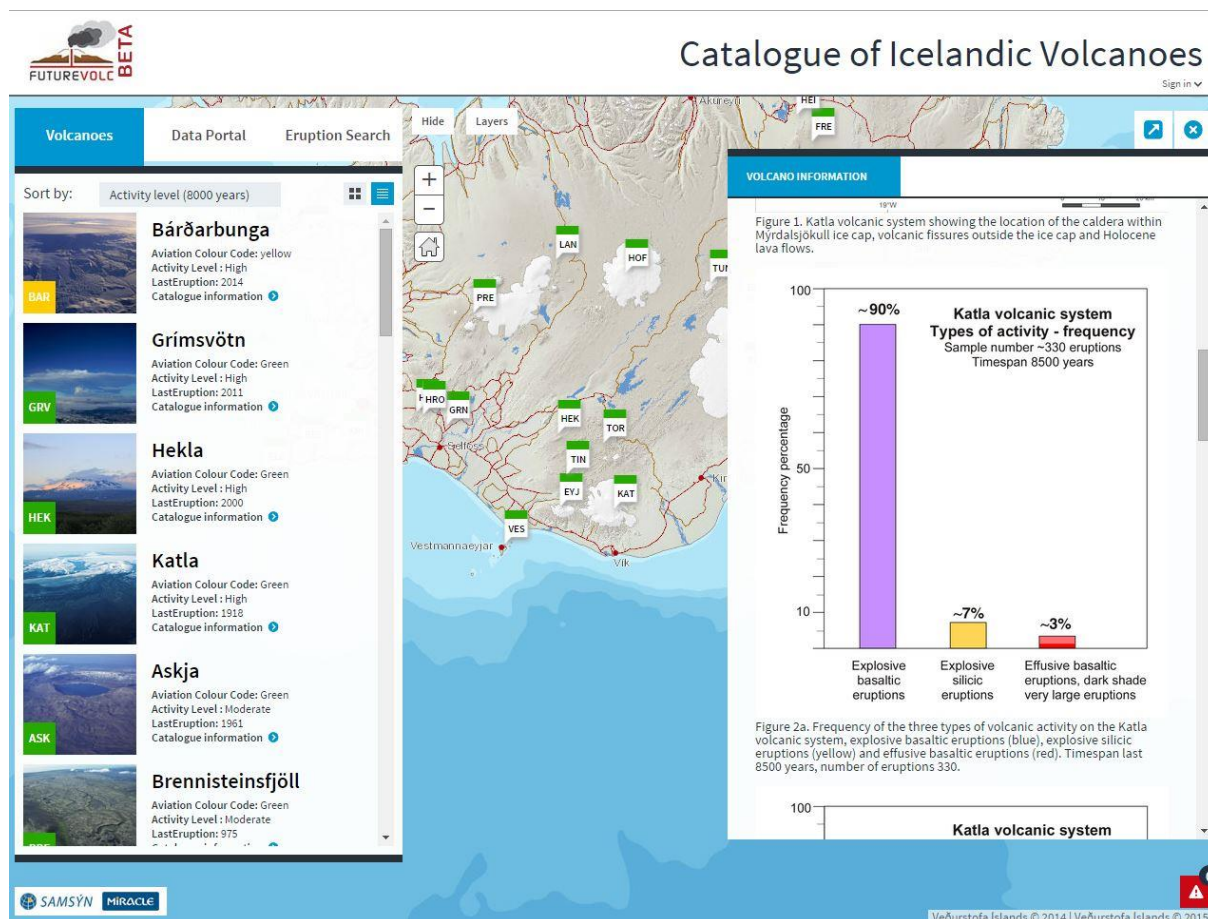


Figure 3.

Eruption source parameters for individual eruptions can be accessed using the database search (“Eruption Search”). Variety of search parameters can be selected, as shown on the left hand side on Figure 4. Summary results appear on the right hand side (Figure 4, top image), and more detailed info can be accessed by clicking on each eruption (Figure 4, bottom image). The search results are downloadable (“Export table into Excel” button).

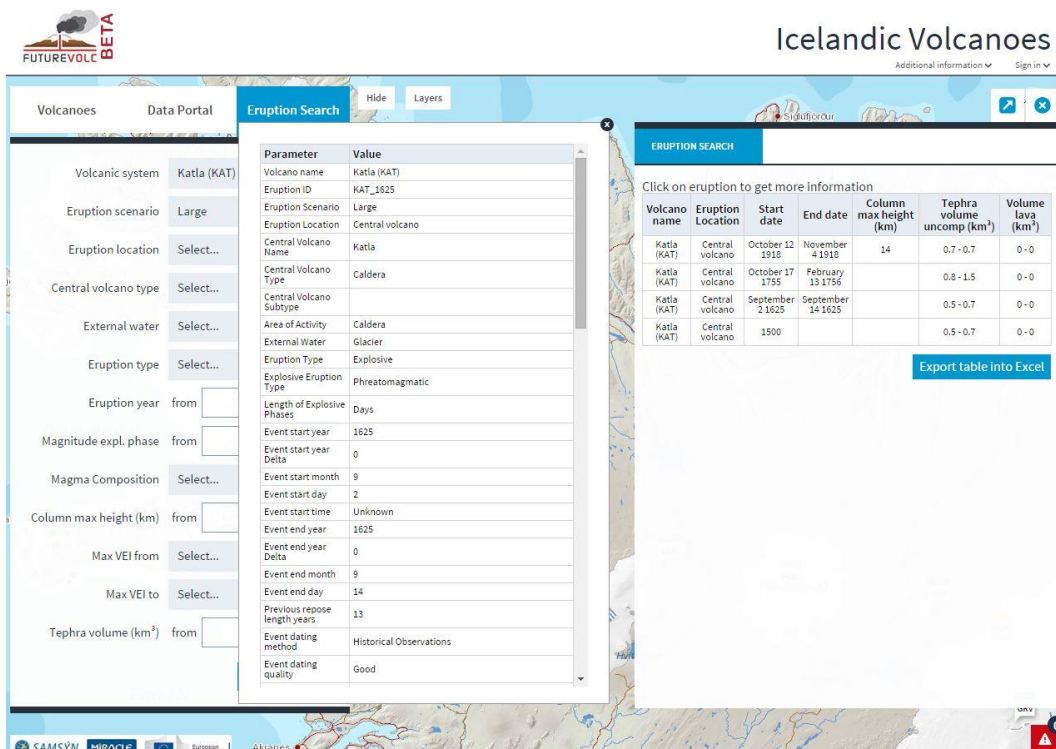
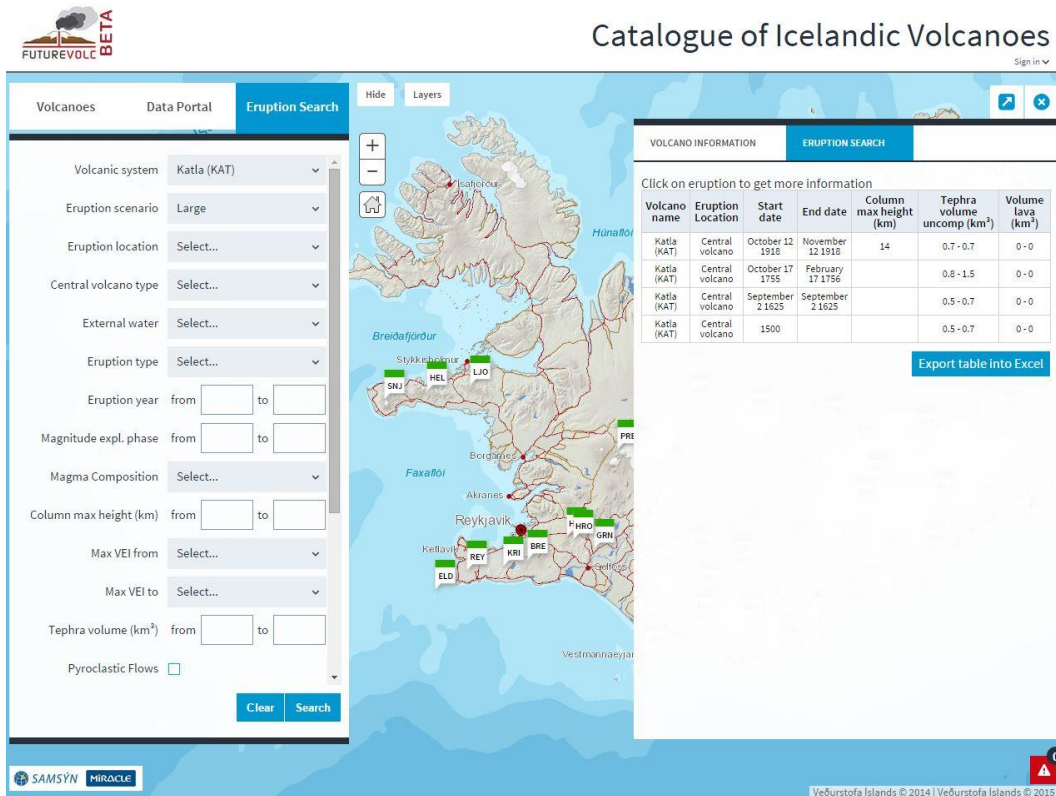


Figure 4.

Detailed and interactive maps of the volcanic systems, including Holocene lava flows (Figure 5, top image) and maps of tephra dispersal (Figure 5, bottom image). Note that Figure 5 shows only a snapshot of the available maps. In the current version of the web resource, maps can be displayed for only one volcanic system at a time, but this will be modified in the next version.

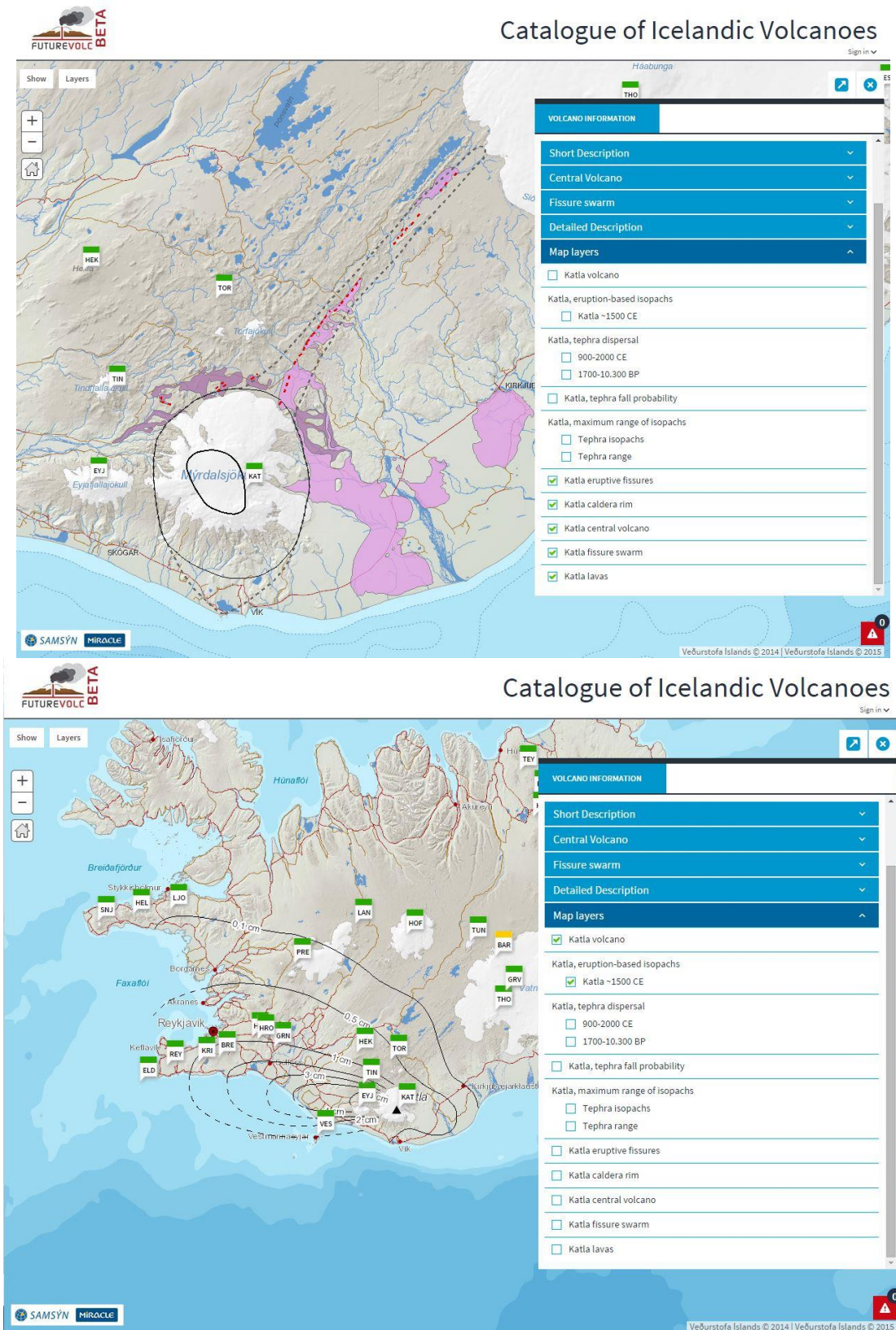


Figure 5.



New live webtool to help assess and understand the current level of activity. The recent number of seismic events ('recent' being one day, one week, one month or one year) compared with the 'background' (mean value 1991-2013). The seismic data used by this webtool is accessed from the IMO database.

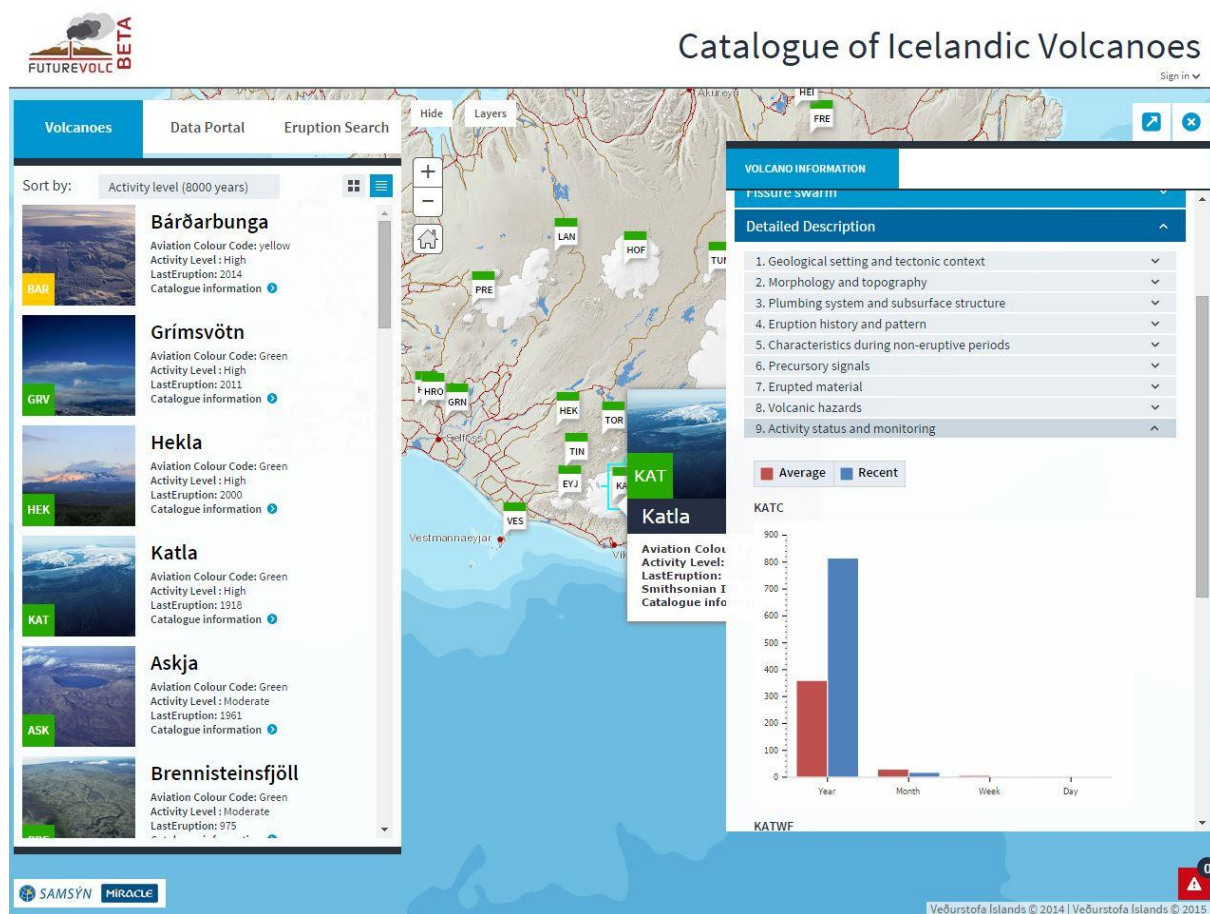


Figure 6.

#### 4. Referencing the Icelandic volcano Catalogue

When using material published in the Catalogue of Icelandic Volcanoes, the individual chapters should be referenced as follows.

The citation is based on an example from Katla volcanic system, but is transposable to all other volcanic systems defined in the Icelandic volcano Catalogue.

Larsen, Guðrún, Magnús T. Gudmundsson, Kristín Vogfjörð, Evgenia Ilyinskaya. 2015. The Katla volcanic system. In: Ilyinskaya, Larsen and Gudmundsson (eds.): Catalogue of Icelandic Volcanoes. IMO, UI, CPD-NCIP. Doi xxxxxxxx

An individual Doi number will be soon available for all chapters of the catalogue. It will be indicated at the header of each chapter

#### 5. List of contributors to the Icelandic volcano Catalogue

##### **Editors:**

Evgenia Ilyinskaya  
*British Geological Survey, formerly at Icelandic Meteorological Office*

Guðrún Larsen  
*Institute of Earth Sciences – Nordvulk, University of Iceland*

Magnús T. Gudmundsson  
*Institute of Earth Sciences – Nordvulk, University of Iceland*

##### **Project Steering Committee:**

Evgenia Ilyinskaya, Kristín Vogfjörð, Trausti Jónsson, Sara Barsotti, Sigrún Karlsdóttir  
*Icelandic Meteorological Office*

Guðrún Larsen, Magnús T. Gudmundsson  
*Institute of Earth Sciences – Nordvulk, University of Iceland*

Björn Oddsson, Víðir Reynisson  
*Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police*

**Author contributions:**

Kristín Vogfjörð:

Sub-chapters on current alert level and activity status for all volcanic systems

Evgenia Ilyinskaya and Björn Oddsson:

Sub-chapters on eruption scenarios for volcanic systems

**Graphics:**

Emmanuel Pagneux, *Icelandic Meteorological Office*

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**Authors (in alphabetical order by surname):** -

Páll Einarsson, *Institute of Earth Sciences – Nordvulk, University of Iceland*  
Tungnafellsjökull

Sigmundur Einarsson, *Icelandic Institute of Natural History*  
Brennisteinsfjöll, Krýsuvík-Trölladyngja, Reykjanes-Svartsengi

Karl Grönvold, *Institute of Earth Sciences – Nordvulk, University of Iceland*  
Hofsjökull-Kerlingarfjöll, Þeistareykir

Magnús T. Gudmundsson, *Institute of Earth Sciences – Nordvulk, University of Iceland*  
Bárðarbunga, Eyjafjallajökull, Esjufjöll, Grímsvötn, Katla, Tindfjallajökull, Þórðarhyrna

Margaret Hartley, *University of Cambridge*  
Askja

Ármann Höskuldsson, *Institute of Earth Sciences – Nordvulk, University of Iceland*  
Eyjafjallajökull, Snæfell, Vestmannaeyjar, Örfajökull

Evgenia Ilyinskaya, *British Geological Survey - formerly at Icelandic Meteorological Office*  
Sub-chapters on eruption scenarios

Sveinn P. Jakobsson, *Icelandic Institute of Natural History*  
Eldey, Grímsnes

Haukur Jóhannesson, *Jarðfræðipjónusta Hauks Jóhannessonar ehf*  
Snæfellsjökull, Ljósufjöll, Lýsuskarð

Gudrún Larsen, *Institute of Earth Sciences – Nordvulk, University of Iceland*  
Bárðarbunga, Eldey, Grímsnes, Grímsvötn, Hekla, Katla, Langjökull,  
Björn Oddsson, *Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police:*

Sub-chapters on eruption scenarios

Kristján Sæmundsson, *Iceland GeoSurvey*

Fremrinámar, Heiðarsporðar, Hengill, Hrómundartindur, Krafla, Prestahnjúkur, Torfajökull

Magnús Á. Sigurgeirsson, *Iceland GeoSurvey*

Reykjanes-Svartsengi,

Thor Thordarson, *Institute of Earth Sciences – Nordvulk, University of Iceland*

Askja, Hekla, Kverkfjöll,

Kristín Vogfjörð, *Icelandic Meteorological Office*

Sub-chapters on activity and current status