British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

SCIENTISTS AND PUBLIC:
IS THE INFORMATION FLOW DIRECTION STARTING TO CHANGE?

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Over half of the population of the UK own a smartphone, and about the same number of people uses social media such as Twitter. For the British Geological Survey (BGS) this means millions of potential reporters of real-time events and in-the-field data capturers, creating a new source of scientific information that could help to better understand and predict natural processes.

Citizen science at BGS:
http://www.bgs.ac.uk/citizenScience/home.html

CROWDSOURCING

BGS provides web and smartphone applications as crowdsourcing platforms so that geology enthusiasts, many of whom may have no specific scientific training, perform or manage research-related tasks such as observation or measurement. The use of crowdsourcing data allows scientists to accomplish research objectives more feasibly than would otherwise be possible. In addition, these apps aim to promote public engagement with the research, as well as with science in general.

SOCIAL MEDIA MINING

Social media provides a different channel for gathering potentially useful information from the public, where the filtering and analysis of these unstructured data can help to validate scientific predictions and models or to quickly locate natural geohazard events.
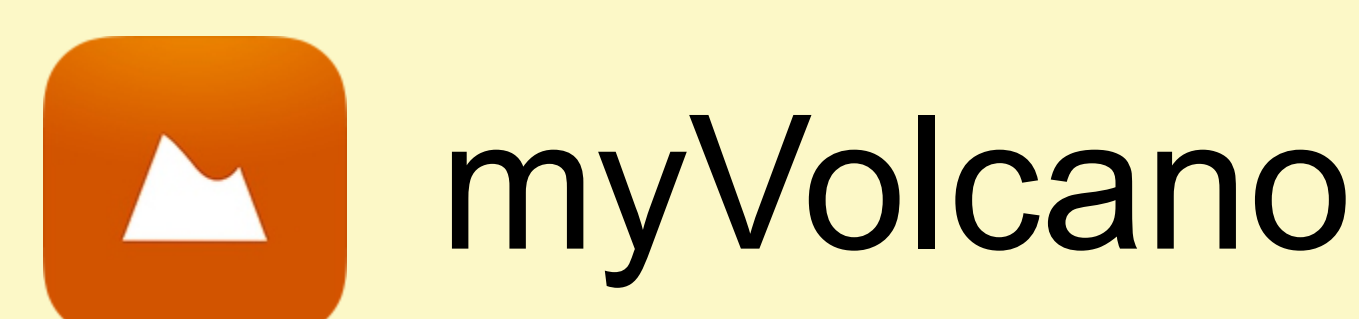
myVolcano

myVolcano is an iPhone/iPad app that enables you to **get involved** in monitoring volcanic hazards and to **discover** volcanoes of the world. It allows you to **share** volcano-related information which will help scientists to gather vital new data about volcanic eruptions.

⬛ WORLD VOLCANOES

myVolcano lets users explore the **1553 world volcanoes available** using data provided by the **Smithsonian Institution (SI)**. This information includes:
• Volcano photograph
• Detailed background info
• Date of last eruption
• Location coordinates
• Volcano elevation
• Volcano classification

Using ESRI mapping technology the user can view high-resolution **aerial and satellite imagery** to get a new perspective on world volcanoes

⬛ HAVE YOU SEEN VOLCANIC ASH?

myVolcano allows you to contribute to an active scientific community directly from your Smartphone with a **step by step guide** of how to collect, record images, take videos and even how to collect physical ash samples. The ash samples then get sent back to our scientists at BGS where they will analyse them and assess what they contain and where it may have come from. Once our scientists have analysed the sample, the results, that you have collected, will be available for display and query in the Observations layer of the app.
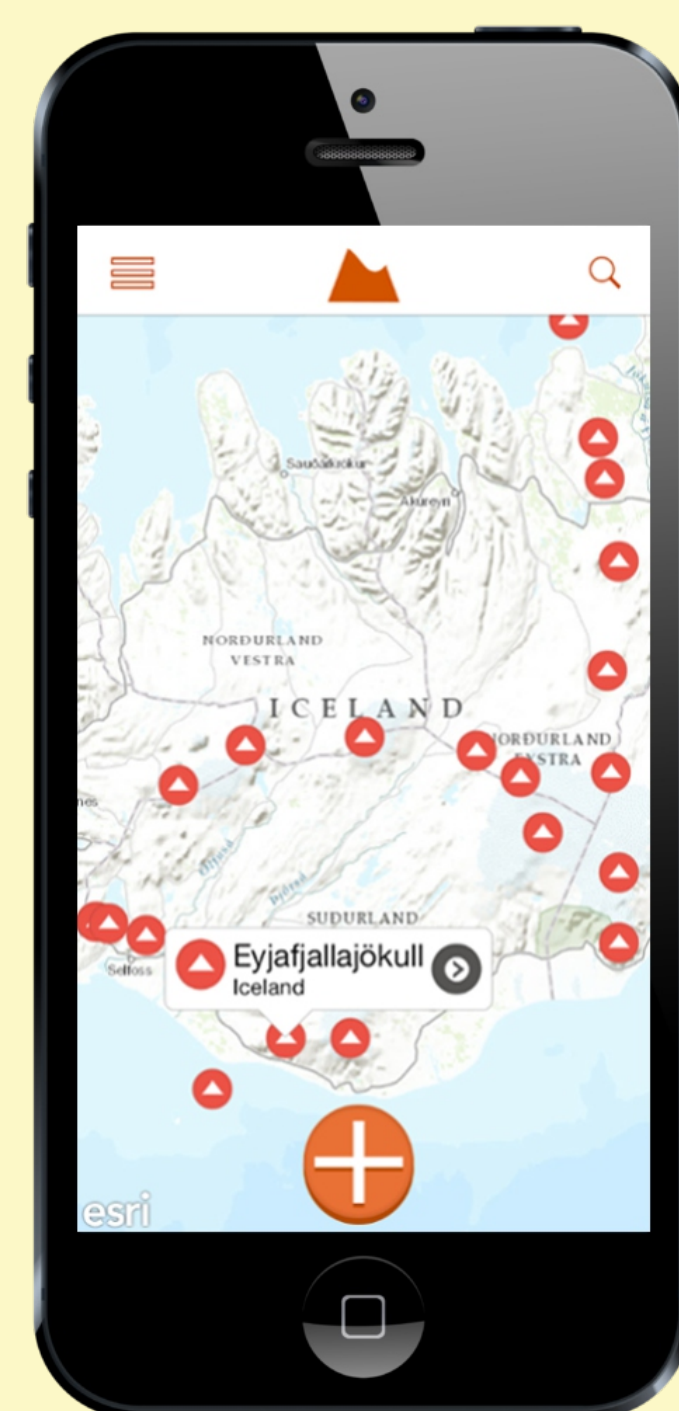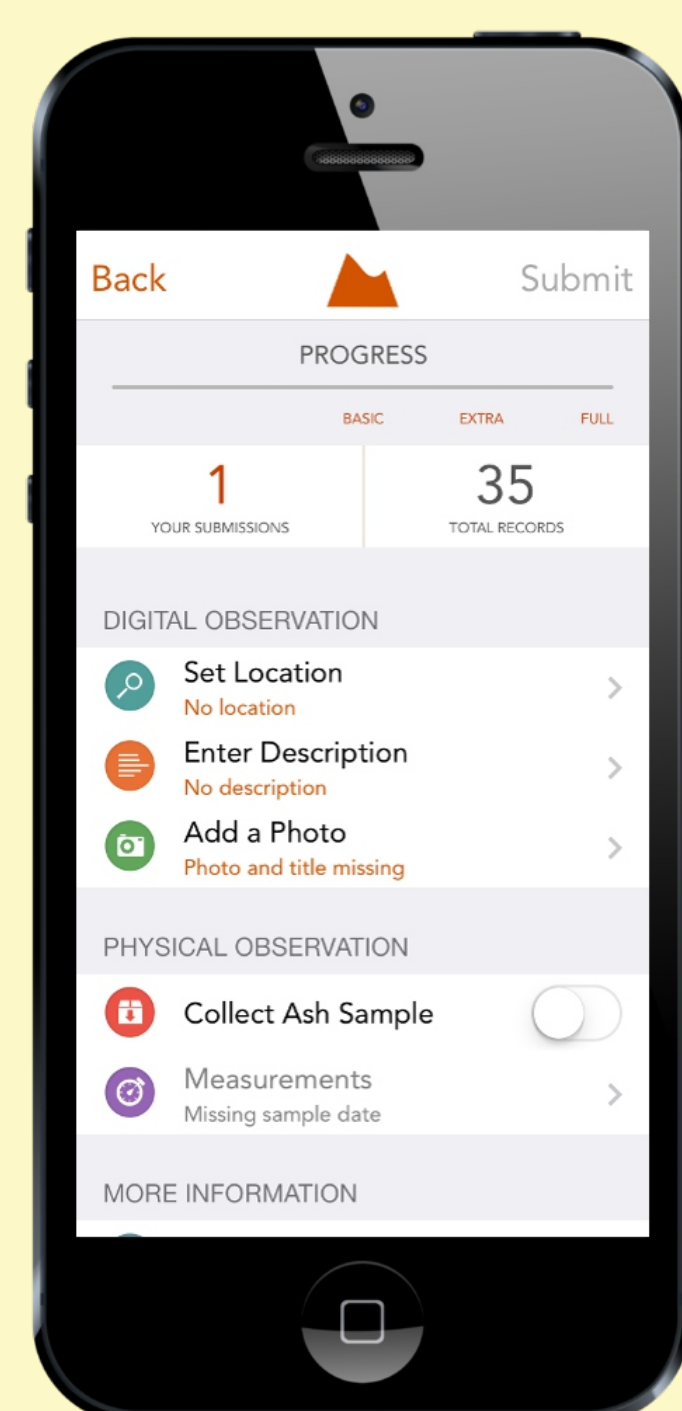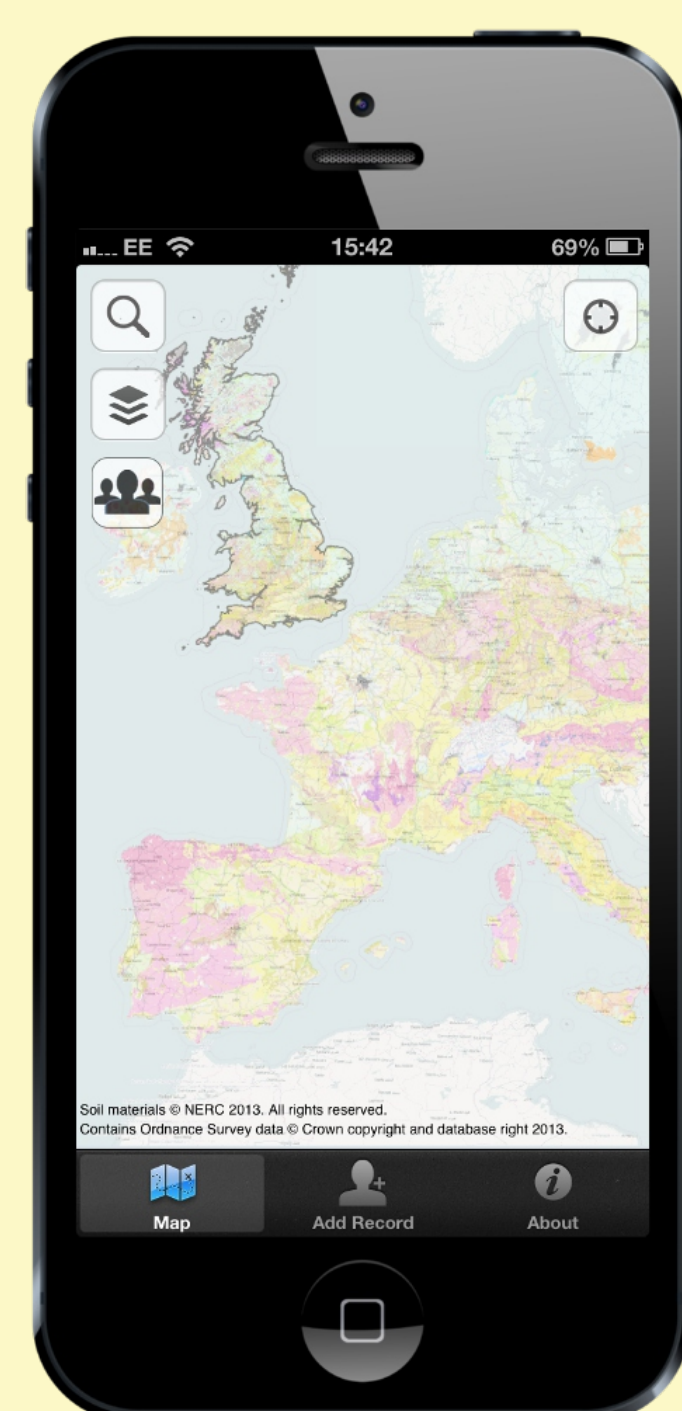
mySoil

mySoil is a Smartphone app that gives you access to a comprehensive European soil properties map. It includes an option for the public to upload information about the soil where they live, helping to improve knowledge about the properties of soils and the vegetation habitats that they provide.

⬛ EUROPEAN SOIL DATA

mySoil is **for anyone** interested in the soil in Europe (gardeners, farmers, environmentalists, land use planners…).

Users across the **UK** can view a map of the **soil parent material** in your local area, retrieve descriptions of the **soil depth**, **texture**, **pH**, **soil temperature**, **organic matter content** and **dominant habitats** . **European** users can view a map of the **soil parent material** and access **soil depth**, **texture** and **dominant habitats.**
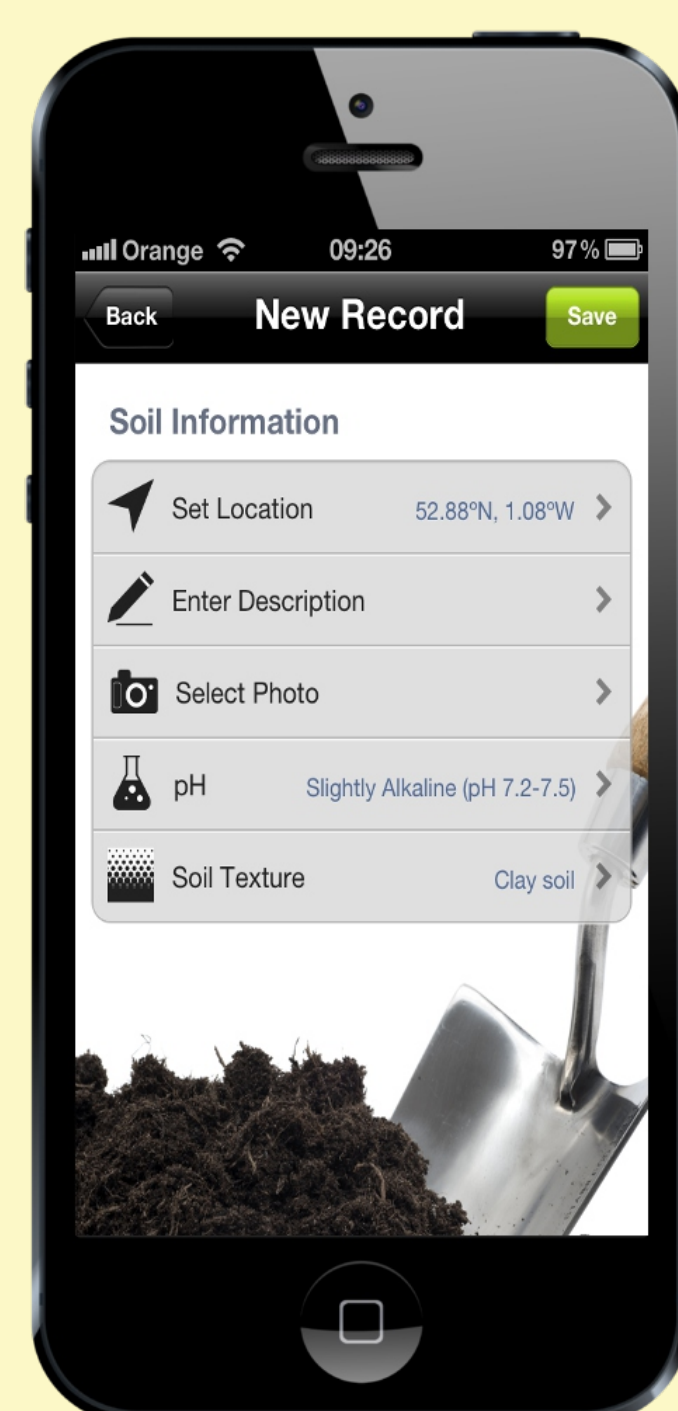
⬛ BUILD UP A COMMUNITY SOILS DATASET

Share information about the **soil in your area** by submitting a new record into the application.
• Set Soil Location
• Enter Description
• Take a photo of the soil
• Measure soil pH if you have the available kit
• Select the soil texture that best describes your soil
This information will help soil scientists to **validate datasets** and spot areas that don't match up.

Turn on the crowdsourcing layer to check the **over 1500 soil information** records added by people like you.

GeoSocial | Aurora
Look who's talking about...

BGS is starting to explore the usefulness of social media for scientific survey and analysis with the release of GeoSocial-Aurora, a **web mapping tool** that searches for tweets related to aurora sightings and locates them as markers on a map.

WHY MAP AURORA SIGHTINGS? When a geomagnetic storm forecast is issued, a common question posed to our scientists is **"How far south will the aurora borealis be seen?"** Current projections do not always match sighting reports received after an aurora display, but by using social media, such as Twitter, we hope that this new source of data will help improve our scientific projections of these events.

WHAT ARE AURORAS? Auroras are a side effect of geomagnetic storms and are powered by massive eruptions of gas from the Sun. We get the aurora light show because of passing clouds in the solar wind (caused when gases from the Sun's corona burst out into interplanetary space, dragging with them the Sun's magnetic field). These clouds energise electrical currents in space around the Earth. The aurora is then formed in great ovals, centred on the magnetic north and south poles. Protons and electrons rain down into the upper atmosphere above the auroral ovals. Each particle shower gives up energy as red, green and other coloured light through collisions with atmospheric gases.

http://mapapps2.bgs.ac.uk/GeoSocial_Aurora/index.html

⬛ Report aurora sighting using Twitter

> **BGS** @BritGeoSurvey
> #BGSaurora loc[Aberdeen] Sending tweet to report an event!
> ↩ Reply ⇄ Retweet ★ Favorite

⬛ Two types of tweets

Active: Users are encouraged to send aurora sighting tweets in a prescribed format which includes the **#BGSAurora** hashtag

Passive: Tweets filtered using either #aurora or #northernlights hashtag. Passive tweets don't always return desired results.

⬛ Georeferenced tweets will be located on the map

1) Location in tweet's text
2) Tweet location feature
3) Location in user account (not reliable)

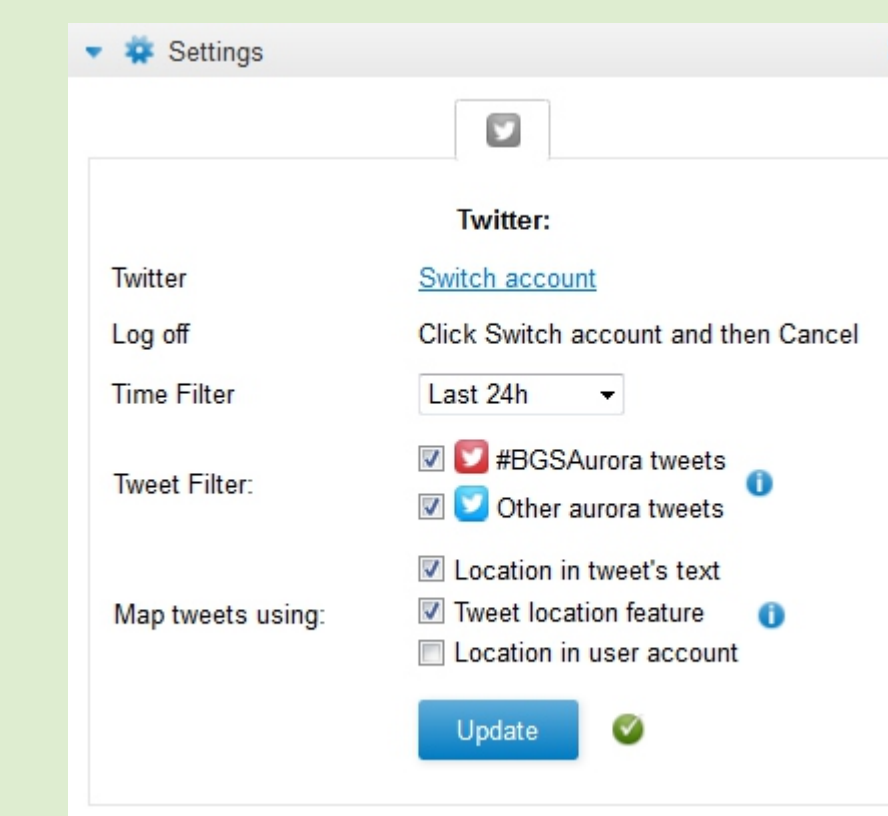### ⬛ Tweets can be displayed as:
Points
Clusters
Density

⬛ Tweets are currently harvested using the **Twitter REST API**, which has the following limitations:
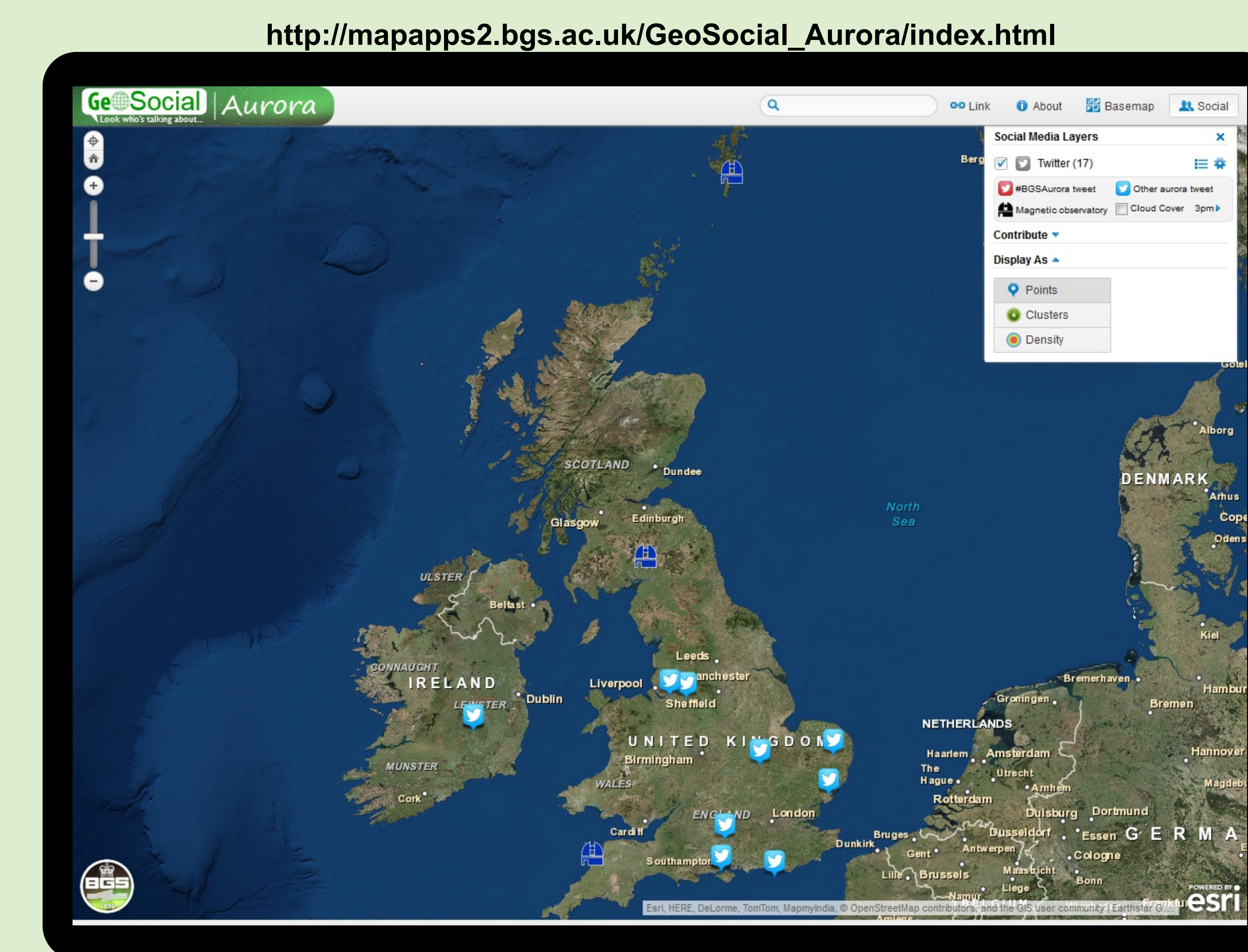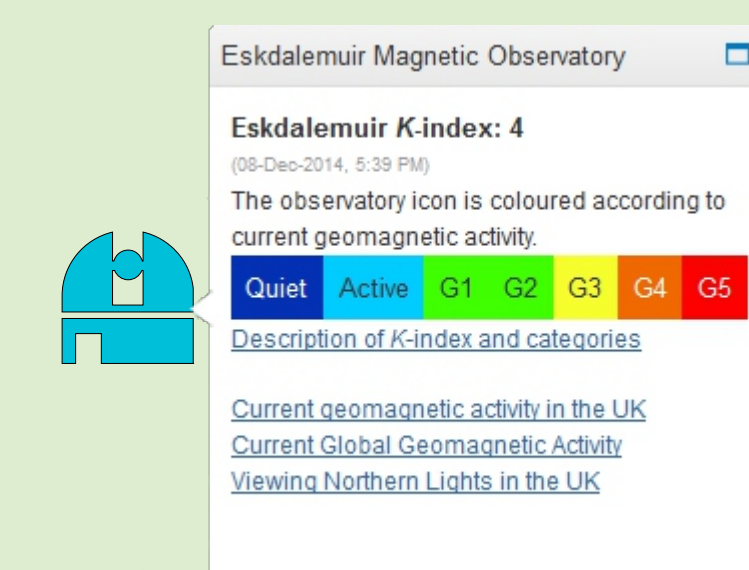
• Log in to see tweets on the map
• Time filter goes back only about a week
• Tweets are not stored

⬛ Settings allow to filter tweets by time, hashtag and location type

⬛ Supporting information

• Observatories
• Cloud cover

NEXT STEPS

- Include other events: Landslides, Earthquakes, Flooding...

- Mine new social media: Facebook, Flickr, You Tube...

- Create new data mining model to overcome current limitations of the Twitter REST API (as listed previously)

- Improve passive searches to get better results