INSPIRE and reusable tools for smartphone apps: innovative activities in the European geological sector

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What we’ll cover

- A survey of national geological survey organisations that explores their efforts to offer access to geology data via smartphone and tablet devices.
- Why did we carry out this survey?
- What apps did we uncover?
- Report the results of the survey
- Attempt to draw some conclusions from these results
Purpose of the survey

• to better understand how the geology sector is approaching geospatial data-sharing through mobile technologies and what lessons have been learned that can be shared with other communities, asking
  • who is doing the development work and what partnerships are being formed to create these apps?
  • to what extent can the app development work undertaken be reused and shared with other organisations and communities - operating systems, methodologies, development frameworks, architectures, tools
  • how successful have such apps been and how can success be measured?
  • where do barriers exist to app development for geospatial data within the geology sector?

• to understand INSPIRE’s influence and role in supporting the provision of this data, asking
  • what role do web services play in the provision of data to mobile apps?
  • what is the openness and reusability of the data being provided?

• to try to understand who the perceived and actual users are of some data within the scope of INSPIRE
  • is data being provided to new users, including citizens and those outside of the geology domain?

It is hoped that findings from this work will not only be of benefit to the geology community but also provides lessons for others interested in sharing geospatial data through apps.
Replies from across Europe
Who replied on behalf of their organisation?
Do you have apps or plan to develop them?

- Yes
- No
- Don't know

App review - 23 different apps listed
www.bgs.ac.uk/mysoil

Portable access to soil properties:

- Soil Texture
- Soil pH
- Soil Depth
- Organic Matter
- Topsoil Thickness
- Parent Material

Seamlessly combining data from different data providers into one interface.
mySoil – BGS/CEH App

Crowdsourced Data

- Users can add data to the map
- Extend and validate data holdings
- New Community-based products
iGeology 3D – Augmented Reality
GeoTreat - SGU, GEUS, NGU

Hanebukten, Nordkoster
Här finns en mycket välutbildad, medastor jättegrita...

Måskär
I de kala hållarna på norra Måskär finns en grå ögonförande Måskärsgranit (en magmatisk bergr). Ögollen består av upp till 5 cm långa...

Yttre Ursholmen
Äldsta bergart är här en grå gnejs, sedimentärt ursprung som deformeras, upphettades, och delvis smälte för ca 1 560 miljoner sedan i den...

Sommarchamnen
Här finns ögonförande Måskärsgranit i kontakt med kraftigt omvandlad...
BRGM - i-InfoTerre

Dossiers sur le sous-sol
Forages d'eau
Anciens sites industriels
Mouvements de terrain
Cavités souterraines
Aléa retrait-gonflement
Cartes géologiques
BRGM - i-InfoGeol
BRGM - i-InfoNappe
PGI geologia
Maps4You, Emilia-Romagna, Italy
GeoMap (Geokartan) - Geological Survey of Sweden
And many more…
What apps are you working on or planning for the future?

- Geological hazards
- Coastline app
- Fossils
- Shipwrecks
- Application controllers – Visualisation systems
- More data/map viewers
- More data collection systems
- More geological heritage and tourism
- New versions of existing apps
What uses are provided by these apps?
Why do you currently have no apps or any plans to develop them?
Smartphone operating systems supported

- iOS (iPhone/iPad) is the most supported with over 90%.
- Android follows closely.
- Windows, Mobile-friendly website, and Kindle are less supported with percentages below 20%. 
Most important smartphone operating system

What do you see is the most important mobile operating systems to support?

- iOS (iPhone/iPad)
- Android
- Kindle
- Windows
- Blackberry
- Symbian
- Other (please specify)
Apps: free or charged?

Are your apps free or do you charge for them (tick all that apply)?

- Free app
- Charged app
- In-App Purchases
- Other (please specify)
App publication dates

How often do you update your apps?

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Who develops your apps? (tick all that apply)

- We have in-house developers: 60.0%
- We contract out to specialist developers: 60.0%
- We publish data in formats (with appropriate licences) that allow others to develop apps: 10.0%
- Other (please specify): 10.0%
Developing apps in partnership

Do you develop apps in partnership?

- Yes
- No
- Don’t know
Are these partners inside or outside of the geology community?

- Inside
- Outside
- Both
- Don’t know
Are these partners from your own or other countries?

Are these app development partners from your own or other countries?
How are your apps implemented?

- We develop individual, native apps, coded specifically for each platform: 50.0%
- We utilise cross-platform frameworks and native app wrappers: 40.0%
- We focus on browser-based mobile websites: 60.0%
Smartphone Development Options

- Web Apps
  - Many Platforms
  - Less development

- Cross Platform Mobile Development Frameworks
  - Increased Functionality and Cost

- Native Apps
  - Greater visibility on platform
  - Better content experience
  - Full access to hardware
  - Offline capability
App development tools used

- ESRI SDK: 5
- Route-Me: 2
- map.apps: 1
- Leaflet: 1
- libgd: 1
- Google Maps Android API: 1
- Spatialite: 1
- OpenLayers: 1
- ArcGIS: 1
- Java tools: 1

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Tool licensing conditions

What are the licencing conditions for this tool?

- Open source
- Free for anyone to use, but not open source
- Commercial/proprietary
- Other (please specify)
What effort do you think will be needed to reuse the tool in another organisation?

- Straightforward
- Difficult
- Not possible
- Don’t know
How do you currently promote the potential reuse of your app or its development tools?

- Share the software and documentation on a platform (e.g. GitHub, SourceForge, JoinUp etc.)
- Provide descriptions of the tools/software used in the app with the app
- Promote the app work online via your websites, online discussion, twitter etc.
- Present the app in scientific/conference papers
- We do not currently promote the app software/tools
Do you serve data through your apps?

- Yes
- No
- Don't know
What data themes are published?
Is the data open or charged?

Is the data open or charged to view?

Is the data open or charged to download?
Do you use advertised web services to provide data to your apps?
Do you use services from other organisations in your app?

- Yes
- No
- Don't know
Do you use services from other countries in your app?

- Yes
- No
- Don't know
Do your apps allow users to submit data?

- Yes, feedback on the app itself: 1
- Yes, crowdsourcing/citizen science/volunteered information: 4
- No: 10
How many downloads have your apps received?

- 10s
- 100s
- 1000s
- 10,000s
- 100,000s
- Don’t know
Some sample positive reviews of your apps…

I find this really useful in my role as an agricultural crops advisor…greatly assists with the fertility potential and physical qualities I am likely to encounter.

As geotechnical engineer this is priceless.

Very practical application in the field! Congratulations, keep going.

Very cool application.

Well done for offering this app for free!!! Would have easily paid a few pounds for this!!!

Wow fantastic solution, I hope that it will be further developed.
Some sample negative reviews of your apps…

- app currently not active
- [the app lacks a legend]
- [Does not work on certain phones]
Have your apps received any prizes/awards/honours?

- Minear resources app is testing application for Ministry of Infrastructure and Spatial Planning, Directorate for Energy - Mining department in Slovenia
- ESRI International 1st place Community Favorite winner for Best Mobile App – iGeology, BGS
- AGI Innovation & Best Practice – Highly commended – iGeology, BGS
- ESRI (UK) Innovation in Central Government – Highly commended – iGeology, BGS
- The app Geokartan was rewarded with the Digital Map of the Year price in 2012 by the Swedish Cartographic Society.
How else do you measure and evaluate impact and show value to funders?

- Referenced in a journal
- Newspaper articles
- Radio show coverage
- Online articles
- Application usage statistics
Do you think smartphone apps have helped you reach a wider audience?

Do you think smartphone apps have helped you reach a wider range of users (from experts to non-professionals)?

- Yes
- No
- Don’t know
Hi John, I'm running a little bit late. See you outside the front door of the conference centre. Apologies.

Charles
Do you think smartphone apps have helped you reach a wider range of communities? 

Do you think smartphone apps have helped you reach a wider range of communities (from outside the geological community)? 

- Yes 
- No 
- Don’t know
What types of users are utilising your apps?
Do you think INSPIRE has helped you make information available via smartphone apps?

- Yes
- No
- Don’t know
To what extent has INSPIRE influenced the design or architecture of your apps?
Have any other frameworks/infrastructures/standards/best practice influenced the development of your apps?

- Yes
- No
- Don't know

Can these frameworks/infrastructures/standards/best practice be applied to other communities outside of the geology community?

- Yes
- No
- Don't know
What are the biggest barriers to wider/better app production?

- Limited support for reuse across communities
- Poor documentation
- Lack of standards
- Lack of guidelines
- Lack of reusable vocabularies/semantics
- Lack of example technologies
- Developing apps for multiple platforms
- Software development
- Lack of reusable software
- Access to data/quality of data

• Financial crisis
• Lack of relevant use cases
• No interest on the part of the institute for this type of apps
What do you think are the future trends and technologies related to apps?

- Data acquisition during field work
- Augmented Reality, Cloud and big data streaming
- The growing popularity of mobile solutions in accordance with the growing popularity of mobile devices. ... mobile app developing should be taken more seriously into consideration.
- It's strongly dependent from the mobile network performances.
- Access to increasing types of device sensors and different ways of interacting with the user interface (e.g. eye movement)
- Mobile websites
- HTML5 - to have a single development for both WebApp and Mobile App
- Mixed technologies - partially native and partially web
Conclusions

• Geology community – widely embraced smartphone apps
• Many successful apps developed by a wide range of organisations across Europe:
  • 1000s of downloads
  • Positive reviews
  • Award winning
• Many skills and lessons learnt that can be shared with its own and other communities:
  • In-house development skills
  • Knowledge of a range of open source and free to use tools that are considered easy to reuse
  • Code and techniques for information visualisation and delivery that can be widely reused e.g. map interfaces, augmented reality, 3D viewers
March 2013 - Mobile data usage:
61% from iOS
25% from Android
14% from others
Smartphone Development Options

- Web Apps
  - Many Platforms
  - Less development

- Cross Platform Mobile Development Frameworks

- Native Apps
  - Greater visibility on platform
  - Better content experience
    - Full access to hardware
    - Offline capability

Increased Functionality and Cost
Breaking down barriers

- Barriers
  - Supporting multiple platforms
  - Software development skills and effort
  - Lack of reusable software
  - Limited support for reuse across communities
- Geology community has learnt many of these lessons
- Need to promote this work and potential reuse of available tools to the geology and other communities.
Data delivery via apps

• Heavy focus on delivering data via apps
• Geology data and a wide range of other environmental themes
• Web services (OGC and others REST) are widely used to provide this data to apps
• Data mainly available free
• Many partnership ventures – multi-country and cross-discipline collaborations
• General feeling that apps have helped reach a wider audience
Did INSPIRE help?

• Direct answer largely No
• BUT….
  • Spatial data delivery
  • Web services
  • Open data
  • Partnership working
  • Across countries and domains
  • Reaching wider audience
• All principles and objectives promoted by INSPIRE even if not strictly INSPIRE compliant