

# Spatial Technologies

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Webinar

Lorraine Chaffer  
GTA NSW President 2017

NOTE: Webinar participants were sent weblinks and planning templates used in this presentation via email.

<http://www.bellsfire.co.za/.cm4all/mediadb/ire-earth-globe-wallpaper.png>



# Geography is **visual**



Adapted from Simon Jones PDF Geography resources

<https://www.slideshare.net/jonesy2008/simon-jones-20>

## VISUAL TOOLS

Photos  
Video clips / animations  
Maps  
Graphs  
Diagrams / 2D & 3D  
Illustrations / Picture books  
Models  
Interactive websites / Apps  
**Spatial technologies**  
Fieldwork  
Websites / textbooks

The  
Geography  
advantage



# Spatial technologies

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Spatial technologies are geographical **tools**, to be used by students along with maps; graphs and statistics, fieldwork and visual representations such as diagrams to **acquire, process and communicate geographical information** (undertake geographical inquiry) .

## SYLLABUS : SPATIAL TECHNOLOGIES – ST

Spatial technologies include any software or hardware that interacts with **real world locations**.

Examples include, **but are not limited to**, virtual maps, satellite images, global positioning systems (GPS), geographic information systems (GIS), remote sensing and augmented reality.

Spatial technologies are used to visualise, manipulate, analyse, display and record spatial data.

# Tools continuum

**K-10 GEOGRAPHICAL TOOLS CONTINUUM**

	Maps M	Fieldwork F	Graphs and Statistics GS	Spatial Technologies ST	Visual Representations VR
Stage	Examples may include:				
ES1	<ul style="list-style-type: none"> <li>pictorial maps</li> </ul>	<ul style="list-style-type: none"> <li>observing and recording data</li> </ul>	<ul style="list-style-type: none"> <li>tally charts</li> <li>pictographs</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>illustrations</li> <li>story books</li> <li>multimedia</li> </ul>
1	<ul style="list-style-type: none"> <li>pictorial maps, large-scale maps, world map, globe</li> </ul>	<ul style="list-style-type: none"> <li>observing, collecting and recording data, conducting surveys</li> </ul>	<ul style="list-style-type: none"> <li>tally charts</li> <li>pictographs</li> <li>data tables</li> <li>column graphs</li> <li>weather data</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> <li>satellite images</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>illustrations</li> <li>diagrams</li> <li>story books</li> <li>multimedia</li> <li>web tools</li> </ul>
2	<ul style="list-style-type: none"> <li>large-scale maps, world map, globe, sketch maps</li> <li>maps to identify location, direction, distance, map references, spatial distributions and patterns</li> </ul>	<ul style="list-style-type: none"> <li>observing, measuring, collecting and recording data, conducting surveys or interviews</li> <li>fieldwork instruments such as measuring devices, maps, photographs</li> </ul>	<ul style="list-style-type: none"> <li>tally charts</li> <li>pictographs</li> <li>data tables</li> <li>column graphs</li> <li>simple statistics</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> <li>satellite images</li> <li>global positioning systems (GPS)</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>illustrations</li> <li>diagrams</li> <li>story books</li> <li>multimedia</li> <li>web tools</li> </ul>
3	<ul style="list-style-type: none"> <li>large-scale maps, small-scale maps, sketch maps, political maps, topographic maps, flowline maps</li> <li>maps to identify location, latitude, direction, distance, map references, spatial distributions and patterns</li> </ul>	<ul style="list-style-type: none"> <li>observing, measuring, collecting and recording data, conducting surveys and interviews</li> <li>fieldwork instruments such as measuring devices, maps, photographs, compasses, GPS</li> </ul>	<ul style="list-style-type: none"> <li>pictographs</li> <li>data tables</li> <li>column graphs</li> <li>line graphs</li> <li>climate graphs</li> <li>multiple graphs on a geographical theme</li> <li>statistics to find patterns</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> <li>satellite images</li> <li>global positioning systems (GPS)</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>digital photographs</li> <li>illustrations</li> <li>diagrams</li> <li>annotated diagrams</li> <li>multimedia</li> <li>web tools</li> </ul>

	Maps M	Fieldwork F	Graphs and Statistics GS	Spatial Technologies ST	Visual Representations VR
Stage	Examples may include:				
4	<ul style="list-style-type: none"> <li>sketch maps, relief maps, political maps, topographic maps, flowline maps, choropleth maps, isoline maps, précis maps, cartograms, synoptic charts</li> <li>maps to identify direction, scale and distance, area and grid references, latitude and longitude, altitude, area, contour lines, gradient, local relief</li> </ul>	<ul style="list-style-type: none"> <li>observing, measuring, collecting and recording data, developing and conducting surveys and interviews</li> <li>fieldwork instruments such as weather instruments, vegetation identification charts, compasses, GPS, GIS</li> </ul>	<ul style="list-style-type: none"> <li>data tables</li> <li>pie graphs</li> <li>column graphs</li> <li>compound column graphs</li> <li>line graphs</li> <li>climate graphs</li> <li>population profiles</li> <li>multiple tables and graphs presented on a geographical theme</li> <li>statistics to find patterns and trends</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> <li>satellite images</li> <li>global positioning systems (GPS)</li> <li>geographic information systems (GIS)</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>digital photographs</li> <li>illustrations</li> <li>flow charts</li> <li>annotated diagrams</li> <li>multimedia</li> <li>field sketches</li> <li>cartoons</li> <li>web tools</li> </ul>
5	<ul style="list-style-type: none"> <li>relief maps, political maps, topographic maps, choropleth maps, flowline maps, cadastral maps, thematic maps, isoline maps, land use maps, précis maps, special-purpose maps, cartograms, synoptic charts</li> <li>maps to identify direction, scale and distance, area and grid references, degrees and minutes of latitude and longitude, bearings, aspect, altitude, area, density, contour lines, gradient, local relief</li> </ul>	<ul style="list-style-type: none"> <li>observing, measuring, collecting and recording data, developing and conducting surveys and interviews</li> <li>fieldwork instruments such as weather instruments, vegetation identification charts, compasses, clinometers, GPS, GIS or remote sensing</li> </ul>	<ul style="list-style-type: none"> <li>data tables</li> <li>pie graphs</li> <li>column graphs</li> <li>compound column graphs</li> <li>line graphs</li> <li>scatter graphs</li> <li>climate graphs</li> <li>population profiles</li> <li>multiple tables and graphs presented on a geographical theme</li> <li>statistics to find patterns and trends; and to account for change</li> </ul>	<ul style="list-style-type: none"> <li>virtual maps</li> <li>satellite images</li> <li>global positioning systems (GPS)</li> <li>geographic information systems (GIS)</li> <li>remote sensing data</li> <li>augmented reality</li> </ul>	<ul style="list-style-type: none"> <li>photographs</li> <li>digital photographs</li> <li>illustrations</li> <li>flow charts</li> <li>annotated diagrams</li> <li>multimedia</li> <li>field and photo sketches</li> <li>cartoons</li> <li>mind maps</li> <li>web tools</li> </ul>



# GIS and GPS

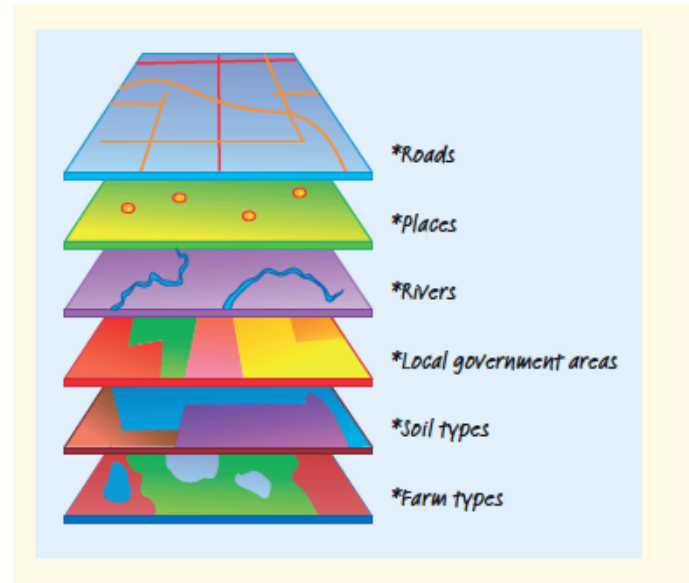
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## GPS

A GPS device locates places via satellite

The device can also **collect data about a place** e.g. latitude, longitude, altitude e.g. Garmin Sports App, phone camera



## GIS:

Geographic information system

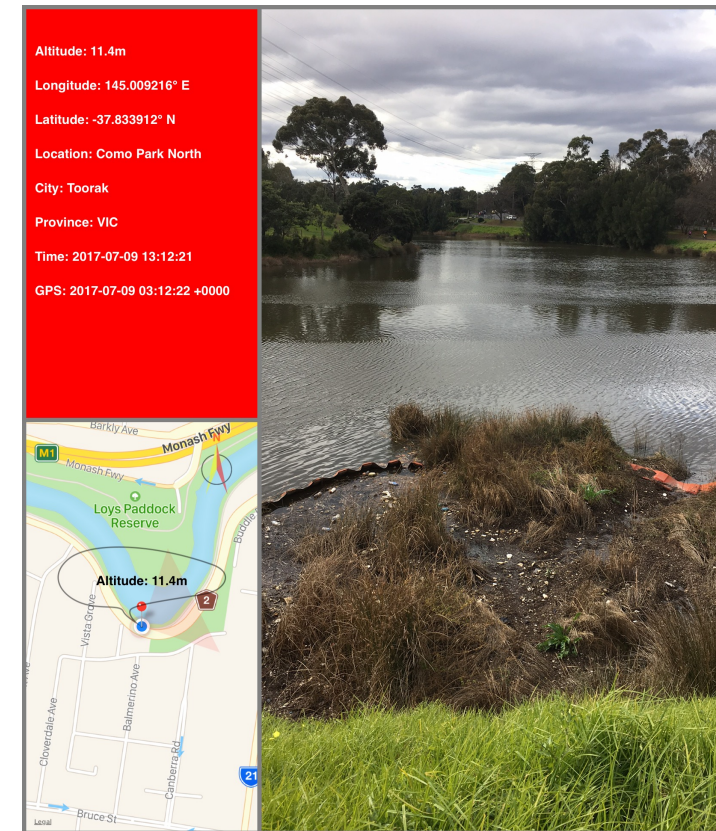
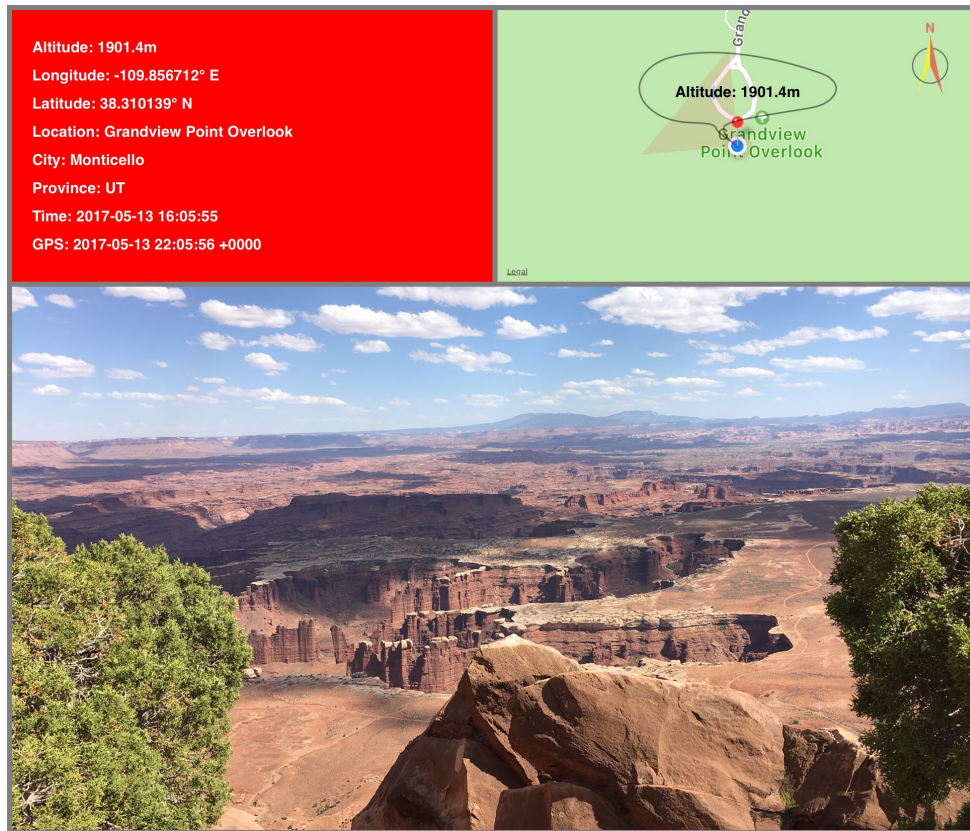
The **digital plotting of spatial data** to create visual images is a GIS e.g. Google Earth

## Syllabus glossary

GPS: Navigation systems that provide location and time information anywhere there is a line of sight to GPS satellites.

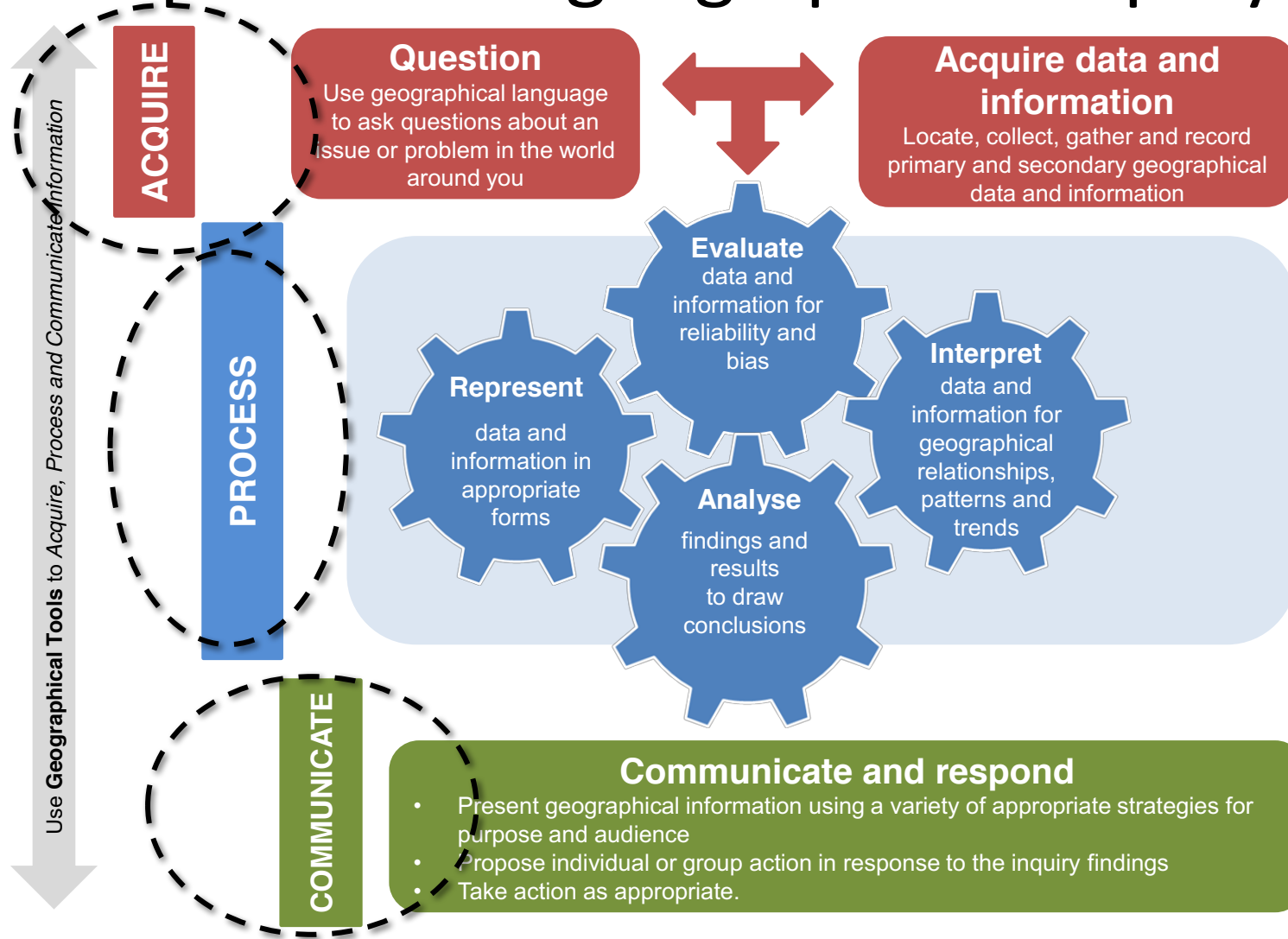
GIS: Systems for storing, managing, analysing and portraying spatial data.

# Tablet / phone camera apps & GPS





# A process for geographical inquiry



Spatial technologies  
are tools for inquiry

Image : [www.hsiensw.com](http://www.hsiensw.com)

# Planning

When planning the integration of spatial technologies  
link to the syllabus –outcomes, inquiry  
questions, inquiry focus, content area

Template : Planning scaffold

Template created by L Chaffer

## TEMPLATE 3 CREATING STUDENT ACTIVITIES USING SPATIAL TECHNOLOGIES

TOPIC: \_\_\_\_\_

Area of content:

Identified outcomes

ICT application(s) / website(s)

Key inquiry question(s)

Geographical inquiry focus of the student activities

- ☐ Acquiring geographical information
- ☐ Processing geographical information
- ☐ Communicating geographical information

ACTIVITY (ies): Step by step instructions



# Mapping

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Map where you could  
use different spatial  
technologies in the  
content areas of the  
syllabus

Units	National Geographic Mapmaker	Google Earth Elevation OR Global Elevation ESRI	Google Tour Builder	Scribble Maps	Other eg VR
<b>Stage 4</b>					
Water in the world					
Place and liveability					
Landscapes and landforms					
Interconnections					

Template : Mapping grid. Created by L Chaffer

# Simple Spatial Technologies

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SPATIAL TECHNOLOGY APPLICATIONS

SEE DOCUMENT WITH LINKS



IMAGE: <http://www.gispeople.com.au/what-is-gis/>



# Acquiring, interpreting & analysing

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National geographic mapmaker  
& similar

Biome viewer app

Real world / real time GIS

# 1. National Geographic mapmaker



The screenshot shows the National Geographic MapMaker Interactive web application. A world map is displayed in the center. Three red circles highlight key interface elements: the top-left toolbar, the top-right map style and scale selection panel, and the bottom-left 'Add & Remove Layers' panel. Red dashed arrows point from these circles to a text box on the right. The text box contains three numbered steps: 1. Select a base map, 2. Select the map scale eg World, Australia, and 3. Select layers to create a map - human or natural features. The bottom-right panel shows various thematic map options like 'Population', 'Elevation', and 'Climate'.

Created by L Chaffer

1. Select a base map
2. Select the map scale eg World, Australia
3. Select layers to create a map - human or natural features

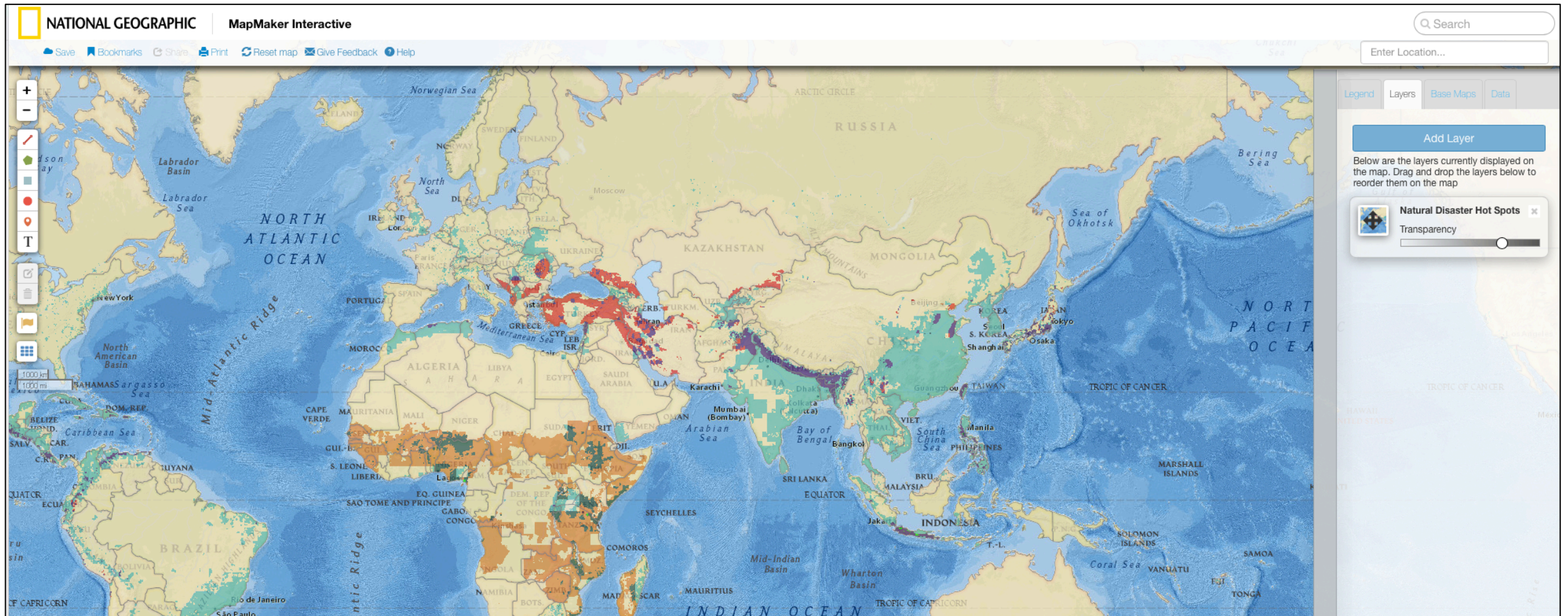
<http://mapmaker.nationalgeographic.org>

Exploring spatial patterns / answer simple inquiry questions / acquiring information

HOT

Analysing relationships / synthesise interconnections / answer complex inquiry questions



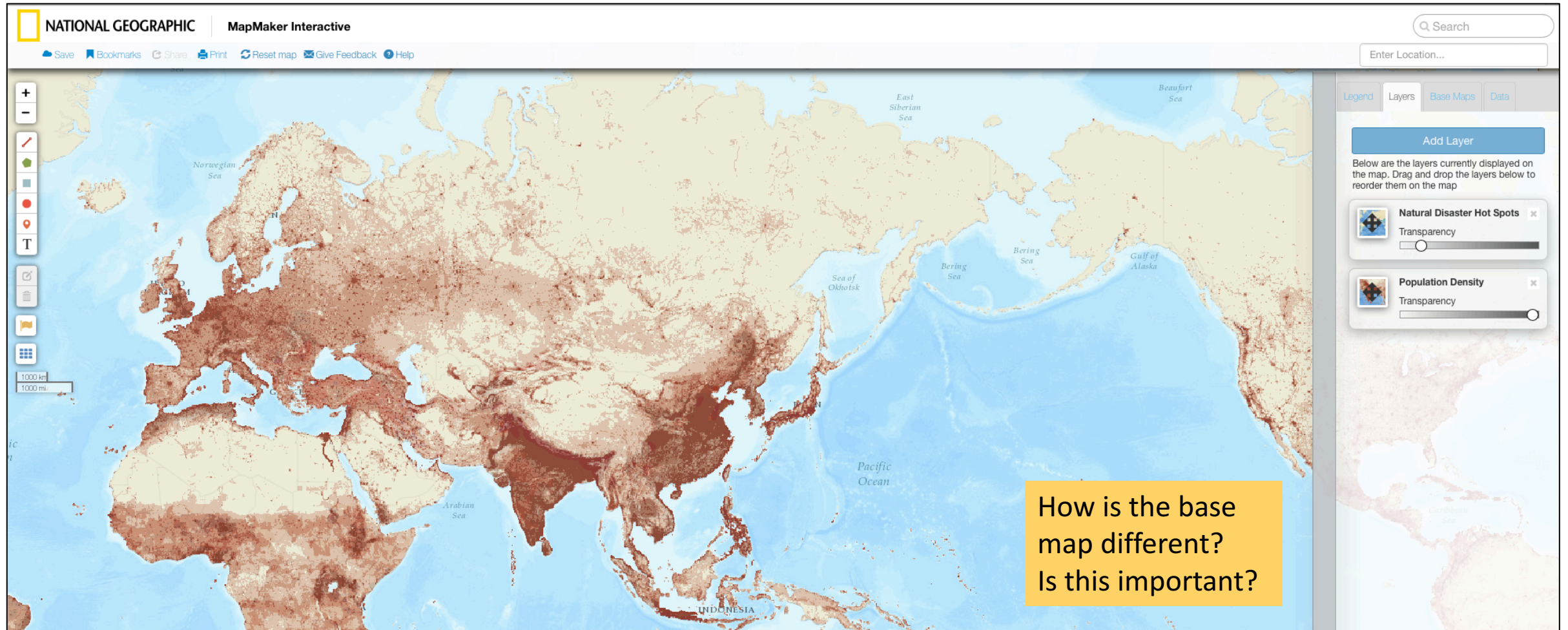


<http://mapmaker.nationalgeographic.org>

## Inquiry question

Where are the global hotspots for geomorphic hazards ? (Acquiring information)

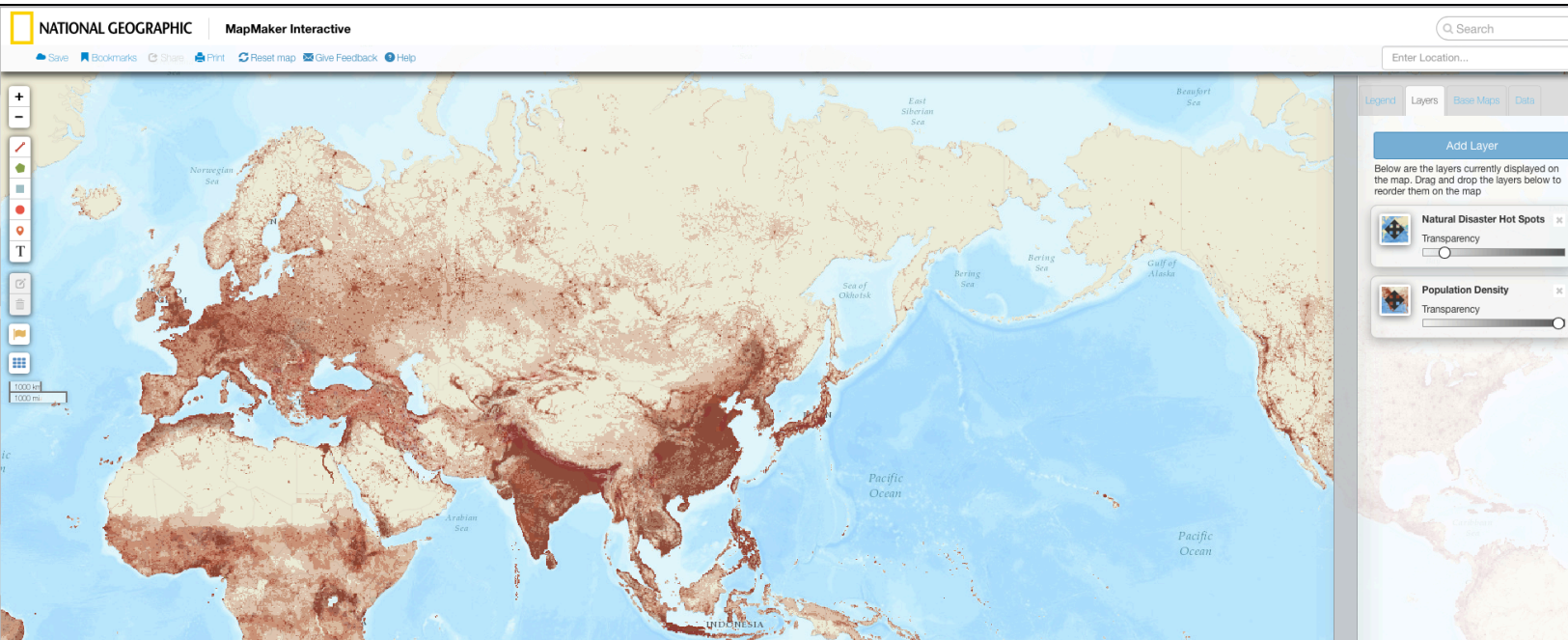
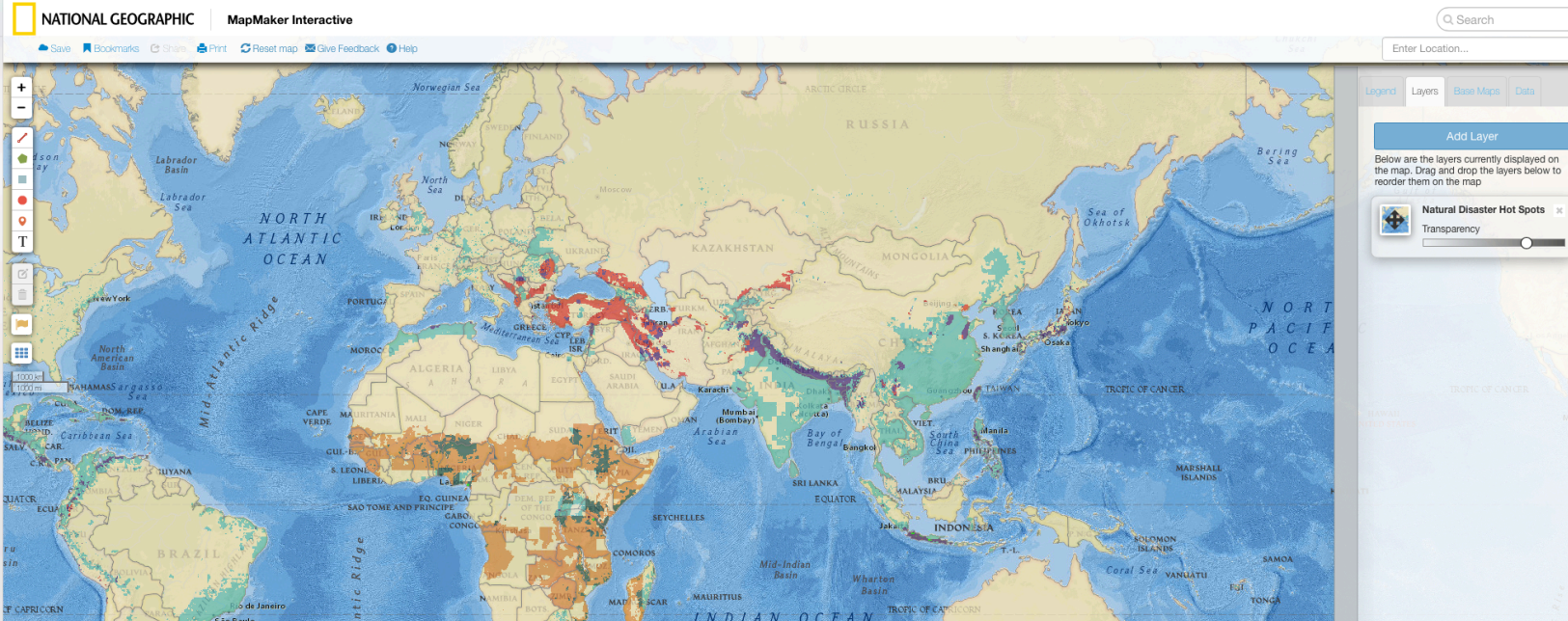




## Inquiry question

Where are the areas of greatest population concentration in the world? (Acquiring information)





## Inquiry

Synthesise - Where are the greatest numbers of people vulnerable to natural hazards and disasters?

Analyse - Which natural disasters have the potential to impact on the greatest number of people?

Screen capture

<http://mapmaker.nationalgeographic.org>

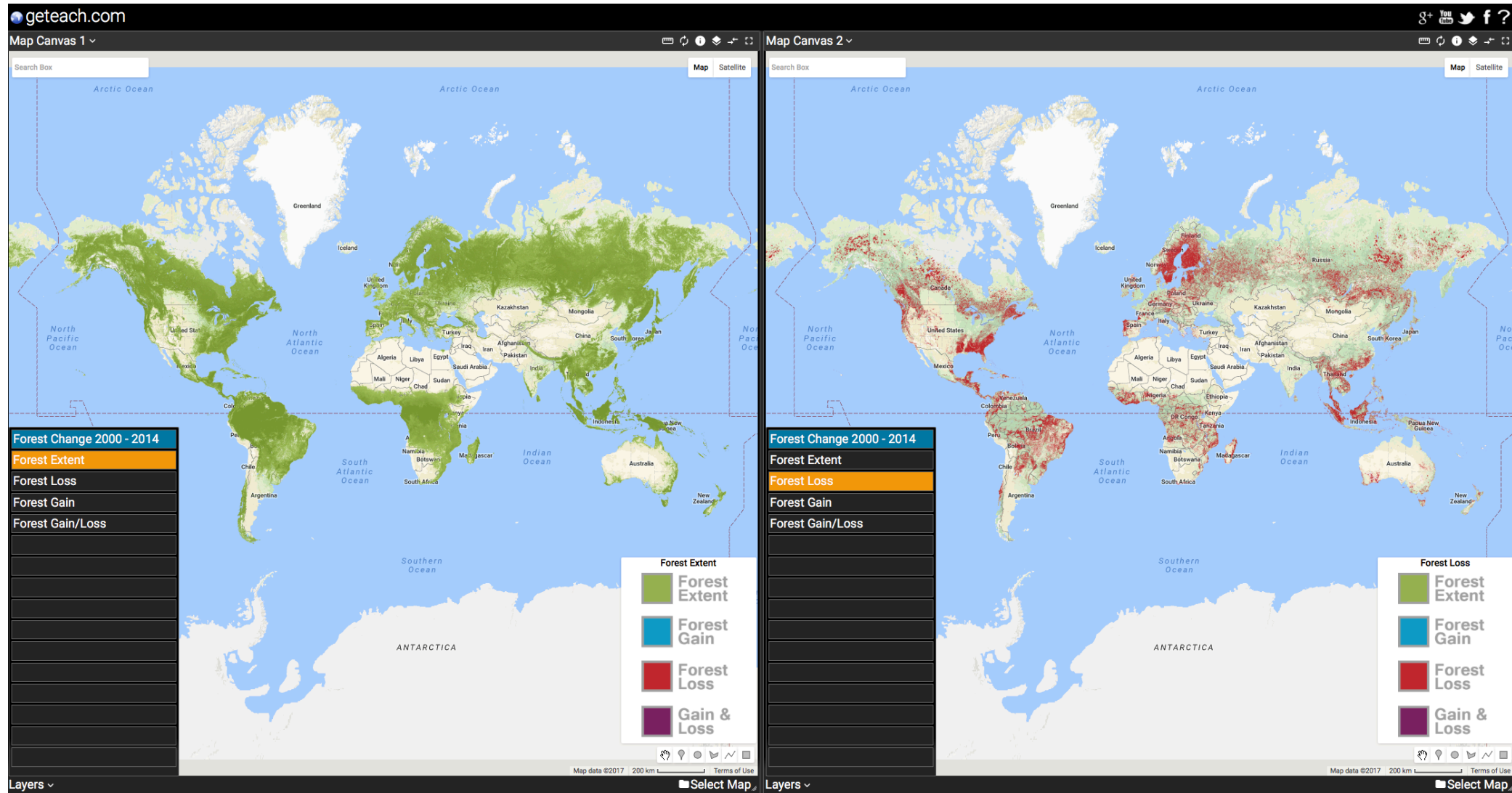
# Learn the tool

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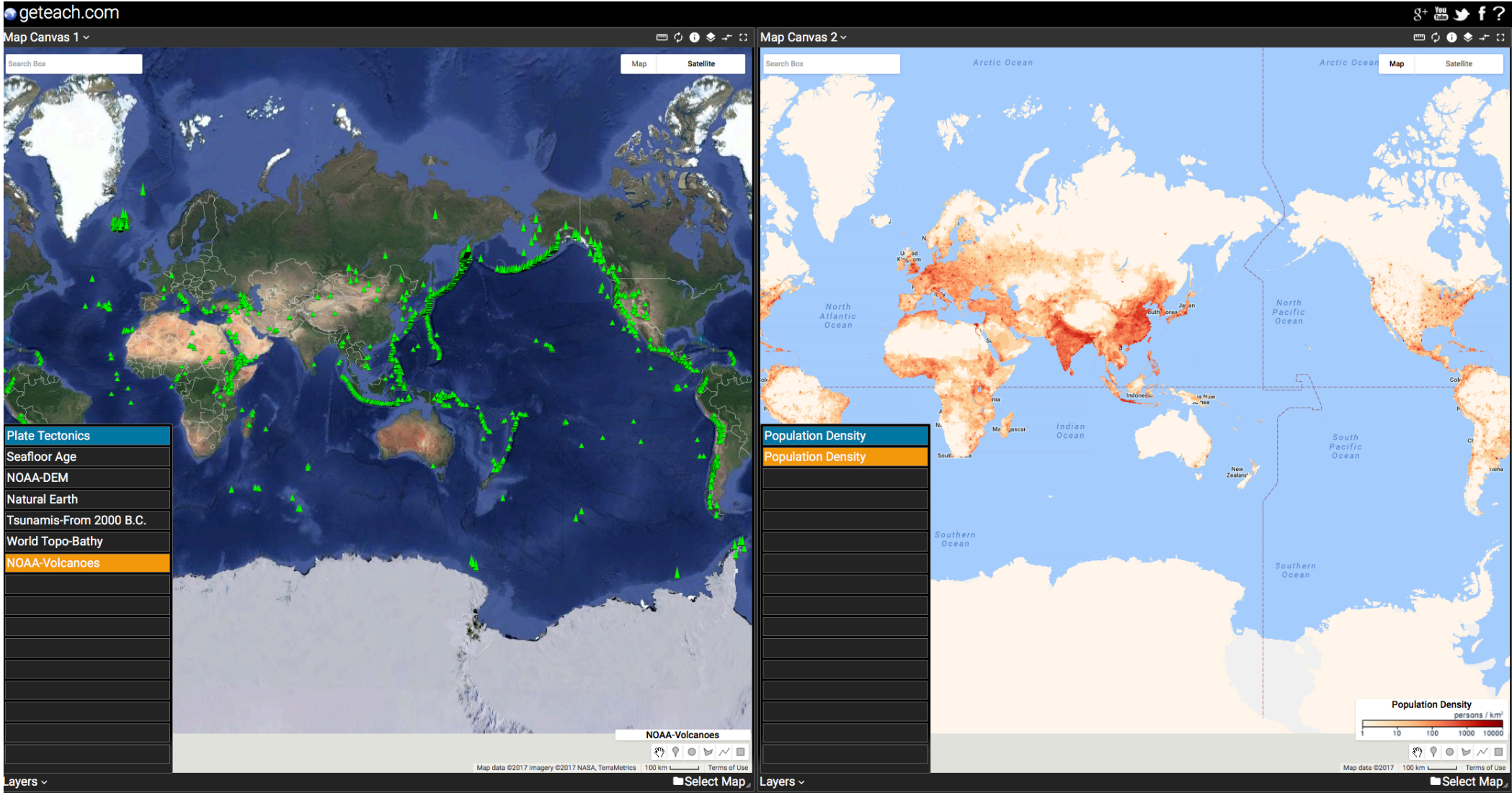
- Find layers you could use for different content areas
- Find layers that can be used to analyse relationships
- Develop inquiry questions
- Differentiate - challenge talented students

## SOMETHING SIMILAR

<https://www.geteatch.com>

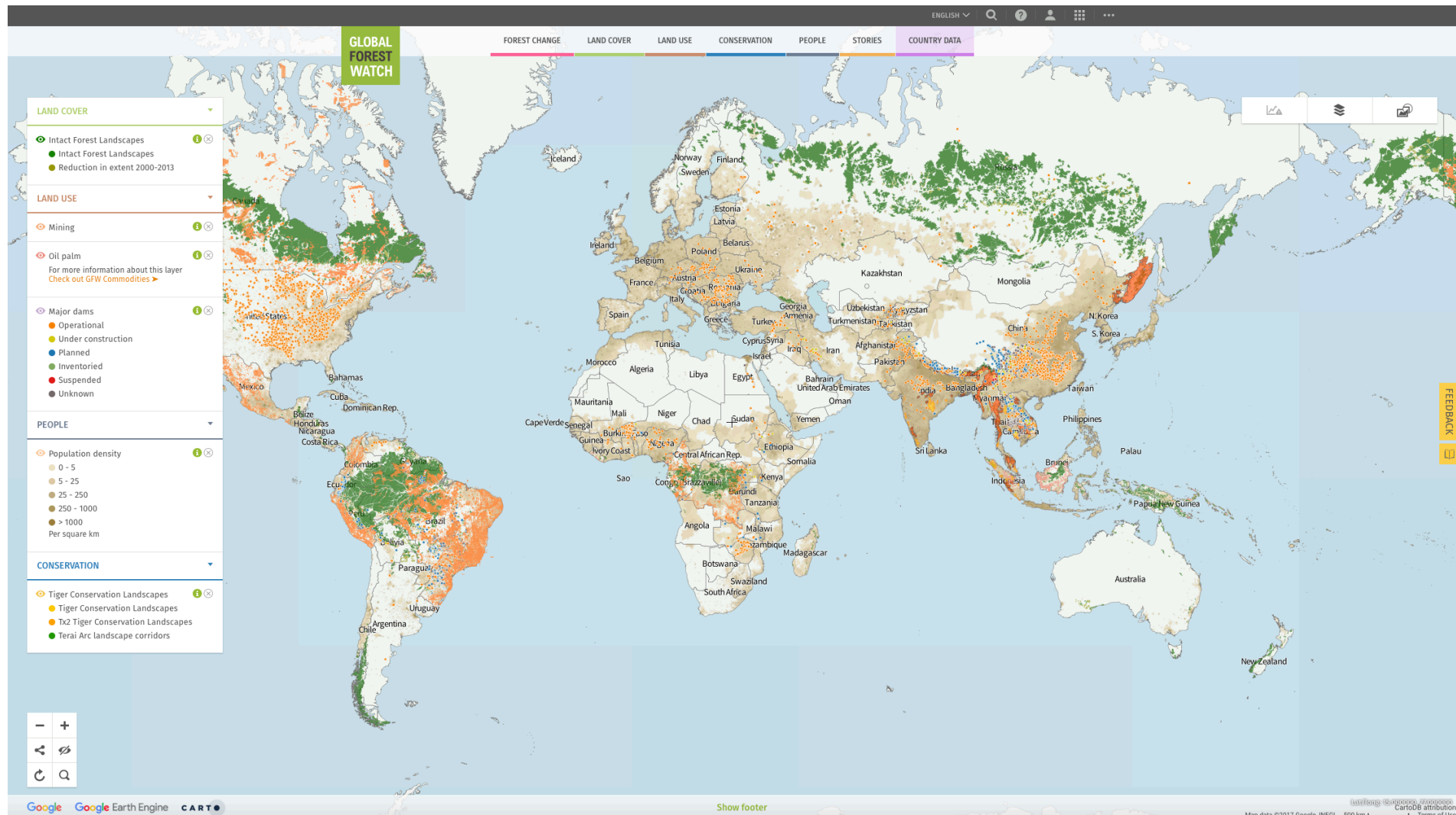






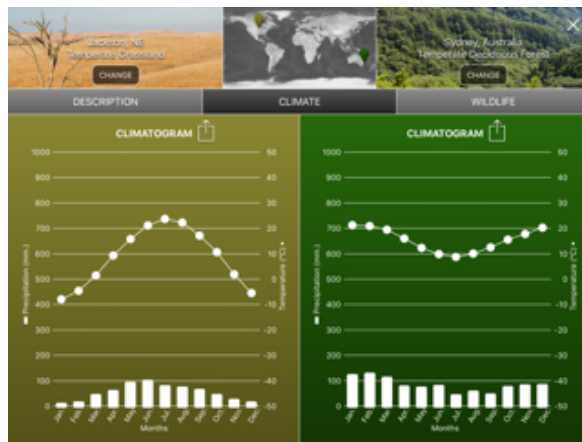


# SOMETHING SIMILAR

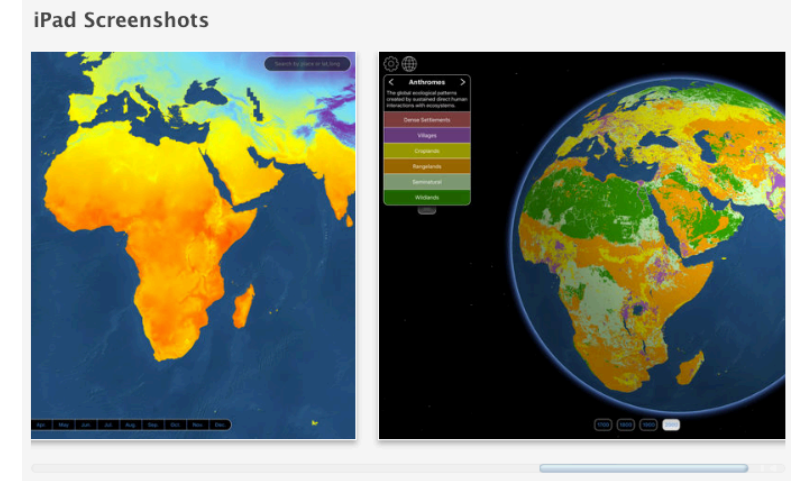


<http://www.globalforestwatch.org>

# App - Biome Viewer (iPad)



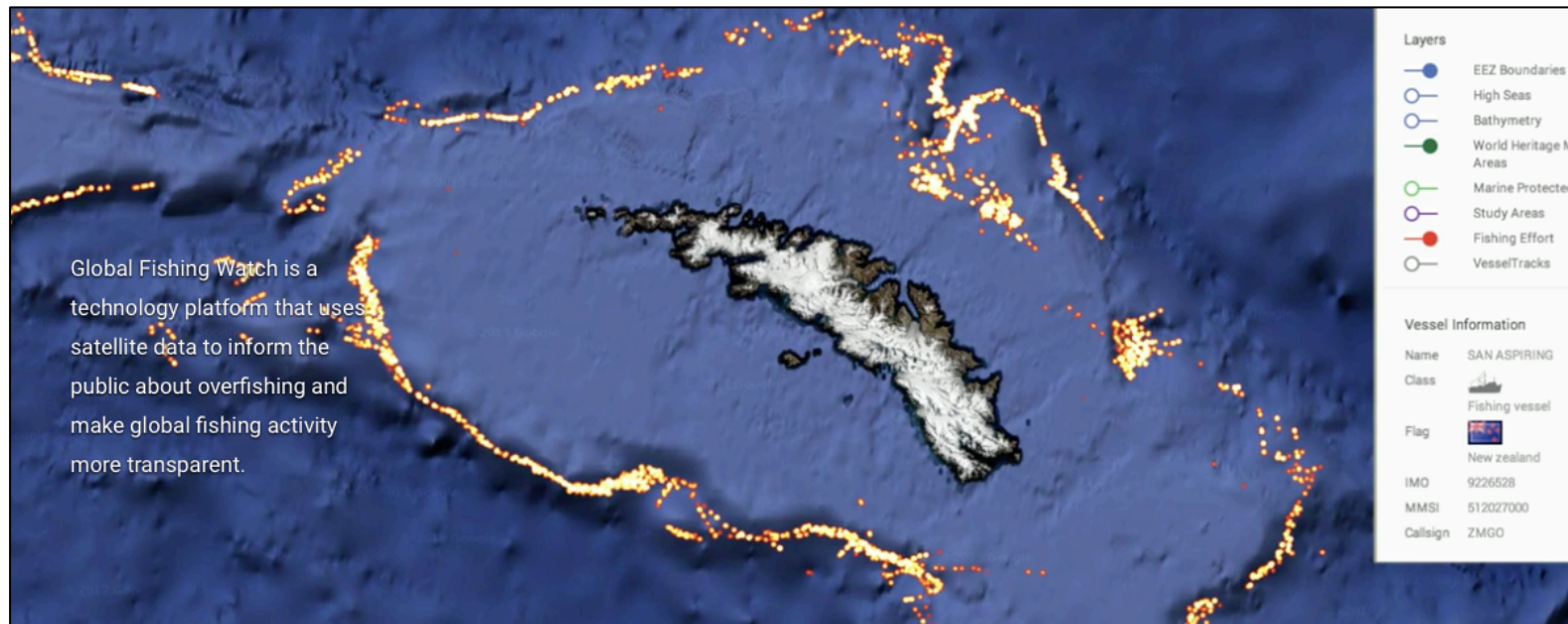
Saves time  
Deeper analysis



iOS devices only

<https://itunes.apple.com/us/app/biomeviewer/id1138439750?mt=8>

# Real world/ real time GIS



Environmental monitoring : Global fishing watch

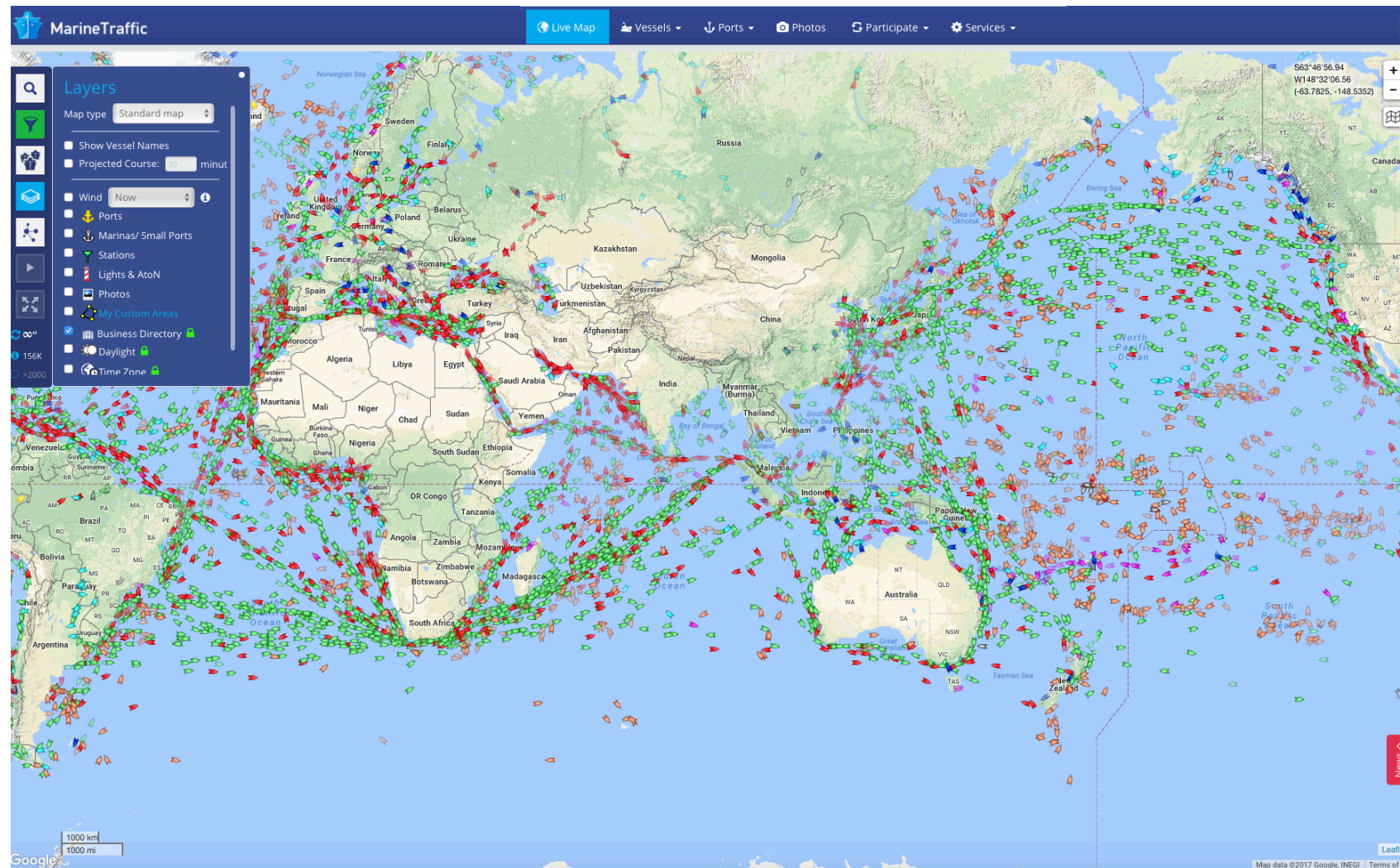
<http://globalfishingwatch.org>

Contemporary  
issues





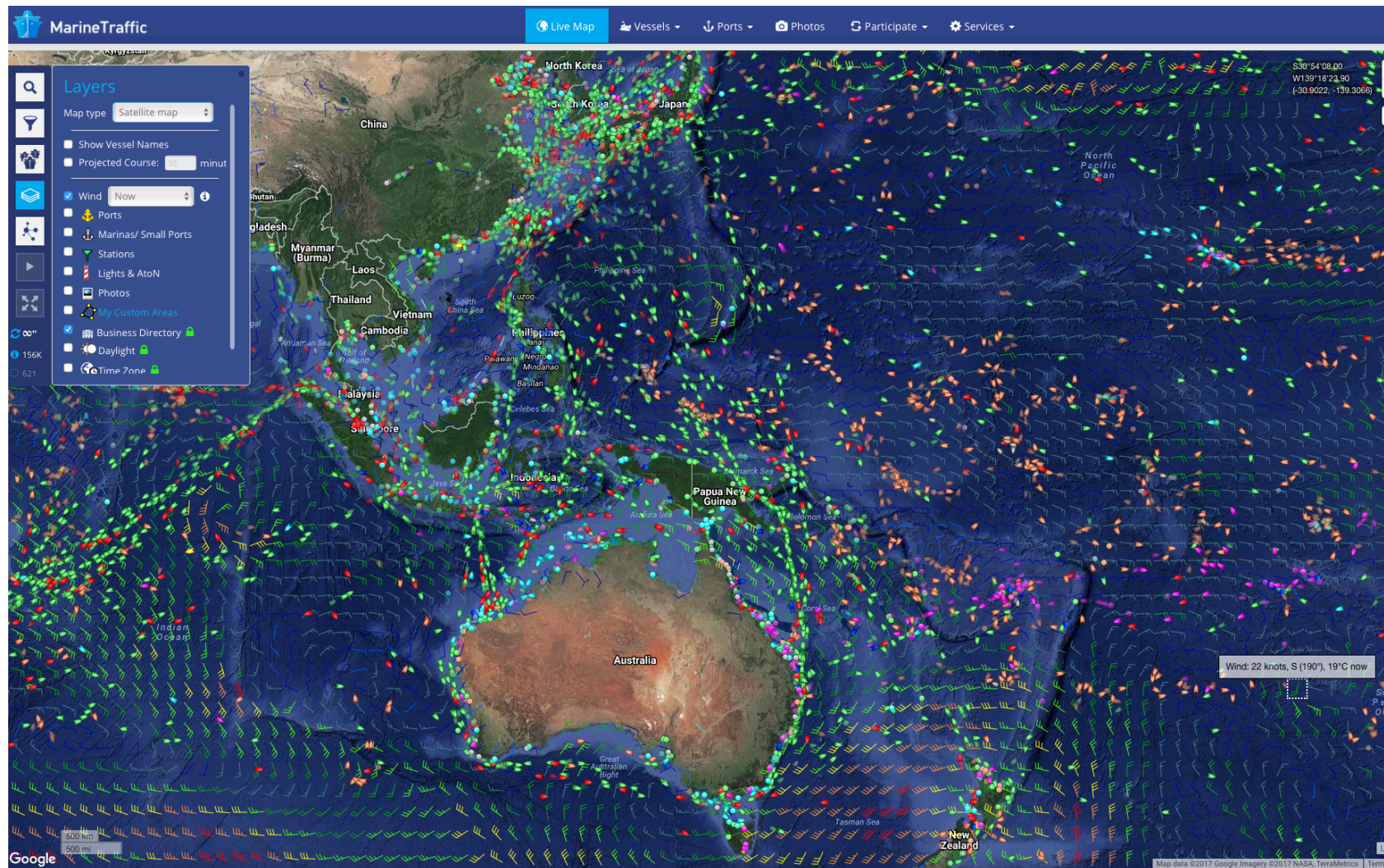
Flights <https://www.flightradar24.com/multiview/30.25,266.14/7>



Study spatial patterns

Marine Traffic <https://www.marinetraffic.com/>



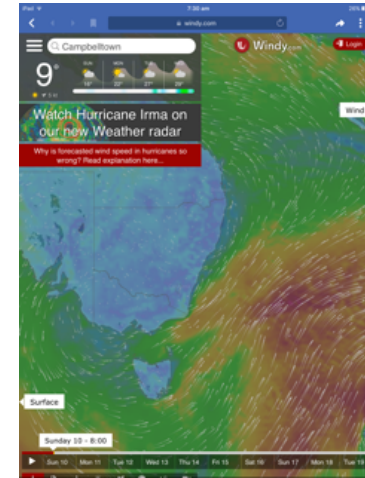


Change base maps  
for impact

# Wind, weather and ocean systems

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- Earth – <https://earth.nullschool.net>
- NOAA Weather Radar (App)
- Weatherzone - weather radar  
[www.weatherzone.com.au](http://www.weatherzone.com.au)
- WOW – ABM web service – information sharing  
[www.bom.gov.au/support/](http://www.bom.gov.au/support/)
- Google earth radar – weather layers tab in GE sidebar + animations + forecasts



# Representing, analysing and communicating

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Creating elevation profiles

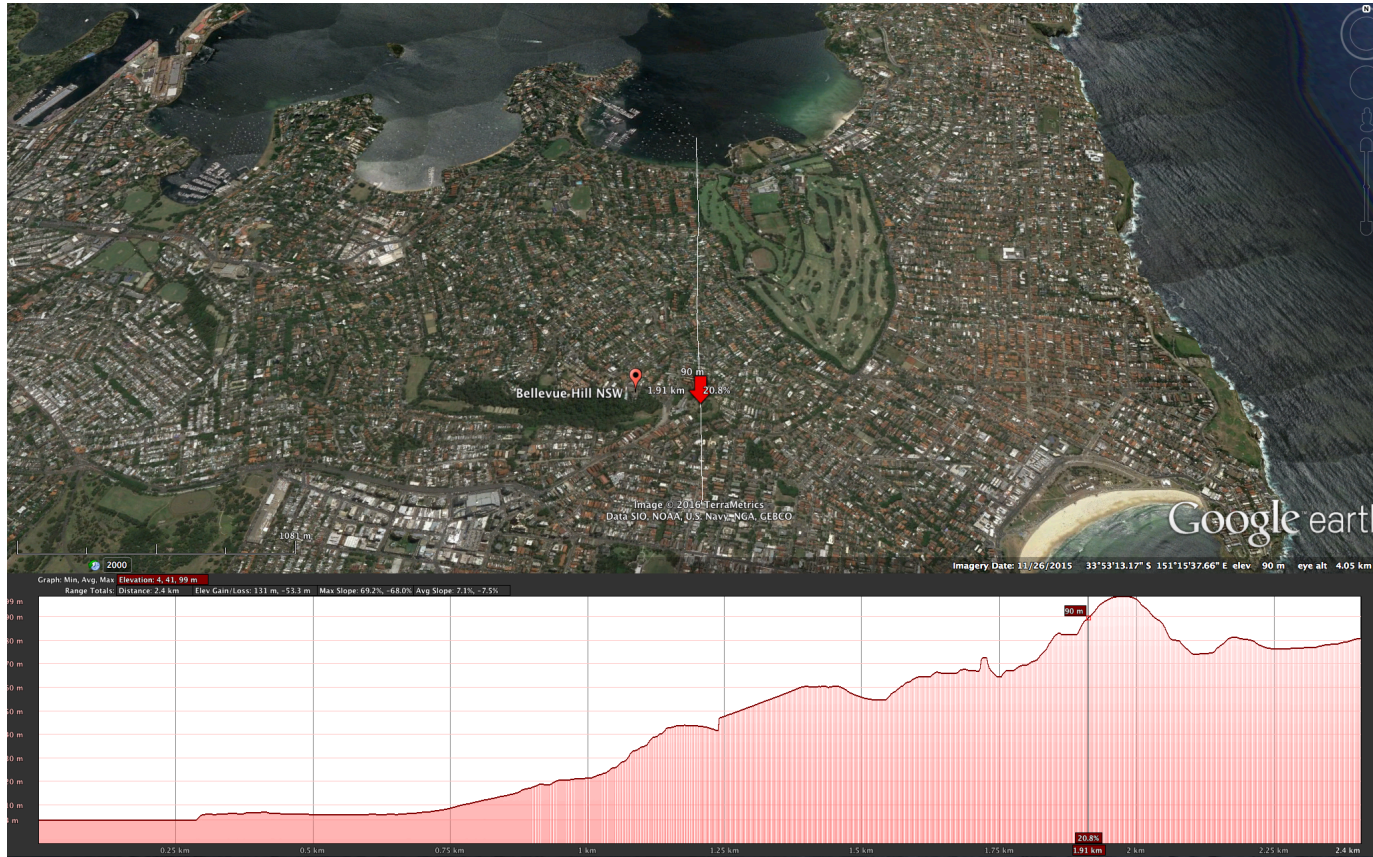
Google tour builder

Scribble maps

Citizen science



## 2. Elevation profiles – Google Earth



Where could this be used?

What Geographical inquiry skills are being used?



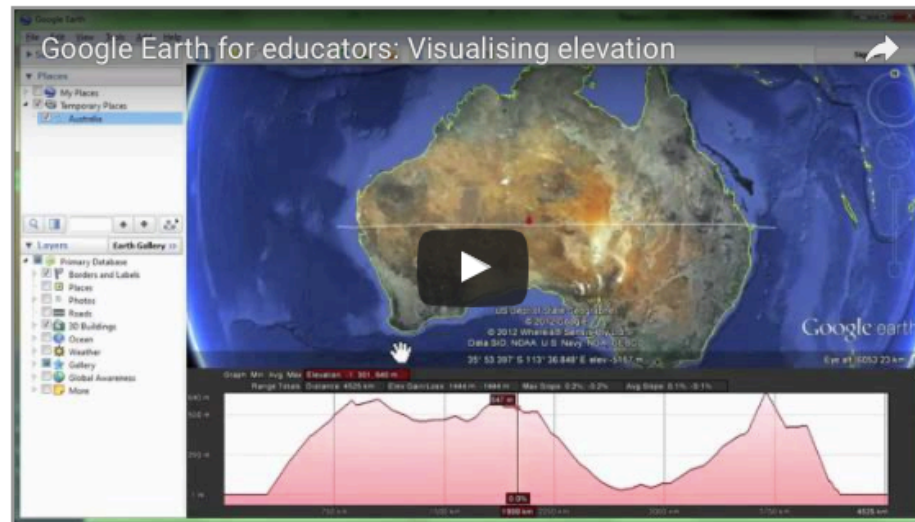


Created by L Chaffer using Google Earth

# Google Earth tutorial

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Watch the video below to see how to create an elevation profile in Google Earth



<http://www.contourededucation.com/resources>

# Relevance

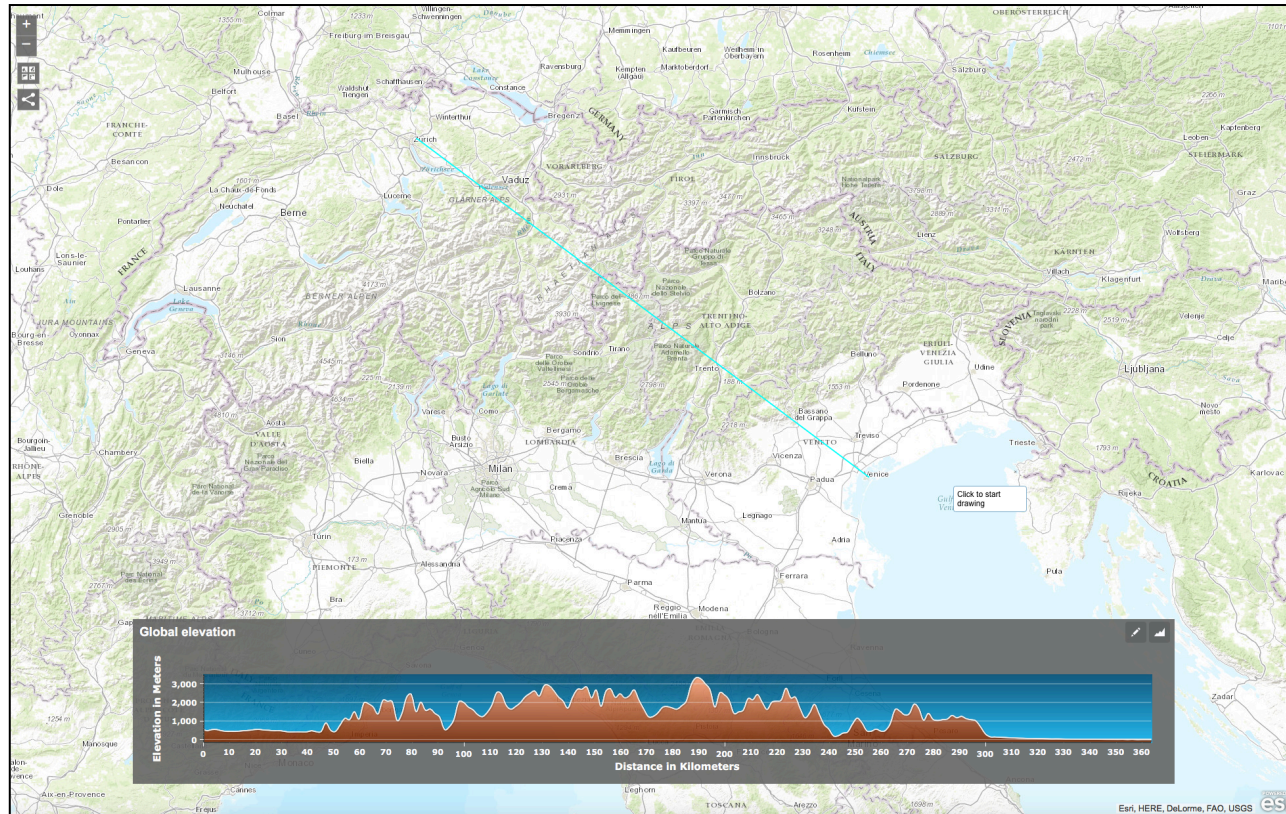
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- Suggest relevant content areas
- What is being represented ?
- Look for relationships eg. landforms & land use
- Interpret /analyse eg. Vulnerability to hazards
- Use inquiry questions



SOMETHING SIMILAR

# ESRI arcgis: Global elevation



Small subset of the GIS for schools program free to Australian schools

Global elevation

<http://esriukeducation.maps.arcgis.com/apps/Profile/index.html?appid=f0a2a2a3e1964129b22c715e31282f6c>

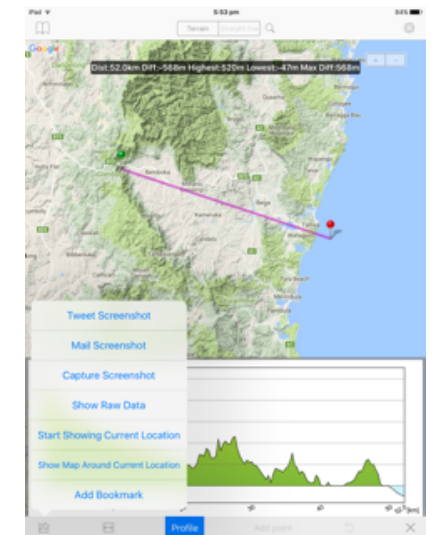
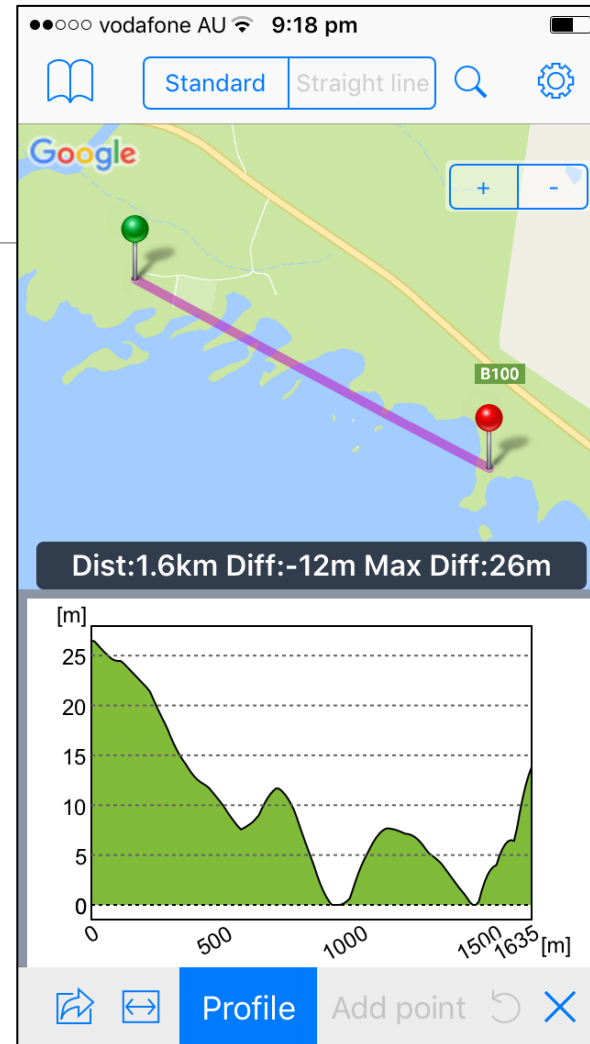


# Topo Profiler

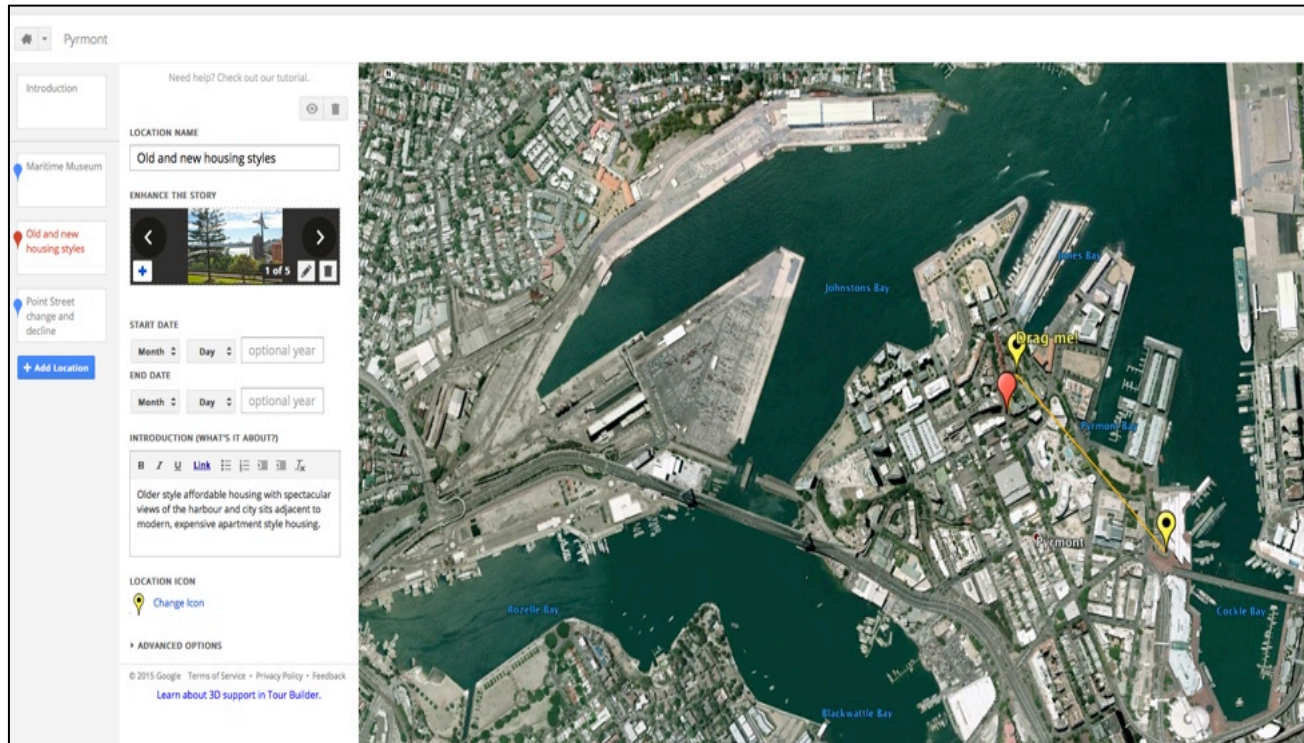
... and there is  
an iPhone / iPad  
App!

Topo Profiler – elevation graph viewer

<https://itunes.apple.com/us/app/topo-profiler-elevation-graph-viewer/id478596308?mt=8>



# 3. Google tour builder



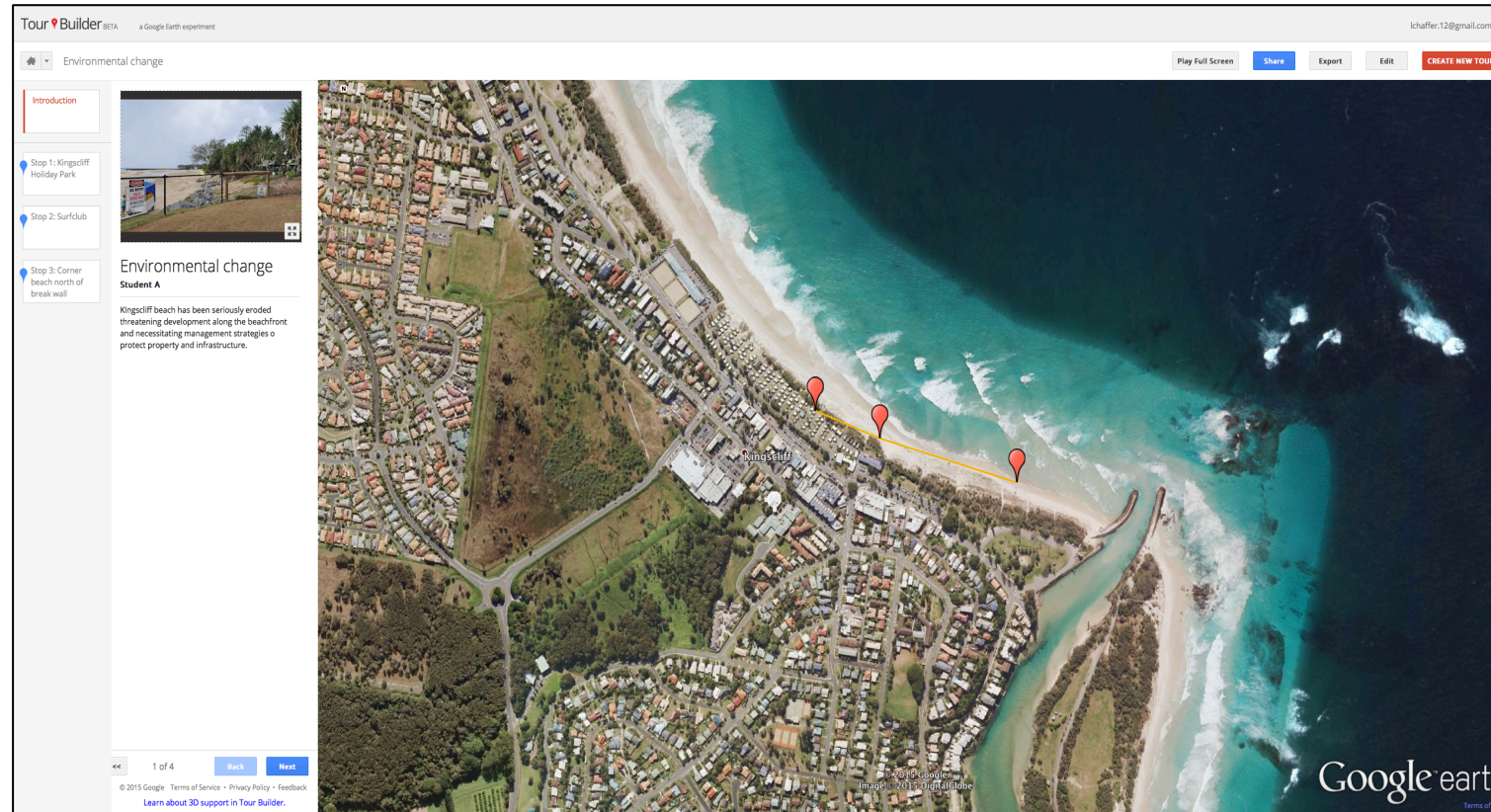
How / where  
could this be  
used?

Communicate  
inquiry findings

Inquiry &  
concepts

Map created by L Chaffer using Google Tour Builder  
<http://www.google.com.au/earth/outreach/tutorials/tourbuilder.html>

# Communicating fieldwork findings



Be geographical

Map created by L Chaffer using Google Tour Builder

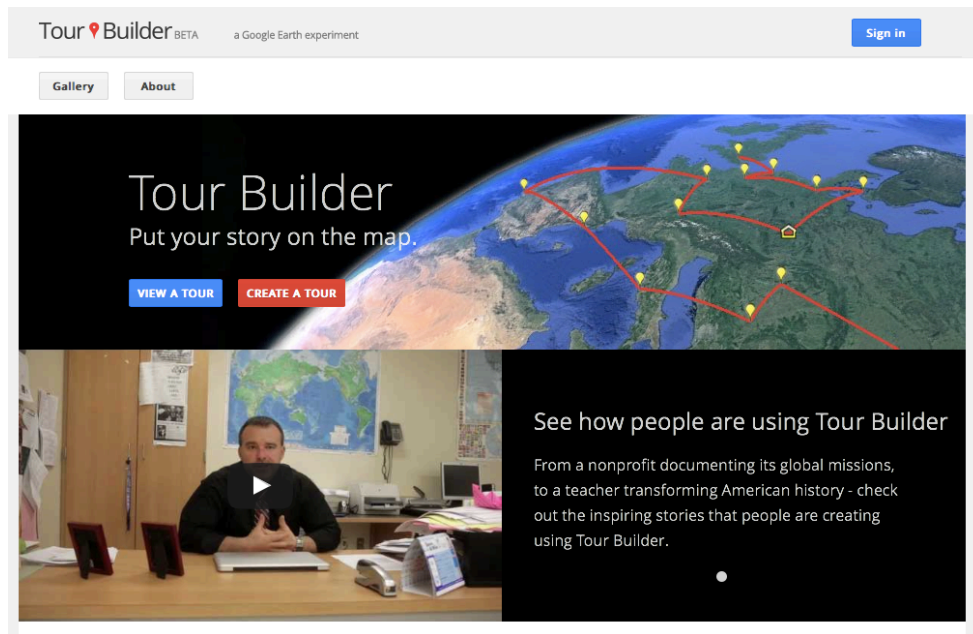
<http://www.google.com.au/earth/outreach/tutorials/tourbuilder.html>

POST FIELDWORK / Communicate inquiry findings



# Tour builder tutorial

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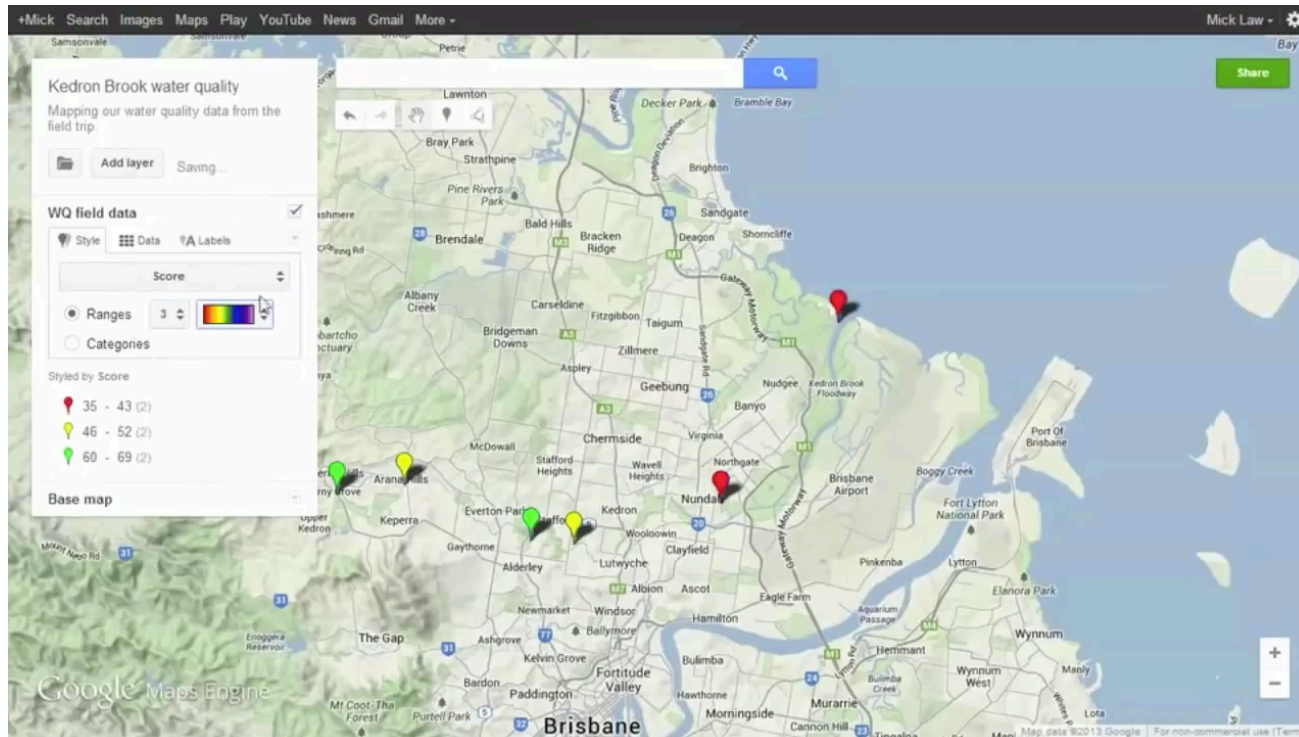
<https://tourbuilder.withgoogle.com>

Be geographical

Inquiry focus?

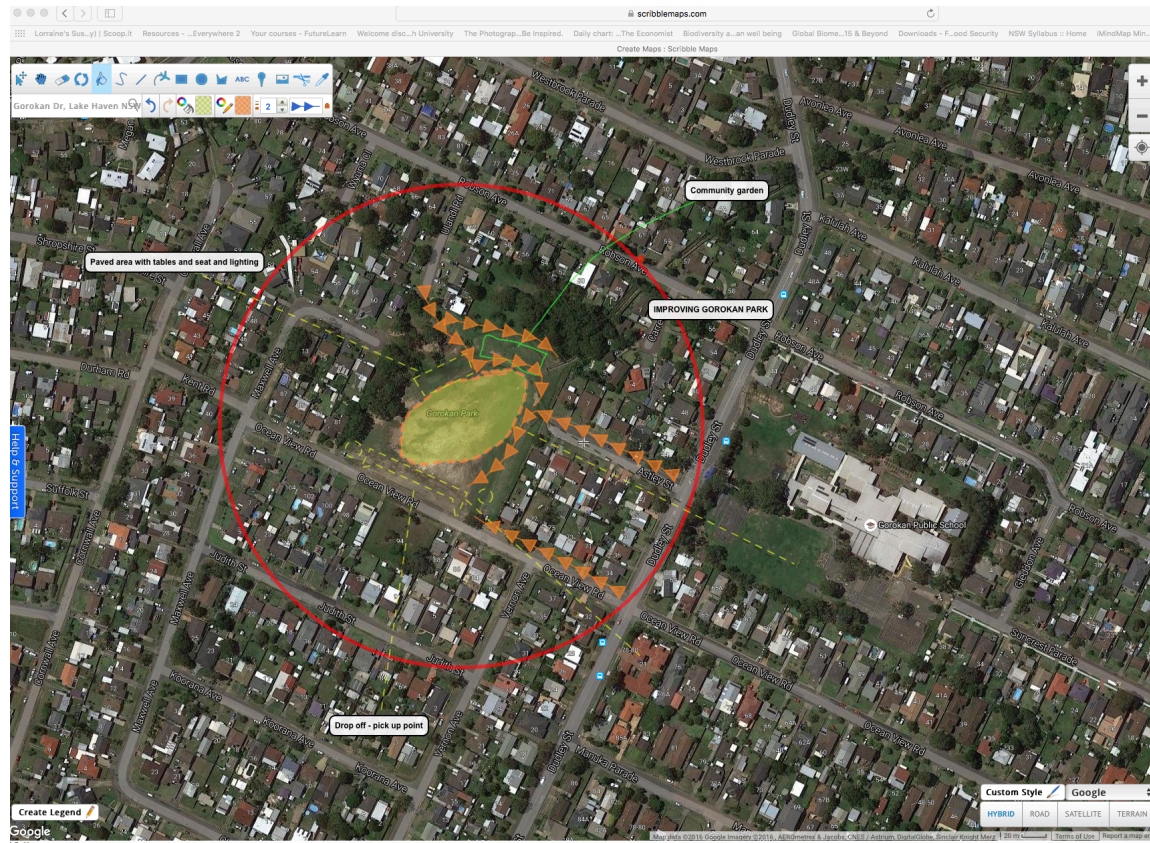
SOMETHING SIMILAR

# Google Maps



Tutorial <http://www.contourededucation.com/resources>

# 4. Scribble maps



<https://www.scribblemaps.com>

Liveability

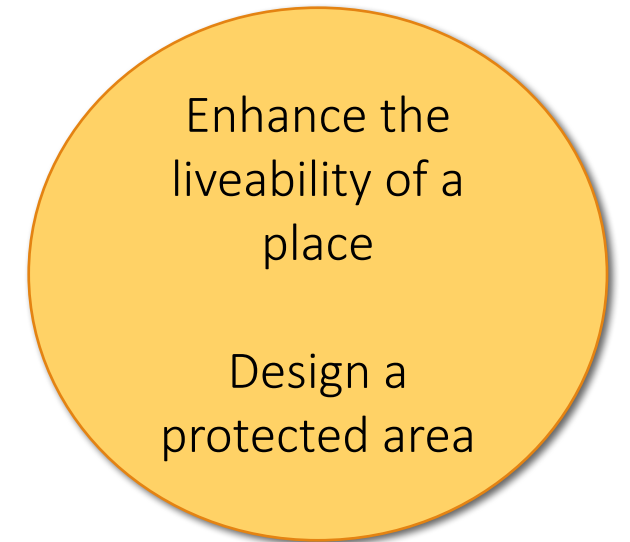
Landscape /  
environmental  
management  
and protection

Authentic task – A proposal to improve the liveability of a local place





<https://www.scribblemaps.com>



Screen captures L Chaffer



# Google Street view / Fieldwork photos

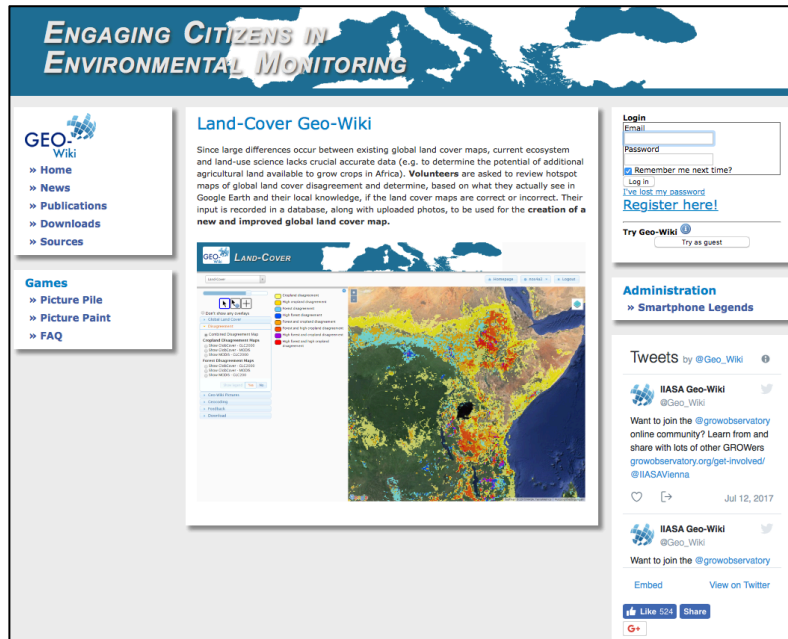


Sketch

Annotate  
images

# Open maps / real world

Citizenship



Citizen science



Magpie attack

Map Kibera

Royal National Park Education Centre / Aussie Backyard Bird Count



# ArcGis in Schools FREE

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Many different  
tools in one  
software  
package

GIS for schools ESRI Australia <http://esriaustralia.com.au/gis-for-schools>

Existing layers to investigate and analyse

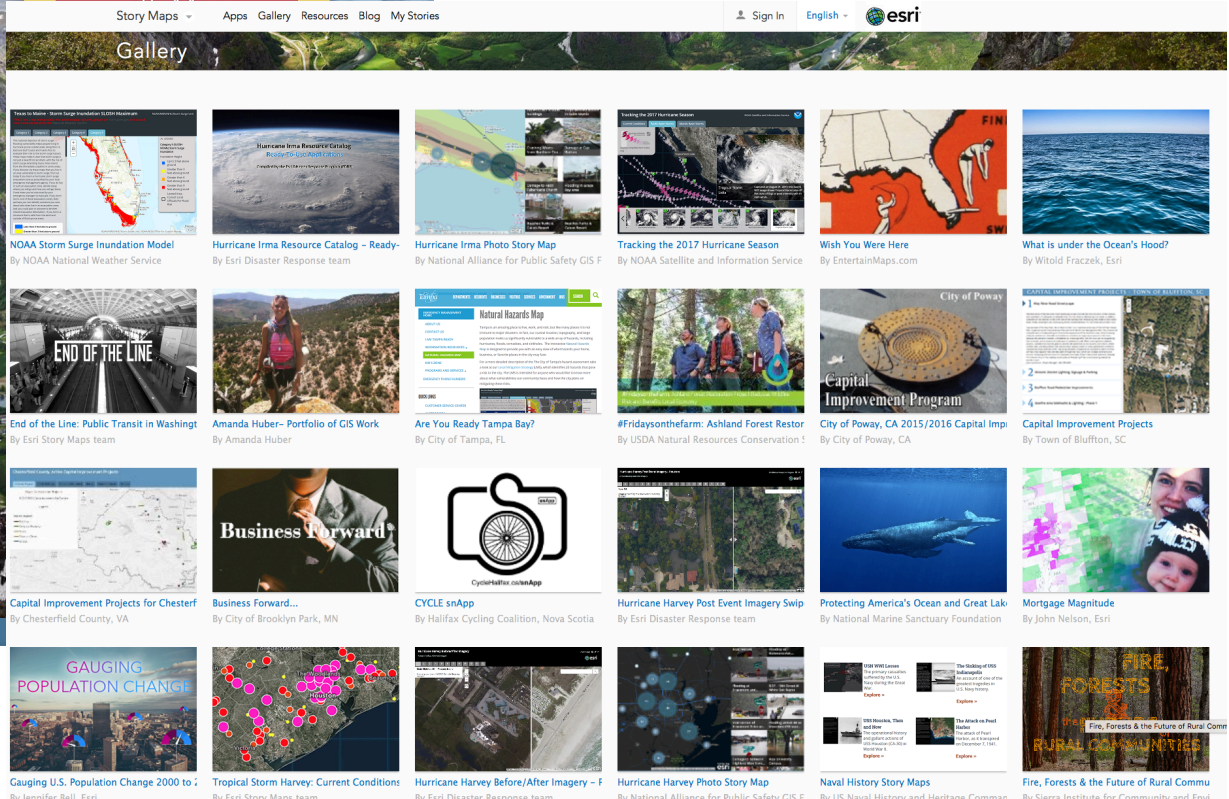
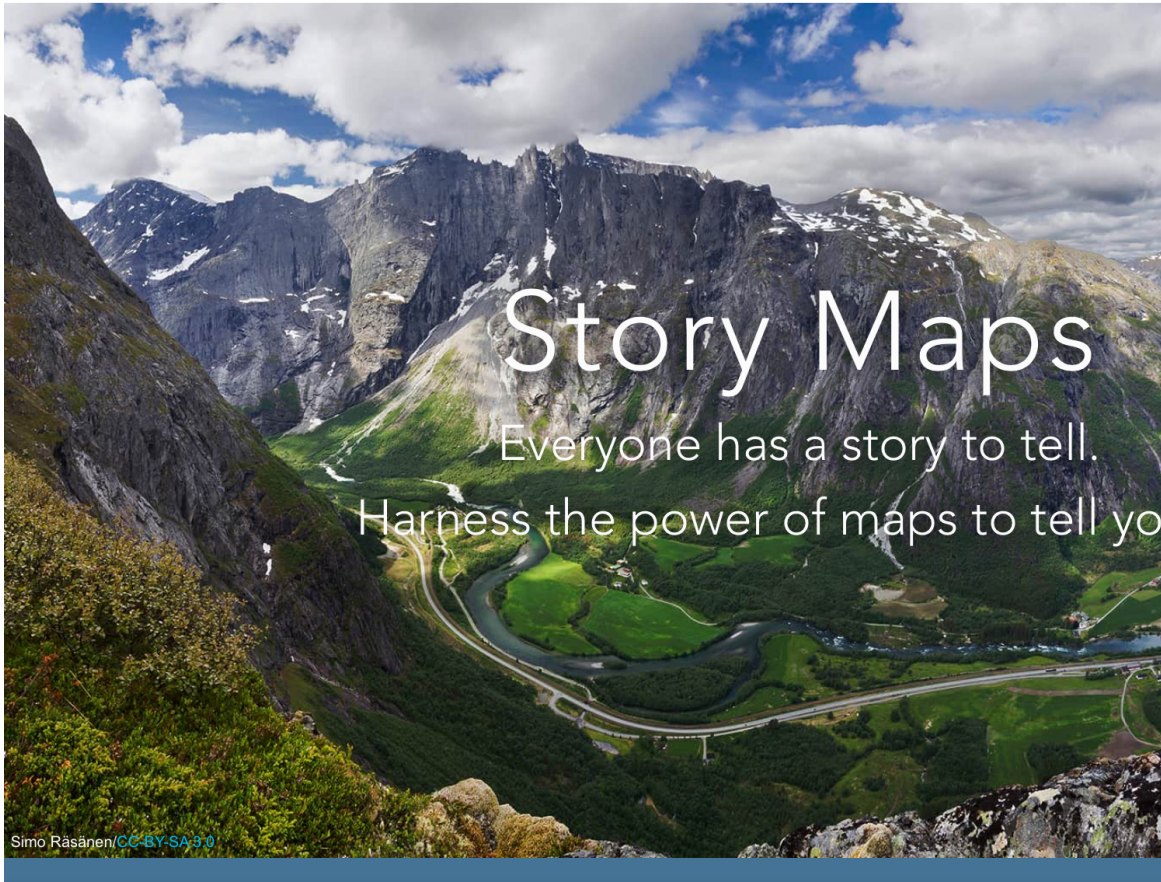
Import data to create maps

Story maps

Fieldwork



**STAY TUNED : GTA NSW / ESRI DAY WORKSHOPS ... 2018**



Acquire, process, create 

<https://storymaps.arcgis.com/en/gallery/#s=30>



Something for all  
topics



Landforms & Landscapes

<https://gctrust.maps.arcgis.com/apps/Cascade/index.html?appid=55584ca0e7f94a9b9473cc28dd6272cf>



Environmental change & management: DAMS

<http://storymaps.esri.com/stories/2015/river-reborn/>



[Return to overview](#)



## South Sudan in Crisis



Decades of ethnic conflict have torn the world's youngest country apart, leaving millions of civilians on the brink of starvation.

Photo: Pajut, South Sudan, March 2017, Nancy McNally/Catholic Relief Services

### Crisis in Context

7.5  
million people in need.

In July 2011, South Sudan declared independence from Sudan, after a long and bloody civil war that left over two million civilians dead and twice as many displaced. Although the country's leaders expressed optimism for a fresh start, South Sudan relapsed into civil war in 2013, after just two years of independence.



Human wellbeing

<http://storymaps.esri.com/stories/2017/dashboard-south-sudan/>

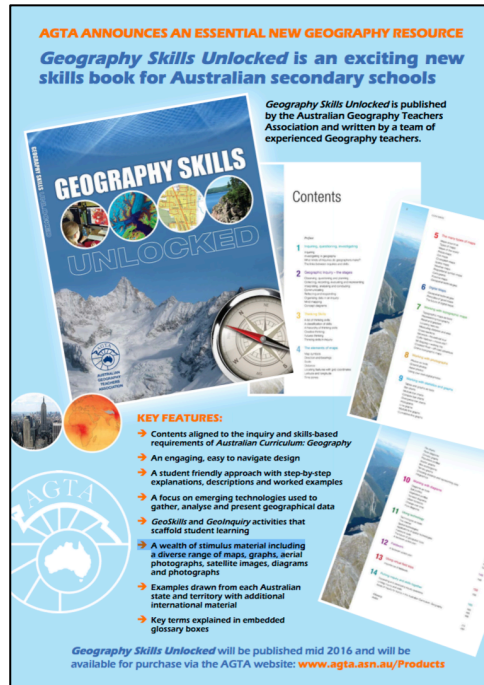
# Why spatial technologies / GIS

Employment /  
career links

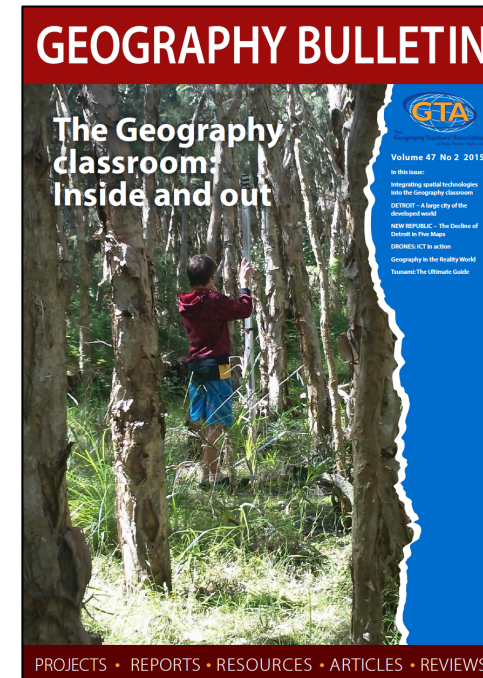


Management and  
protection  
Law Enforcement  
Planning

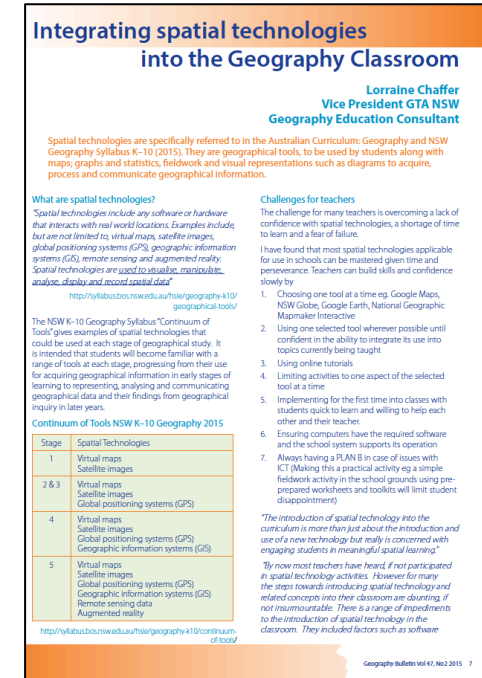
# Further reading



Geography Skills Unlocked  
Chapter 5 : Geospatial technologies pp 67-73  
Chapter 11: Spatial technologies : pp 143-149



GTA NSW Geography Bulletin ( copy on USB)  
Vol 47 No 2 2015  
Integrating spatial technologies into the Geography Classroom



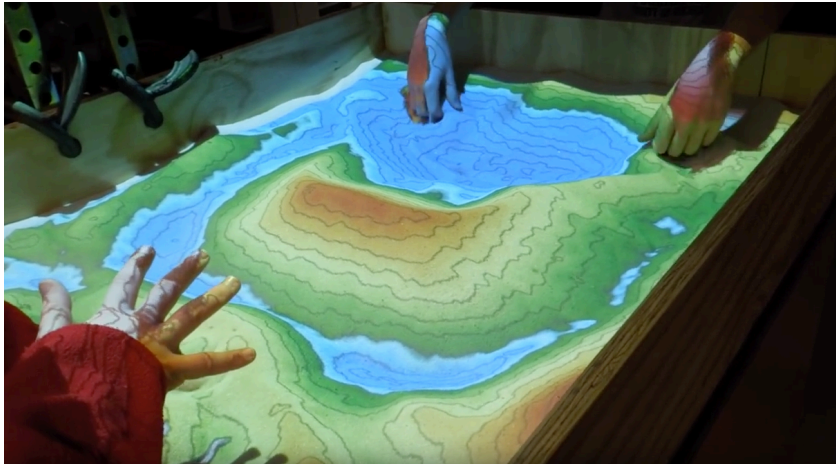


# Thank you: Questions

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# 5. Augmented Reality & virtual reality

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<https://www.youtube.com/watch?v=Ki8UXSJmrJE>

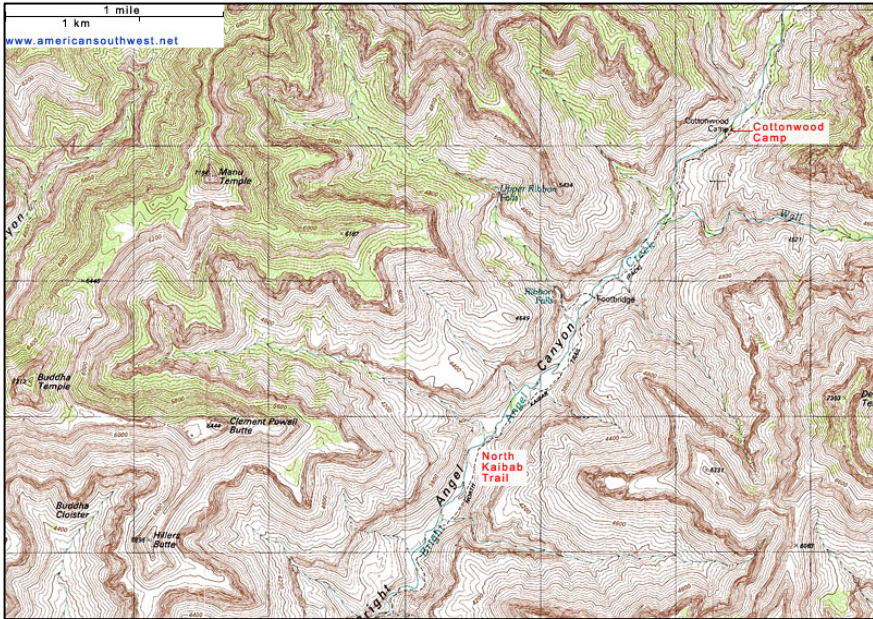


Example: Google expeditions



<https://www.theguardian.com/technology/2016/jun/13/best-virtual-reality-apps-smartphone-iphone-android-vr>  
<https://edtech4beginners.com/2016/11/14/a-fantastic-virtual-reality-app-fuldive/>

## 6. Flyover & streetview: visualising place & space



Google Earth flyover  
Google Earth 3D layer

[https://www.youtube.com/watch?v=eTzj7yyha\\_M](https://www.youtube.com/watch?v=eTzj7yyha_M)

<http://www.americansouthwest.net/topo-maps/north-kaibab-trail2.jpg>



# 7. 360 degree photographs / drone footage



<http://www.airpano.com>

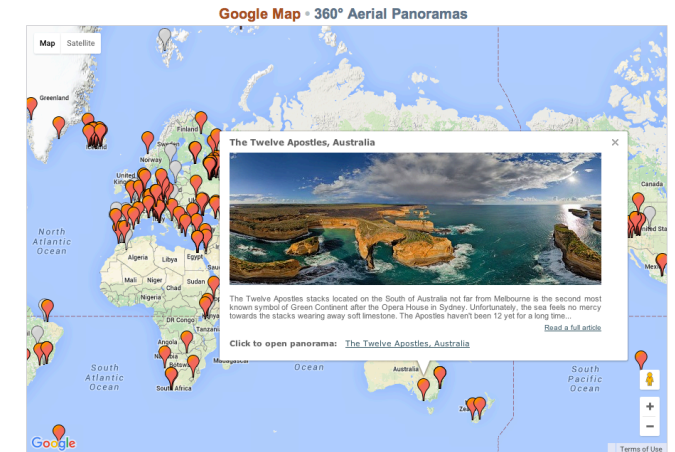
<https://www.airpano.com/files/the-twelve-apostles-australia/2-2>

Screen capture

## Google Map • 360° Aerial Panoramas



# AIRPANO



<https://www.airpano.com/files/the-twelve-apostles-australia/2-2>

Screen capture <http://www.airpano.com>



# 8: Interactive games / Apps

(Must have a spatial component / link to real world places )

Run the River (MDBA / Water / Environmental management )

Run that Town (Urban / Liveability) (ABS)

ABS Spotlight (Liveability / urban )

Stop disasters ( Landforms / water)

Catchment detox ( Water)

Ayiti Cost of a Life ( Wellbeing)

[www.stopdisastersgame.org](http://www.stopdisastersgame.org)

[www.mdba.gov.au](http://www.mdba.gov.au)

[www.runthattown.abs.gov.au](http://www.runthattown.abs.gov.au)

[www.abc.net.au/science/catchmentdetox/files/home.htm](http://www.abc.net.au/science/catchmentdetox/files/home.htm)

<https://ayiti.globalkids.org/game/>

<http://spotlight.abs.gov.au>

<http://www.stopdisastersgame.org/en/home.html>

