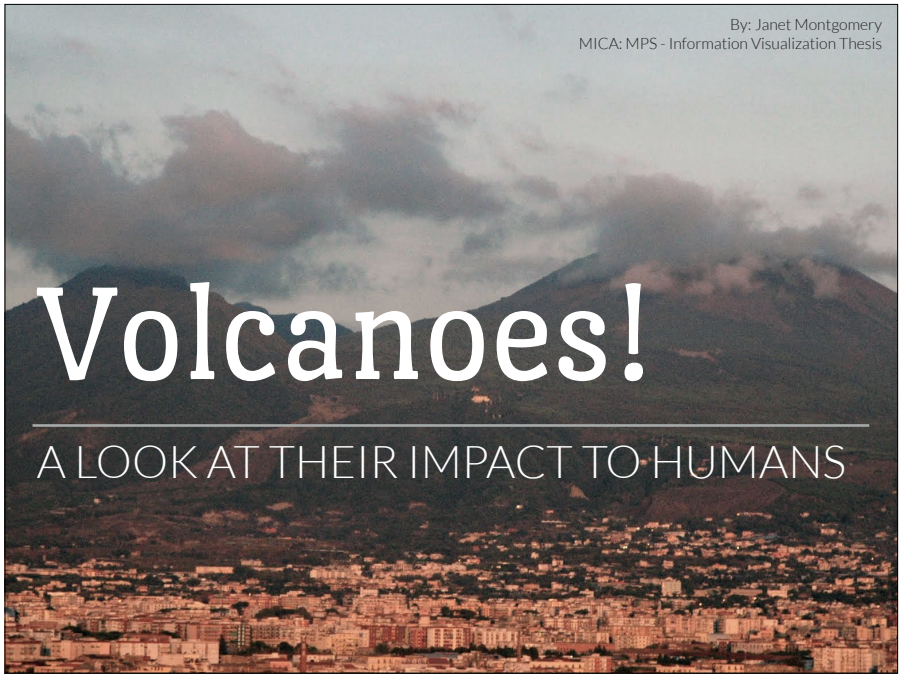


Inspiration

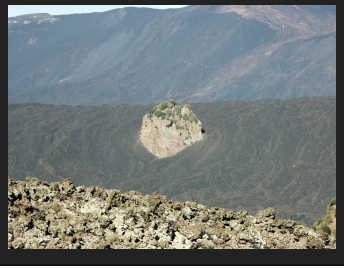
INSPIRATION

It all started here...

Mt. Etna; Sicily, Italy
Sept 2013

INSPIRATION

With a climb up the lava fields...



Mt. Etna; Sicily, Italy
Sept 2013

INSPIRATION

Onto a side crater and down into a lava tube...




Mt. Etna; Sicily, Italy
Sept 2013

INSPIRATION

Since then...




Clockwise:
Mt. Vesuvius; Naples, Italy; Sept 2013

Arenal; La Fortuna, Costa Rica; Oct 2015

Irazu; Cartago, Costa Rica; Oct 2015

Poas; Alajuela, Costa Rica; Oct 2015

The Problem

What is the problem?

- Data analyses are buried in research papers and data tables
- Available resources are very dense and text heavy
- Data communicated in very scientific terminology
- Requires reader to consolidate from disparate sources

THE PROBLEM

Why is the problem important?

- Population proximity to volcanoes
- Understanding hazards and risk reduction
- Impact to travel plans

Audience

THE AUDIENCE

Who is the audience?

- Phase 1: General Public and Students
  - Specifically readers of Wired, NatGeo, NYT, and WaPo
- Later Phases: More scientific community

Why this audience?

- Most volcano publications written for scientific community or elementary school
- Already interest via Wired

THE AUDIENCE

How did they influence the project?

- Find balance between scientific and approachability
- Need design elements to grab attention
- Information consumed digitally over print
- Able to handle large volumes of information but need in chunks

What other audiences could be interested?

- Schools
- Outreach departments for organizations like USGS and SI's GVP

Data Collection and Analysis

Where did the data come from?

- Smithsonian Institution's Global Volcanism Program
- NOAA's Natural Hazards Database
- Center for Research on the Epidemiology of Disasters (CRED) - International Disaster Database
- Volcanoes of the World, 3rd Edition
- USGS

DATA COLLECTION AND ANALYSIS

What were the data concerns?

- Different numbering schemas for volcanoes between sources
- Data not easily exportable/downloadable
- Some data only in print and had to be digitized
- Unknown data criteria and symbol meaning
- Data gaps

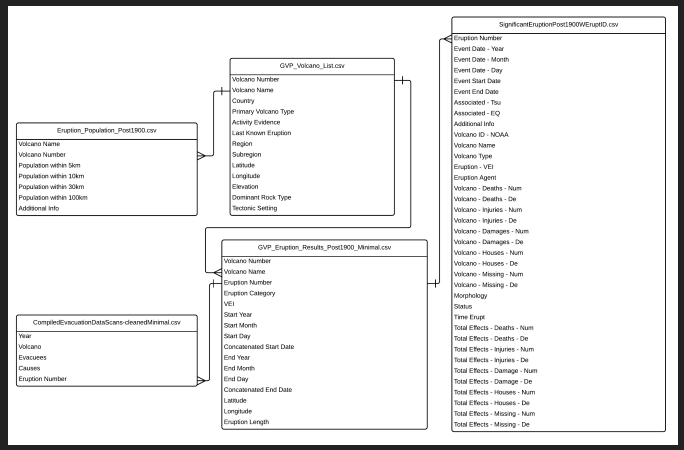
DATA COLLECTION AND ANALYSIS

How was the data cleaned?

- Tools: R and Excel

- Crosswalk data between two volcano numbering schemas
- Crosswalk eruption and significant eruption data
- Consolidate significant eruption data from multiple sources

What was the resulting data structure?



What did I learn during the analysis?

- Volume of volcanoes and eruptions around the world
- United Nations initiative relating to disaster reduction

What surprised me during the analysis?

- For a subject that is highly scientific requires massive coordination, there weren't consolidated sources including human impact
- Fatalities often were not from the eruption itself

DATA COLLECTION AND ANALYSIS

What kinds of questions came up during the analysis?

- Understanding of what happens after the eruption
- Comparing impact to other events
  - Natural disasters (earthquakes, fires, tsunamis)
  - Other unpredictable disasters (car and plane crashes)

How did the data influence the design?

- Data volume available for breakouts

Design and Development

DESIGN AND DEVELOPMENT

What is the solution?

- Interactive visualization
- Educational and consolidated information source
- Focus on:
  - Providing context
  - Correlate scientific concepts and impact
  - Illustrate impact and proximity

DESIGN AND DEVELOPMENT

Why an interactive and what is its value?

- Interactive visual representation increases:
  - Accessibility
  - Likelihood of consumption
- Empower learning about areas we live or travel to
  - Basic volcanic information
  - Disaster risk reduction
  - Disaster recovery and relief
- Increase interest and subsequent help with data gathering
- Provides mechanism to push new information without meeting/printing

What is the structure?

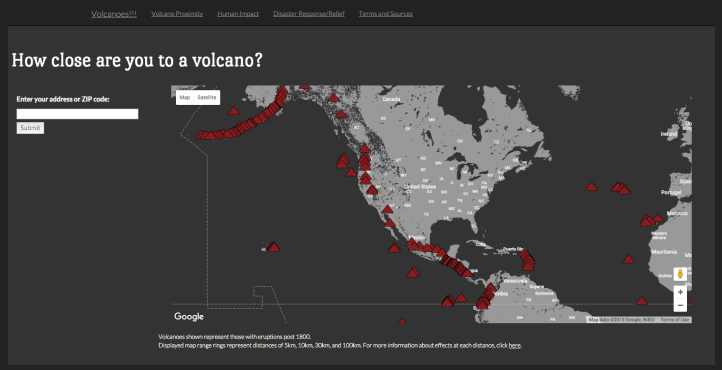
- Design is broken into four sections - proximity, human impact, disaster relief, and terms

Volcanoes!!! Volcano Proximity Human Impact Disaster Response/Relief Terms and Sources

DESIGN AND DEVELOPMENT

What are they key story elements and why?

- For reaching the audience
  - Map of learning your proximity to a volcano



What are they key story elements and why?

- For flow
  - Navigation guiding the educational path

Volcanoes!!! Volcano Proximity Human Impact Disaster Response/Relief Terms and Sources

What are they key story elements and why?

- For illustrating its purpose
  - VEI and Proximity relationship
  - VEI and Impact relationship

Volcanoes!!! Volcano Proximity Human Impact Disaster Response/Relief Terms and Sources

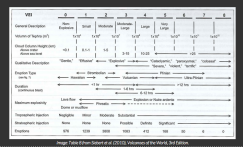
Do you know the impact volcanoes have on humans?

To better prepare for possible volcanic activity, it is important to first understand how volcanoes have impacted humans. We've learned in school about the eruption (VEI 5) of Vesuvius (Italy) that buried Pompeii under volcanic ash in 79 CE, killing most of its inhabitants. Some of us witnessed the destruction caused by the eruption of Mount St. Helens (United States) in 1980 CE, which was a VEI of 5. Then there is the largest recorded volcanic eruption which was Tambora (Indonesia) in 1815 CE, with a VEI of 7, which killed over 70,000 people and caused a global climate change. These represent well-known cataclysmic volcanic events but what about the impact of smaller events?

Understanding VEI

Volcano Explosivity Index, or VEI, is a scale that was created in the 1980s to be able to compare relative size/scale of volcanic activity throughout the world. The VEI scale is similar to the Richter Scale used in earthquake monitoring. The VEI calculation is based on a number of factors including: volume of tephra (airborne materials also known as pyroclasts), column height and eruption duration. The VEI image to the right illustrates the relationship between the VEI determining factors. Historical eruptions have been translated into the VEI scale based on documented observations and geological surveys.

The VEI scale goes from 0 to 8, with a factor of 10 increase in explosivity between each number.



Understanding VEI versus Proximity

This section describes the average impact of eruptions at standardized distances (5km, 10km, 30km, 100km). The descriptions describe tephra and pyroclastic flow probabilities at each of the distances. The

DESIGN AND DEVELOPMENT

What technologies were used?

- Adobe Creative Suite
- HTML
- CSS
- Highcharts
- Javascript / JQuery
- Google Maps API

What testing was completed?

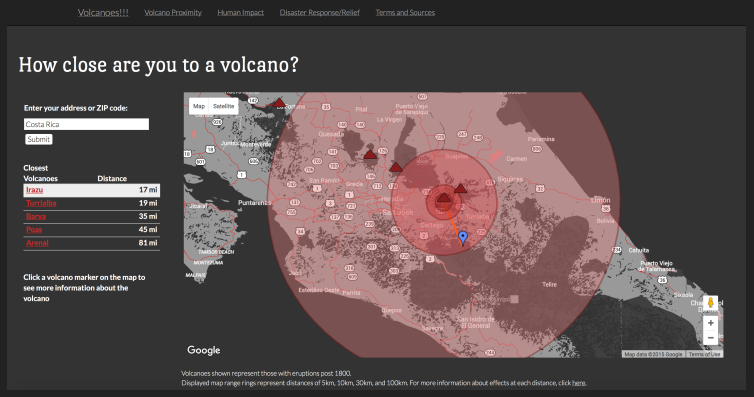
- Tested across several browsers and devices
- User testing with friends and colleagues
  - Captured list of feedback

Final Solution

FINAL SOLUTION

Are you ready for the final solution?

- Site: http://mica.thisisja.net/thesis-volcano-final.html



Future Expansion

FUTURE EXPANSION

What are projected future enhancements?

- Highlight new and on-going volcanic activity
- Find more evacuation and displacement data
- Connect visualizations directly to data sources
- Integrate earthquake data and look into predictive modeling
- Inclusion of the good things (e.g., crops)

Questions?