McGill GIS Workshop Outline

# Objectives

## List of Questions You May Have

### What is GIS?

### What can it do for me and my research?

### What’s the best GIS software?

### How do I learn the ins and outs?

## Demonstrate what GIS can do for geoscientists

## Outline the key principles of GIS

## Provide a step by step guide to make a map in QGIS

## If you take nothing else away from this workshop…

### You should be able to the questions outlined above

### GIS is a helpful tool in your workflow if you have data with a spatial dimension

### GIS software lets you store, collect, analyze, and share spatial data

### Modern GIS platforms like ArcMap and QGIS are all around workhorses – essential to tasks like spatial modeling, database management, cartography, geodesy, data visualization, hazard mitigation, and story telling

### Learning the capabilities of GIS is acquired from repeated, often frustrating, trial and error with the hundreds of built-in tools

### Studies should be designed with the GIS end user in mind!

### Cover Prologue, Units 1 in short (20 minute?) Intro Lecture

### Unit 2 Get’s standalone “Theory treatment” – 30-45 minutes?

### Unit 4 gets the most attention – detailed background, step-by-step guide, and accompanying lecture (90-120 minutes?)

### Wrap up with Unit 5 – 15 closer, further study, future applications of GIS

### Open TA Hours – Time is dependent on interest. 15-30 minutes each?

# Outline

## Prologue: My Background

### Brief Bio

### My GIS Portfolio

#### Sediment Transport in Delaware Bay

#### Fogo

#### American Water

#### Deccan Traps

#### Field Work Planning

#### SlabMetals2

## Unit 1: Why GIS? (They all know what it is)

### Advancing your analysis

#### Consider the spatial dimension (and doing it right)

#### Adding to your data

##### Volcanoes example

### Job prospects

### Making your data reusable!!

#### Deccan Example ☹

### Story telling

#### Examples from Story Maps

## UNIT 2: Principles of GIS

### My working principles

### Data Sources

#### Different data source examples

#### Actually using your data

### Projections

#### Coordinate reference systems

#### Georeferencing

### Data Types

#### Vector

#### Raster

### Errors

### Layout

#### Cartography

## UNIT 3: Getting Acquainted with QGIS

### What you’ll need!

#### Installation and Download

### Live Walk through of interface

#### Main Menus

#### Manipulating data

#### Changing format

### Quick example using my SlabMetals Database

#### Changing projection, re-categorizing, making a change, saving it, exporting as a CSV

## UNIT 4: Tutorial (Arc-Front Volcanoes)

### What problem are we trying to solve?

#### What are the properties of the mantle wedge underlying arc-front volcanoes?

#### How heterogeneous is subduction zone melting?

#### What kinds of tectonic controls do we see on volcanism globally?

### Identifying the tools we’ll need

#### Basic Workflow

#### Specific tools

#### Plugins

### Resources

#### Papers

#### Basemaps

#### CRS

### Cleaning the data

#### Anything we need to change before we start?

### Setting up the workspace

#### Browser

### Analyzing

#### Saving and storing

### Post-Processing

#### Renaming, cleaning, formatting

### Exporting to a nice map

#### Layout Manager

#### Cartographic elements

## UNIT 5: Advanced Skill Preview

### What is the future of GIS in geology?

#### Geostatistics

#### Big Data

#### Mapping formations the virtual way

#### Finally connecting the subsurface and the surface

### Resources for future study

#### Online guides

#### Books

#### Further study

##### GeoPandas

##### GRASS GIS

##### PostGres

# TA HOURS

## Following day or week

## Provide individual feedback on data, comments for future development

## Conceptual questions + practical problems welcome

# Resources For My Prepartion

## <https://www.nationalgeographic.org/encyclopedia/geographic-information-system-gis/>

## <https://www.esri.com/en-us/what-is-gis/overview>

## <https://spatialanalysisonline.com/HTML/index.html>

# Changes Based on 27/05 Meeting

Units 5 becomes advanced ssion, 3 sessions total

50 canadian dollars per session and TA hours

BASIC SESSION Week of June 15th:

Monday the 15th of June for SESSION 1: Basics and Theory 17:00 BST

Wednesday the 17th of June SESSION 2: Example Day 17:00 BST

ADVANCED SESSION Week of June 29th

Monday the 29th of June for SESSION 3: Advanced Stuff 17:00 BST

Wednesday the 1st for TA Hours: given time blocks where I’m available