

Name_____

Date_____

SWGNET Module 1-- Introduction: Geology and Topography

Overview

After completing this module, the user should be able to:

- understand the basics of using GIS (Geographic Information Systems) within the SWGNET framework
- define topography and geology
- describe the topography and geology of the 4 geologic provinces of Arizona
- understand the influence of geology on topography
- know how to find rocks of different ages and types

Introduction

Let's begin by examining the [SWGNET](#) homepage (you might want to bookmark it as a favorite).

Make at least three observations about the main image on the page and write them down here:

- 1.
- 2.
- 3.

The main image is a **DEM** (digital elevation model), with 1km **resolution**.

What do the colors on the DEM represent?

Where are the highest elevations found, and how high are they?

Where are the lowest elevations found, and how low are they?

Would something the size of your home show up in an image with 1km resolution? Why or why not?

If you lived in Arizona, would you be able to pick your house out of this image? Why or why not?

Would something the size of a mountain (say, Humphrey's Peak) show up in an image with 1 km resolution? Why or why not?

Would you be able to pick Humphrey's Peak out of this image? Why or why not?

Topography

From the SWGEONET home page, click on the link on the left that says "DATA." You will see a variety data available for downloading. For now, however, click on the link that says "**Even Newer! Geoinformatics Online Mapping--windows based.**" If you are using a dial-up connection, the page will take a few minutes to load.

The entire SWGEONET area comes up by default. Use the zoom in tool to enlarge Arizona so that it fills up the screen. Shut off all layers except the NED layer.

Arizona has four main geologic provinces: The Colorado Plateau (high and flat); Canyon Country (flat except for deeply incised canyons); Transition Zone (band of mountains); and Basin and Range (alternating highs--mountains and lows--valleys). Answer each question below, and then **assign the location the proper province.**

Which area has very little **relief** (i.e., mostly flat)?

How would you describe the southern third of Arizona?

Which area appears to be the most mountainous?

Where are canyons located?

Geology

Choose a county to work with, either by using the identify button, OR the query button. For either method, make sure that the County layer is the active layer.

Tip: If you are planning on completing the rest of the modules currently available (especially the hazards module), be sure to choose a county located in Arizona in which both earthquakes and landslides are present (do this by turning on those layers).

Describe the topography of the county you have chosen to work with (i.e., where are flat areas, mountains, canyons, etc.):

Turn on the Arizona geology layer and make it the active layer. Next, examine the geologic map of Arizona. Each color represents a different rock unit. The label for each rock unit represents two things: the first letter tells you the time period in which the rock was formed, and any following letters indicate either the actual name of the unit, or the lithology (rock type). For example, Trg: "T" indicates that the rock unit was formed in the

Tertiary time period (18-66 million years ago), and the “rg” is shorthand for Rim Gravels. The [Geologic Time Scale](#) under the tools module will assist you with determining names and ages of the various units.

Use the identify command to determine what rock types are present within the county you have chosen, and write them down in the table below. Use the abbreviations (e.g., Tb, Xg, etc.).

Igneous	Metamorphic	Sedimentary

Which rock type is dominant?

Which rock unit is the oldest, and how old is it?

Which rock unit is the youngest, and how old is it?

What correlations can you make between rock type and age, and topography (i.e., are the oldest rocks on the mountains, or do they have the highest elevations, etc.)? You may want to make a printout of either the topography or the geology to make a more accurate comparison.