**Determining Plate Rates from Hotspot Tracks**

Using Google Earth, download the HotspotVolcanism.kmz file and explore its contents. The first layer shows the distribution of plate boundaries, color coded by boundary type. The second layer provides ages (in millions of years) and locations of hotspot volcanoes. In this exercise, you will use the ages and locations of the hotspot volcanoes to determine the direction and rate of plate motion.

**In the HotspotVolcanism.kmz file, you will see the ages of a few volcanoes for each of the following hotspot tracks:**

* Hawaii-Emperor
* Yellowstone
* Easter Island
* Galapagos Islands
* Marquesas Islands
* Louisville Volcanic Chain
* Tristan da Cunha
* Kerguelen (90 East Ridge)
* Reunion Chain

1. Using the distance tool, measure the distance between the present location of the hotspot at **Kilauea Volcano** (southeast Hawai’i) and **Midway Island**, an older volcano along the chain, **in kilometers (km)**.

Measure distances from the point of each pin and round to the nearest whole km.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**km**

2. To determine the average rate of motion for the Pacific Plate in kilometers per million years, divide the distance between two volcanoes along the chain by their difference in ages (shown in millions of years, Ma). (Remember rate = distance/time). Round to the nearest tenth.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**km/my**

3. Most plate rates are measured in cm/yr, so convert your rate to cm/yr. A centimeter is the width of an average fingernail. Again, round to the nearest tenth.

Rate = \_\_\_\_\_\_\_\_\_\_\_\_ cm/yr

4. You probably noticed that the ages of the volcanoes do not always decrease linearly toward the present location of the hotspot. Explain in 1-2 sentences why you think this is the case.

5. Based on the hotspot tracks shown in the HotspotVolcanism.kmz file and the ages of the volcanoes, match the plate name from the following list to the arrow that most closely illustrates the direction of motion. (1) African Plate, (2) India/Australian Plate, (3) Indian Plate, (4) Nazca Plate, (5) North American Plate, (6) Pacific Plate, (7) Somalian Plate



6. Predict whether the **dominant** relationship between the following plates is convergent or divergent based on the plate motion determined from the hotspot tracks:

* Pacific & Nazca Plates
* North American & African Plates
* Somalia & Indian Plates