PART 1: C_Volcano Ages

At the end of the activity, each group member will turn in:
1. *One completed table of Volcano Ages for Hawaiian Ridge Volcanoes*.

2. *One graph with plotted Volcano Ages versus Distance from Kilauea.*

3. *Completed questions below.*

Overview
• With your group you will measure the Distance from Kilauea for several of the volcanoes of the Hawaiian Ridge.
• Then you will plot Volcano Age versus Distance from Kilauea for the Main Hawaiian Islands, and for the Northwestern Hawaiian Islands, for the few volcanoes that have age data.
• Finally you will calculate the rate of Volcano migration for the volcanoes of the Hawaiian Ridge and discuss explanations for the differences in volcano migration rates.

Directions and Questions

1) **COMPLETE TABLE PROVIDED:** Complete the blank spaces for Distance from Kilauea (km) for the 16 spaces in the table provided Volcano Ages for Hawaiian Ridge Volcanoes. Each group member can complete 4 blanks, or you can team up and do these in pairs. You can make the measurements using the string or tape measure provided and the scale bar on the map. You can use either the smaller strip map (which has diamond symbols for the location of the age) or full-size wall map for measuring (which has diamond symbols for the location of the center of each shield volcano in the Main Hawaiian Islands). Share results so each group member has a completed table.

2) **COMPLETE GRAPHS PROVIDED:** Once the table is completed, each group member will plot **ALL** of the Volcano ages on the graphs provided of Volcano Age (Myr) versus Distance from Kilauea (km). Plot **single data points** for the volcano ages for the Northwestern Hawaiian Islands *on the larger graph*. On the smaller inset graph, for the Main Hawaiian Islands, plot vertical lines to indicate the age range of each volcano.

3) Once all the Volcano ages are plotted on your graphs, use a ruler to draw best-fit line through the data points for the ages of the volcanoes of the Northwestern Hawaiian Islands.

Then draw a best fit line through the vertical lines for the Main Hawaiian Islands in the smaller inset map. Answer the following questions on the next page:

—Does one line fit the ages well? Does it appear to be a constant migration rate or varying migration rate?

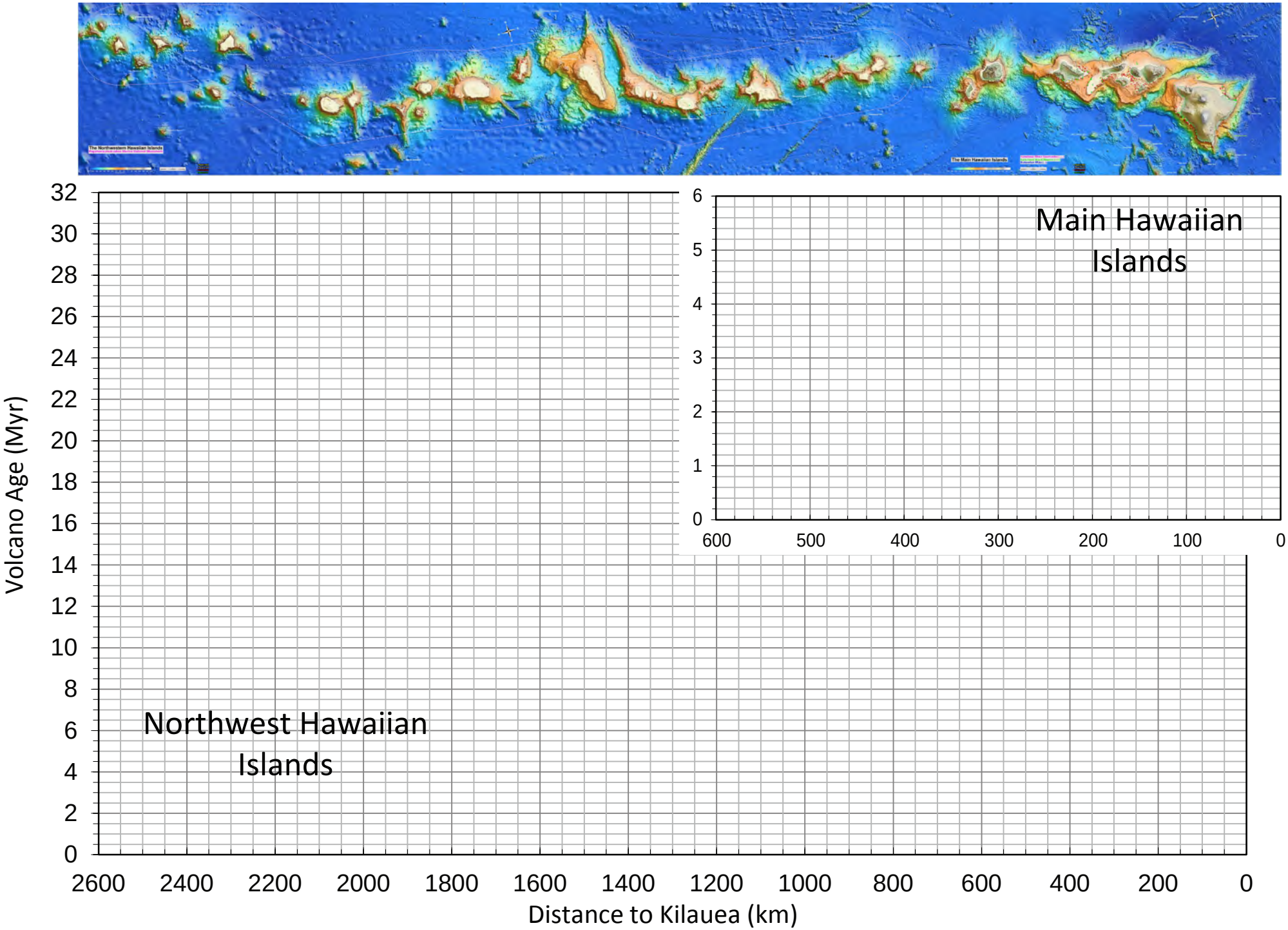
— From the best-fit lines, in both the larger graph (whole Hawaiian Ridge) and smaller inset graph (Main Hawaiian Islands), calculate rates for **Volcano migration** away from the Hawaiian hotspot at Kilauea Volcano in **km/Myr**, and then convert this estimate to **cm/yr**. [Volcano migration is the same as velocity: the change in distance divided by the change in time, or age, for the best-fit line. Select two points on each best fit line, to obtain distances and ages for the equations. Show your work below.]

4) Compare the rates of Volcano migration for the Northwestern and Main Hawaiian Islands, and discuss with your group possible explanations for the differences in the rates.

5) **Summarize your ideas and observations in several sentences** below, and list **TWO** possible **explanations** for the different Volcano migration rates for the Northwestern and Main Hawaiian Islands.
Be prepared to share your findings with your next group.

VOLCANO AGES FOR HAWAIIAN RIDGE VOLCANOES

	#	Volcano name	Dist. from Kilauea (km)	Age (Million years)
	1	Academician Berg		31.0
	2	Turnif		29.3
	3	Kure	2543	
	4	Nero	2492	
	5	Midway		27.6
	6	Ladd	2391	
	8	Salmon Bank	2316	
	7	Pearl & Hermes		24.7
	9	Kilo Moana	2114	
	10	Lisianski	2052	
	11	Pioneer Bank	1998	
	12	Kaiuli	1940	
	13	W. Northampton	1886	
	14	E. Northampton		19.9
	15	Laysan		20.7
	16	Mōlī	1795	
	17	Maro East	1747	
Northwest Hawaiian Islands	18	Maro West	1682	
	19	Raita	1611	
	20	NW Gardner	1514	
	21	Gardner		12.3
	22	West St. Rogatien	1365	
	23	St. Rogatien Bank	1339	
	24	W. Brooks Bank	1317	
	25	Brooks Bank		13.0
	26	SE Brooks Bank	1284	
	28	Kānehunamoku	1235	
	27	French Frigate Shoals		12.0
	30	Mokumanamana		10.3
	31	Necker SE	1045	
	32	Keoea	963	
	33	Twin Banks West		9.6
	34	Twin Banks East	901	
	35	Westpac Bank	871	
	36	Nīhoa West	825	
	37	Nīhoa East		7.5
	38	Middle Bank	702	
	39	Ni'ihau	565	5-6
	40	Kaua‘i		4-5.8
	41	Wai‘anae, O‘ahu	374	3-3.9
	42	Ko‘olau, O‘ahu		1.8-3.3
	43	West Moloka‘i	280	1.8-2.1
	44	East Moloka‘i	256	1.5-1.8
Main Hawaiian Islands	45	Lāna‘i		0.8-1.3
	46	West Maui	221	1.4-2
	47	Kaho‘olawe	185	0.9-1.2
	48	Haleakalā		0.2-2
	49	Māhukona, Hawai‘i	145	0.4-0.6
	50	Kohala, Hawai‘i	100	0.4-1.1
	51	Hualālai, Hawai‘i	65	0.2-0.8
	52	Mauna Kea, Hawai‘i	54	0.2-0.6
	53	Mauna Loa, Hawai‘i	20	0-0.6
	54	Kīlauea, Hawai‘i	0	0-0.3


Main Hawaiian Islands
Northwest Hawaiian Islands
Volcano Age (Myr)
Distance to Kilauea (km)
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
6
5
4
3
2
1
0
600
500
400
300
200
100
0