

EART 120: Controls on fluvial channel type

Name: _____

This exercise will give you practice identifying different fluvial channel types and introduce some of the controls on whether a river is braided or meandering. You will use Google Earth to find and measure nine different rivers from around the world.

Instructions:

First, change the elevation and lat/long units (Tools menu and then Options). Set the units of measurement to “meters, kilometers” and set the lat/long to “decimal degrees.”

For each river, copy the lat/long coordinates into the Google Earth search bar. You may have to zoom after navigating to the river to see the whole channel. Identify the channel type as braided or meandering and **enter that classification in the river type column in the table.**

Measure the channel width near the starting point and **enter the width in the table.** For braided or multi-channel rivers, try to find a place where there is a single channel (or where most of the water flows through a single channel).

Note the elevation of the starting point, listed on the bar at the bottom of the window. Be careful for some rivers, as the Google Earth elevations can be a little erratic, so zoom in fairly closely and make sure it's robust. You will use it later to calculate the gradient.

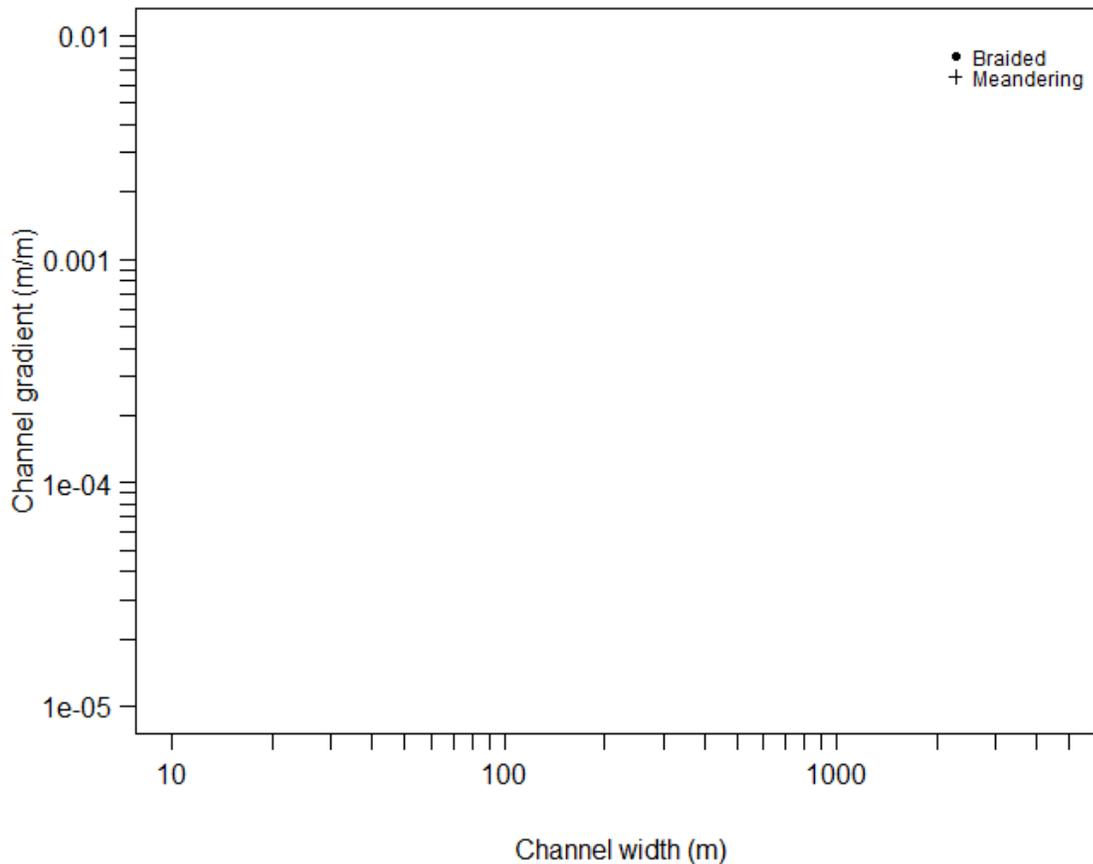
Next, use the Measurement tool (the blue ruler icon in the row of icons), select the Path tab, and change the units to meters from the dropdown menu. Measure from the starting lat/long point until you reach the ending lat/long point. Measure the actual river path (a reasonable approximation path is OK), not just a straight line. If the river has multiple channels, measure the distance along the one that looks like the main channel (the widest one). If there is no clear main channel, measure a straight line.

Determine the elevation of the downstream end of your measurement path by reading the elevation from the bar at the bottom of the map. Again, check around the point to make sure the reading is reliable.

Calculate the gradient, in meters of elevation loss per meter of channel distance, by dividing the elevation difference (maximum-minimum) by the channel distance, **and write the gradient in the table.**

River	Lat/Long	River Type	Gradient (m/m)	Width (m)
Ganges	25.35 N, 82.035 E to 25.205 N, 82.268 E			
Brahmaputra	27.555 N, 94.86 E to 27.301 N, 94.692 E			
Yana	67.558 N, 134.143 E to 67.618 N, 134.355 E			
Bear	56 N, 129.957 W to 55.98 N, 129.9655 W			
North Platte	41.435 N, 96.59 W to 41.404 N, 96.504 W			
Tagliamento	46.389 N, 13.144 E to 46.355 N, 13.125 E			
Mississippi	35.12 N, 90.09W to 34.933 N, 90.243 W			
Danube	45.54 N, 18.935 E to 45.443 N, 18.991 E			
Kiewa	36.183 S, 146.984 E to 36.207 S, 146.996 E			

When you have completed the table, plot the results on the graph below, using cross symbols for meandering rivers and solid circles for braided rivers, as indicated by the legend. Note that the axis scales are both logarithmic.



Use your data to answer these questions:

1. How is river type (braided vs. meandering) related to channel gradient?
2. How is river type (braided vs. meandering) related to channel width (which we are using as a rough proxy for the discharge, or amount of water flow, in the river)?
3. What other factors might influence river type? Compare climate and vegetation between the river types.
4. How do you think current velocity differs between braided and meandering rivers, on average?
5. Land plants did not evolve until the Ordovician and weren't common until the Devonian. How would this evolutionary event have affected river morphology?