**Sea-level Changes from Online Maps**

Google Earth provides a great way to look at sea-level trends around the world, a topic that is highly relevant to understanding coastal sediment transport. Remember that sea-level at individual locations can change because of processes operative globally (e.g., the volume of water in the ocean is increasing due to glacial melting to the expansion that occurs as the oceans warm) or due to local effects. Local sea level change may be caused by movements of the Earth’s crust (e.g., due to isostatic rebound after glaciers melt or to faulting/folding) or by the deposition or compaction/subsidence of sediments on the seafloor. If you aren’t sure where a location is, you can look it up in Google Earth or a similar mapping program

**Instructions:**

Navigate to the National Oceanic and Atmospheric Administration (NOAA) web page https://tidesandcurrents.noaa.gov/sltrends/ and view your data in their viewer.

**Looking at the data:**

1. First take a look at the East Coast of North America. Note that these trends are based on the record of tidal currents from gauges that are fixed to the seafloor (click on any one of the stations and follow the link to “sea level trends” to see the data—the Charleston, SC record is a particularly nice example). Approximately what is the average rate of sea-level rise along the East Coast?

Average rate of sea-level rise for the east coast is around 3.50 mm/year

1. Now travel up the coast to Canada. Can you explain why the gauges at Quebec and Pointe Au Pere indicate that sea-level is falling?

Due to changes in temperature the St. Lawerance River flows faster into the Great Lakes

1. Scoot down to the Gulf of Mexico. How would you describe the sea-level trends at Eagle Point, TX, and Grand Isle, LA compared to those on the East Coast? Can you think of explanations for the differences?

As the cooler water from the polar caps moves into the ocean warmer areas like the gulf of mexico see an increase along with the fact these locations are both the mouths of rivers causing more water to flow in and raise the level at these locations.

1. Now take a trip to Alaska (you can see Russia from there!). What is going on with sea-level at Skagway? Make sure to take a look at the sea-level trend data—what do they indicate about changes in this region during the past 50 years? (You might also want to look at the record from places like Skagway and Kodiak Island)

These locations have a significant decrease in sea level compared to other locations as conditions cause the cooler water here to recede. In the past 50 years these locations have seen a decrease in sea level consistently for 50 years, but no action has been taken to stop it.

1. Finally—take a trip around the world and check out some prominent places to see how sea level change is being expressed there. Please visit these places and report on sea level rise, while also considering what might be unique to that location:
   1. The Hawaiian Islands – 2mm/year, High Temperature but easy flow between islands makes currents not stagnate as much as other areas
   2. Tokyo, Japan. Check out video (please mute for your neighbors’ sake!) at <https://sealevel.climatecentral.org/maps/google-earth-video-global-cities-at-risk-from-sea-level-rise#tokyo> - many if not all the streets and sidewalks will be unwalkable.
   3. Funafuti in Tuvalu – 3.9mm/year - a tiny island like this is prone to being flooded especially with a twice than global average sea level rise
   4. Gan II in The Maldives (-0.652306, 73.173140). - 3.39mm/year series of small islands outside of Indian ocean under warm conditions
   5. Why are the people of Maldives and Tuvalu particularly concerned about sea-level rise (you might zoom in to see what the islands look like)? - Extremely flat islands in warm areas prone to flooding