GLY 4734/6932 - Coastal Morphology and Processes
Beach Profiles / The Bruun Rule

March 28, 2019

Names: _____ Group: _____

The "bathtub model" of sea level rise describes how SLR would affect the shoreline if the beach profile does not change (like pouring water into a bathtub).
The "Bruun Rule" describes shoreline change given a beach profile which is dynamically responsive to SLR.

1. According to the bathtub model:

   (a) How does the shoreline position change as sea level increases?

   (b) How does the upper shoreface change as sea level increases?

   (c) How does the lower shoreface change as sea level increases?

2. What are some limitations of the bathtub model?

3. According to the Bruun Rule:

   (a) How does the shoreline position change as sea level increases?

   (b) How does the upper shoreface change as sea level increases?

   (c) How does the lower shoreface change as sea level increases?

4. What are some limitations of the Bruun Rule model?

5. How does shoreline change in response to sea level rise using the Bruun Rule compare to shoreline change using the bathtub model?

6. Consider two beachfaces, one with coarse grain sand and the other with fine grain sand. the effects of sediment grain size on beach profiles.

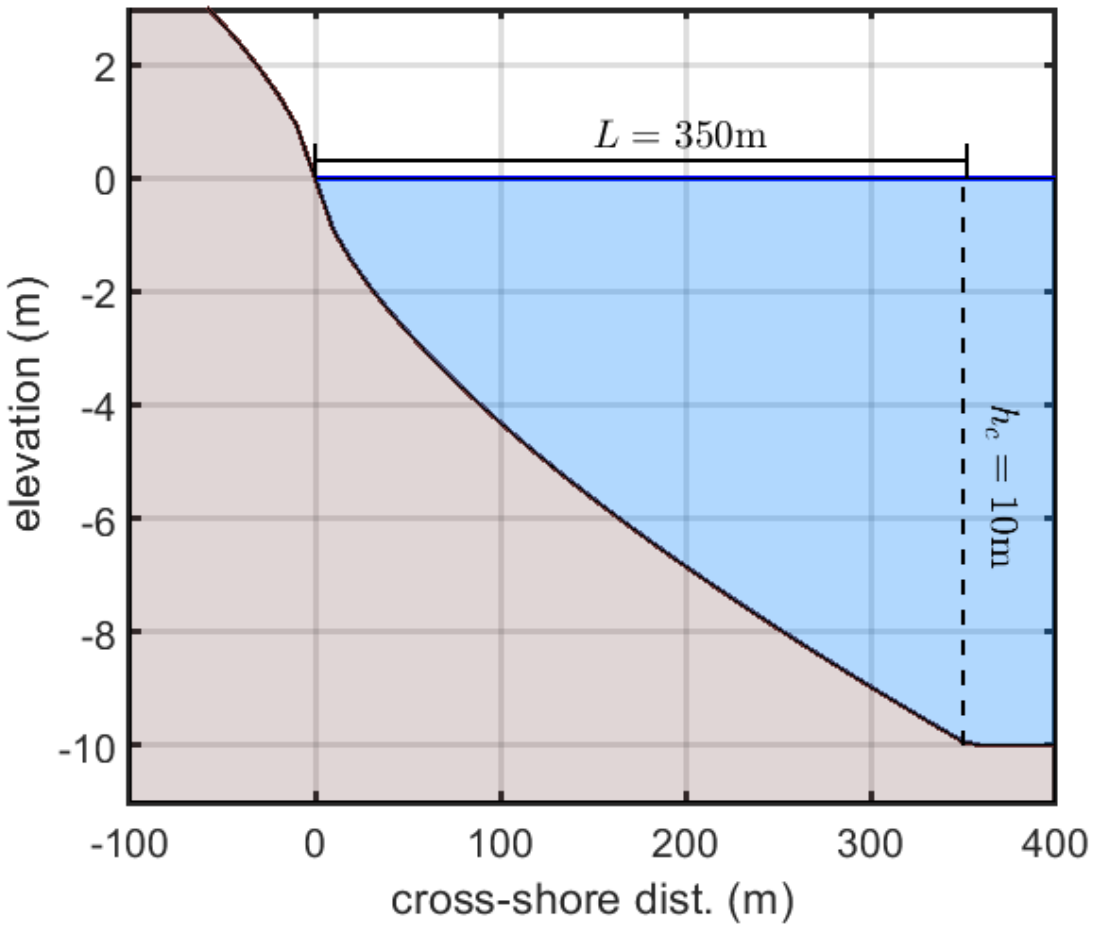
   (a) Describe how you would expect the slope of the two beaches to differ.

   (b) If both beaches experience the same amount of sea level rise, which beach would experience greater shoreline recessions?

   (c) Describe the relationship between beach slope and shoreline change due to sea level rise.

7. Consider the diagram below and Bruun's Rule.

$$R = \frac{SL}{h_c} \tag{1}$$



Given 2 meters of sea level rise ($S = 2$), determine the following. Provide you answers as (x, z) coordinates, where x is the cross-shore position and z is elevation.

(a) Shoreline position

(b) Position of the depth of closure

Draw the adjusted profile on the diagram. Label h_c, R, and S.