

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?

1 pt - recedes

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

1 pt - doesn't change or narrows

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

1 pt - doesn't change or widens

2. What are some limitations of the bathtub model?

no score - answers will vary

3. According to the Bruun Rule:

(a) How does the shoreline position change as sea level increases? **1 pt - recedes**

(b) How does the upper shoreface change as sea level increases? **1 pt - steepens or erodes**

(c) How does the lower shoreface change as sea level increases? **1 pt - shallows or accrete**

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

no score - answers will vary

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

1 pt - more shoreline change using the Bruun rule

6. Consider two beachfaces, one with coarse grain sand and the other with fine grain sand.

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

1 pt - coarser:steeper::finer:shallower

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

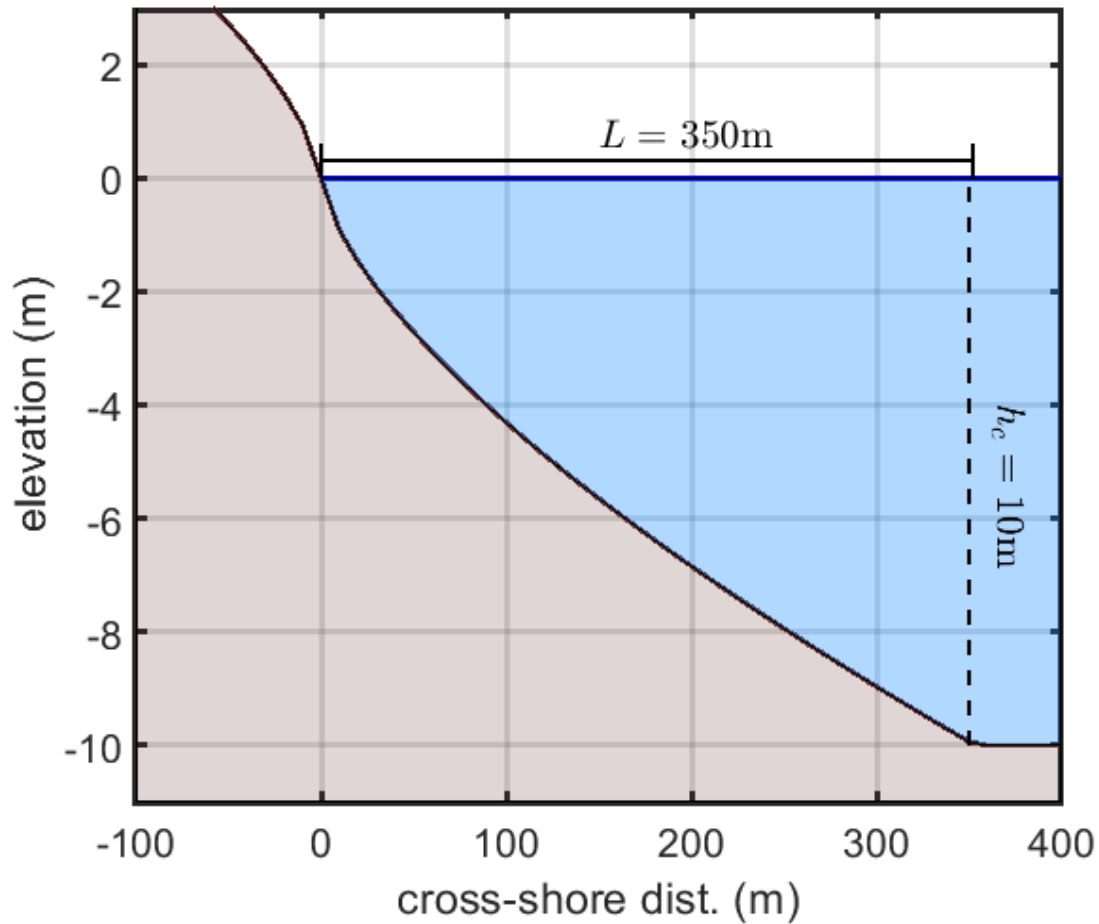
1 pt - finer

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

1 pt - they are inversely related

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

$$R = \frac{SL}{h_c} \quad (1)$$



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

(a) Shoreline position

2 pt - (-70, s)

(b) Position of the depth of closure

2 pt - (280, -8)

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

4 pt - S , R , h_c , and profile shape