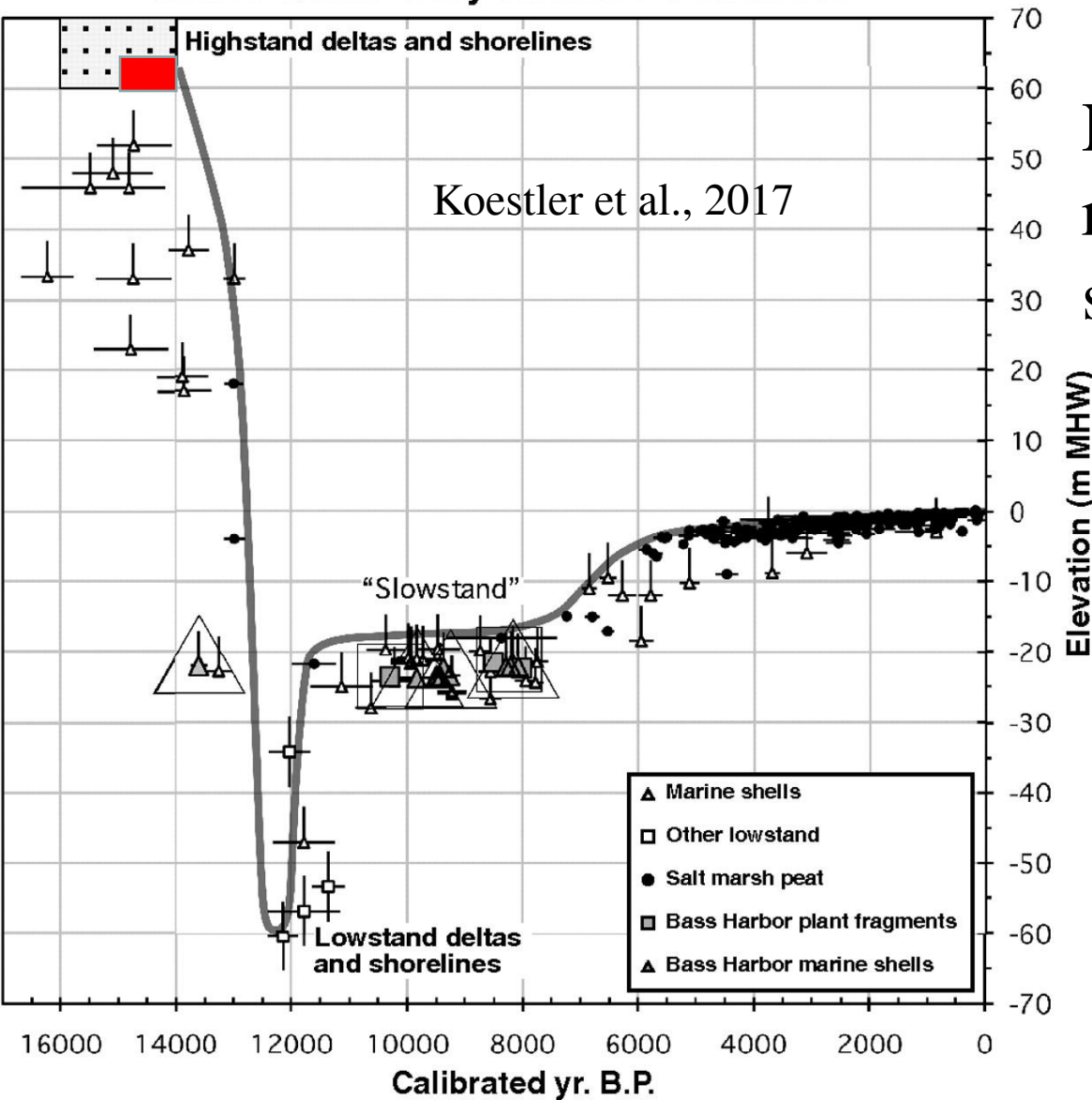


Sea Level Rise & Maine's Shell Middens



Maine Quaternary Relative Sea Level

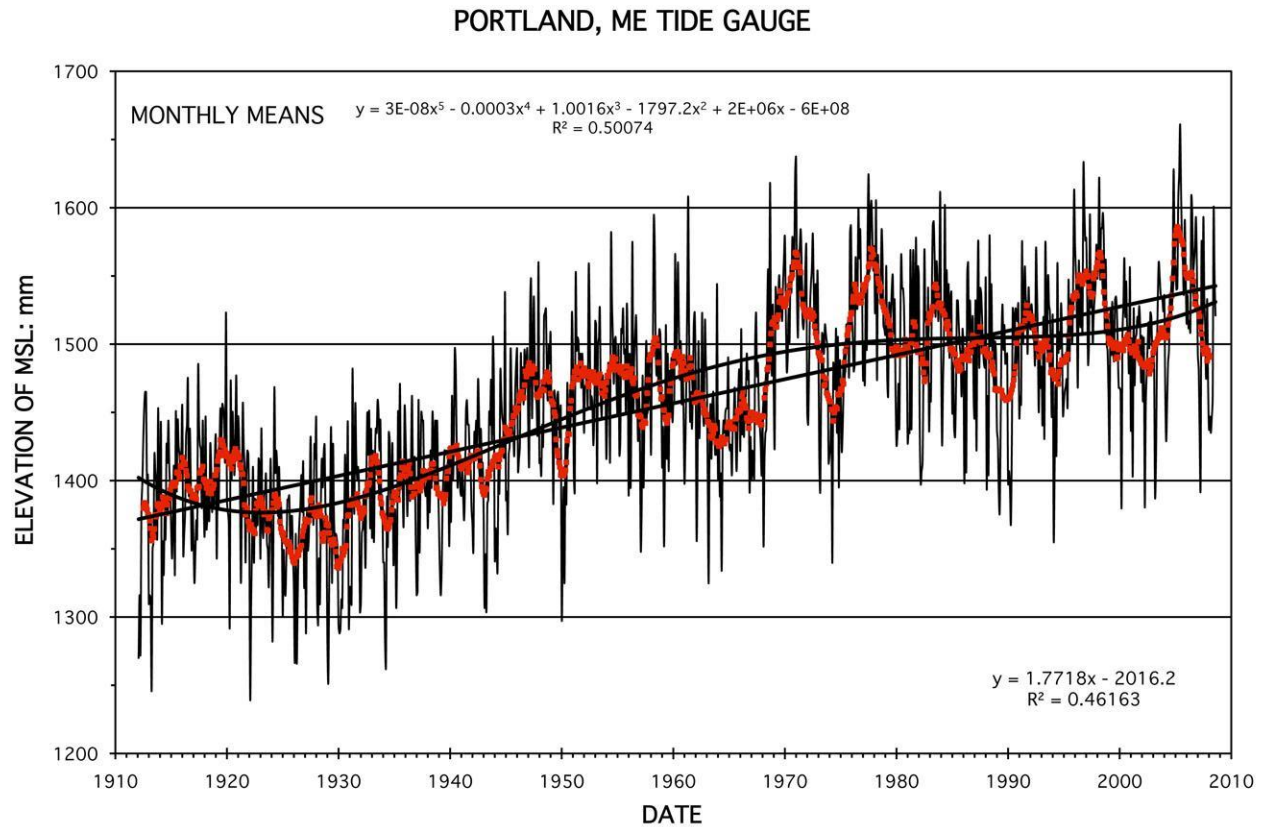


New technique to date raised shorelines: surface exposure dating

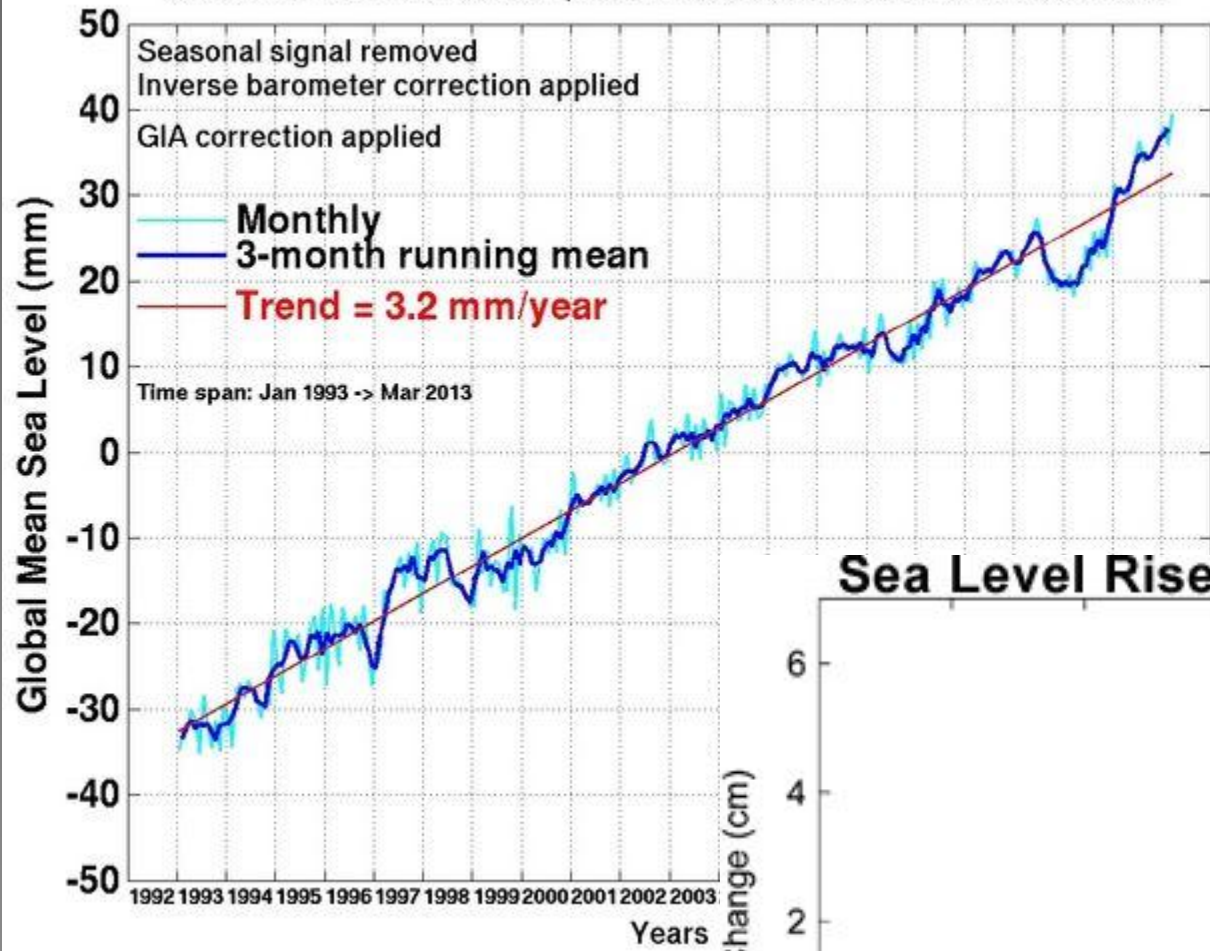
Kelley et al., 2010, 2013

Bar Harbor tide gauge

Portland tide gauge record: 1.77 mm/yr,
1912-2009 (0.58 ft/century)

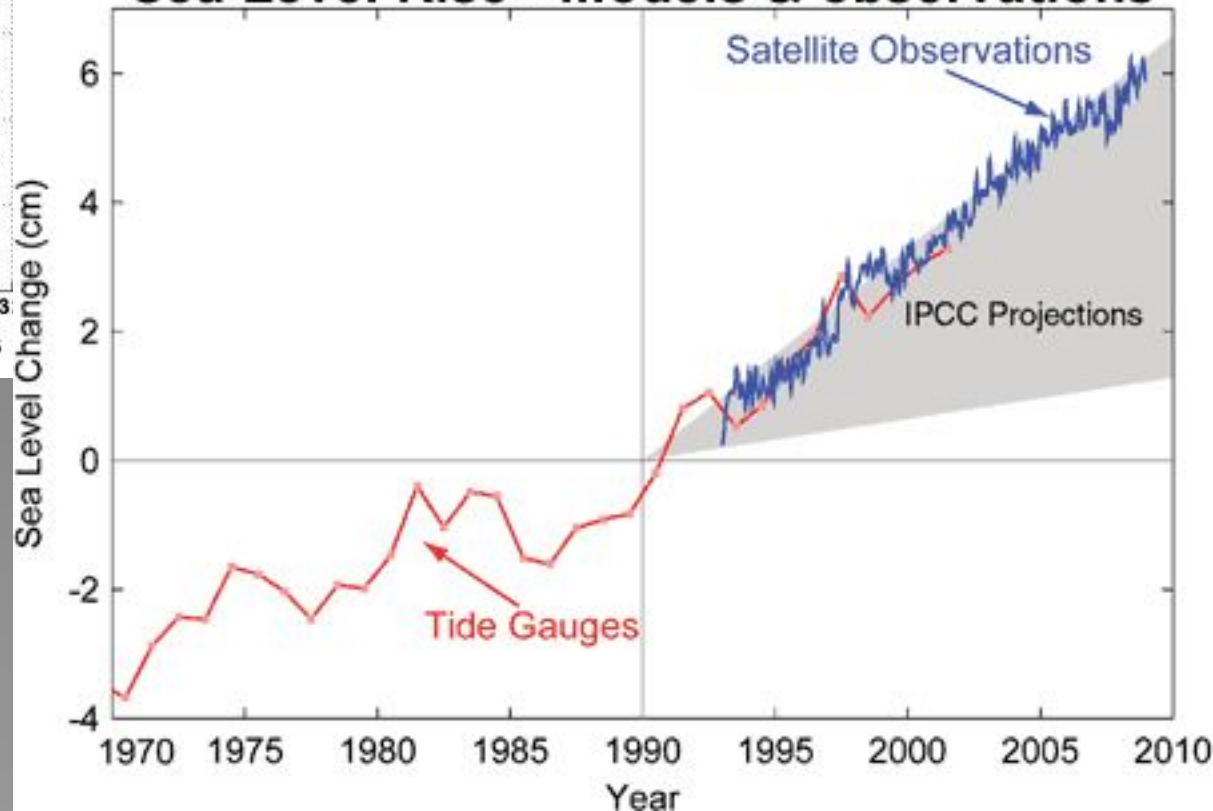


GMSL from TOPEX/Poseidon, Jason-1 and Jason-2 satellite altimeter data



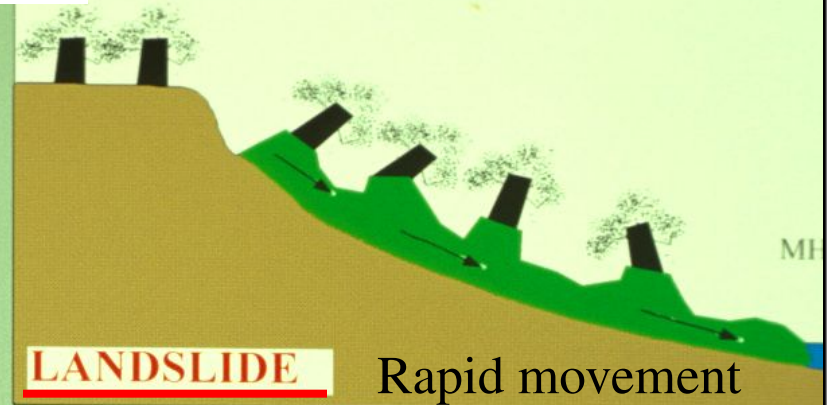
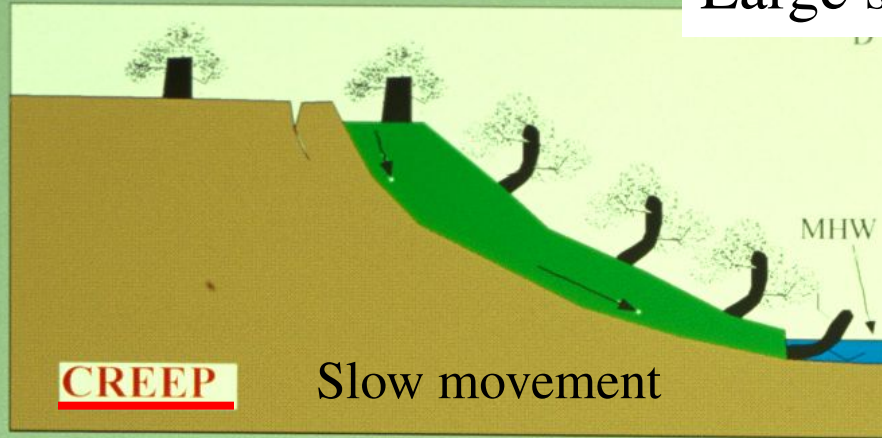
Note that satellite is not confused by “noise” that tide gauge deals with.

Sea Level Rise - models & observations

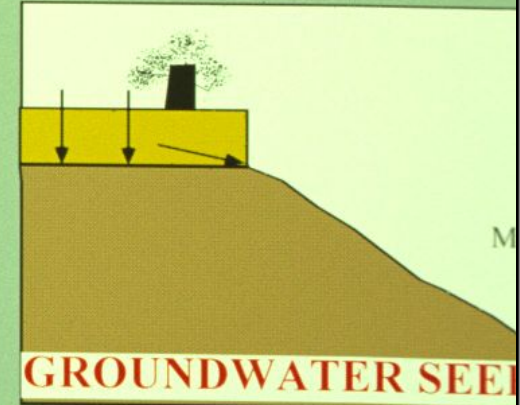
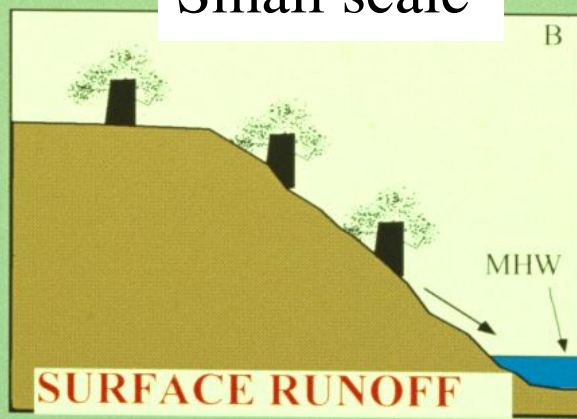
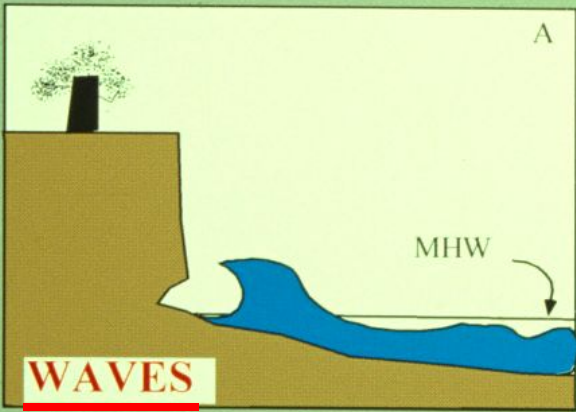


<http://www.skepticalscience.com/sea-level-rise-predictions-basic.html>

Large scale



Small scale



BLUFF-EROSION PROCESSES

1. Wave Attack:
carries away mud
from bluff toe



2. Surface Runoff (rain, snowmelt)

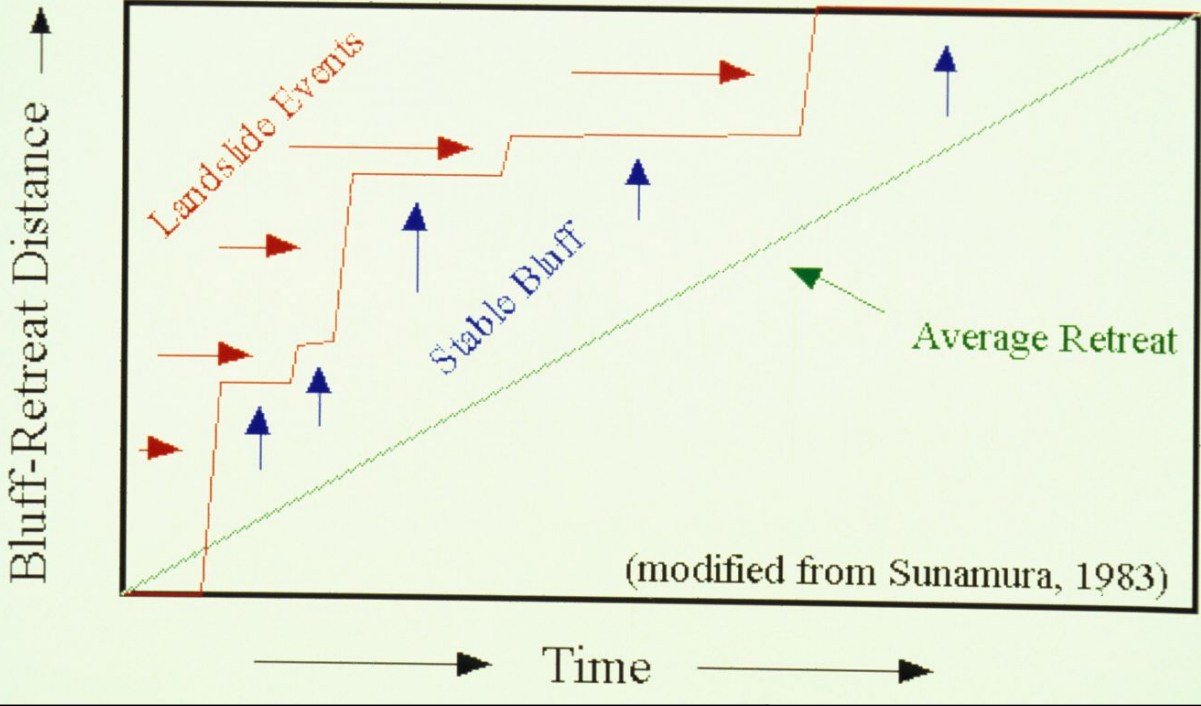


3. Groundwater Thaw, Spring, Lubec, ME

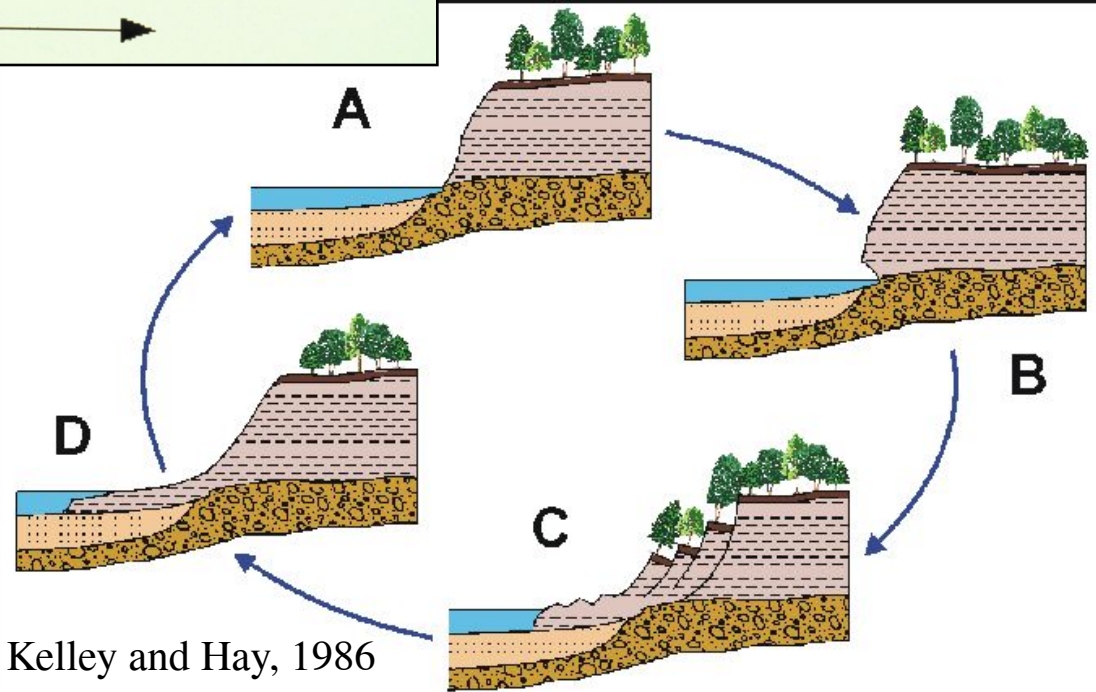


EPISODIC BLUFF RETREAT THROUGH TIME

Rate(s) of Bluff Retreat



(modified from Sunamura, 1983)



Kelley and Hay, 1986

Olsen Site Midden



We monitor midden sites and other bluffs to better predict rate(s) of retreat. This is a detailed 3-d model of an eroding site that can be compared with future images to evaluate erosion.