

Lecture 11

## Midterm review

- i. Turn on PRS
- ii. [New homework posted](#)

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## Midterm logistics

- a. Bring a #2 pencil
- b. Scantrons will be provided
- c. Cheat sheet
- d. Photo ID

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## Resources to study

1. Your in-class lecture notes
2. Content in assigned reading
3. Topics covered in homework

\* These are complementary materials.

\* One resource enhances the other, but does not necessarily duplicate it.

\* Focus study on - synthesis of concepts and areas in which your understanding isn't fully developed.

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**Synthesis of large themes**

- How the solar system formed
- How planetary bodies become differentiated
- Why some planets have magnetic fields
- Why some planets have active volcanism
- How plate tectonic activity operates on Earth
- How planetary bodies move around the Sun
- What causes the tides?
- How craters formed on the Moon

\* Know "how and why" we know things.

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**The details**

Know terms used in lecture and reading.

Be able to cite the significant contributions of key scientists.

Differences between the Moon and Earth

Key characteristics of the rocky planets

Names of geographic features we discussed in lecture, reading or homework

How to use quantitative skills in obtaining key information needed to make an assessment or decision

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Your judgment and execution in deciding how to allot limited study time.

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# The earth-moon-sun system

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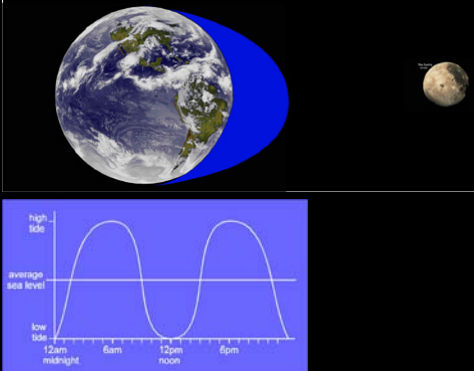
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How we envision the tide - what's wrong with this picture?



The diagram shows Earth and the Moon. A blue oval represents the tidal bulge on Earth. Below it is a graph of sea level over a 24-hour period. The y-axis is labeled 'high tide', 'average sea level', and 'low tide'. The x-axis is labeled with '12am midnight', '6am', '12pm noon', and '6pm'. The graph shows two peaks (high tide) and two troughs (low tide) over the 24-hour period.

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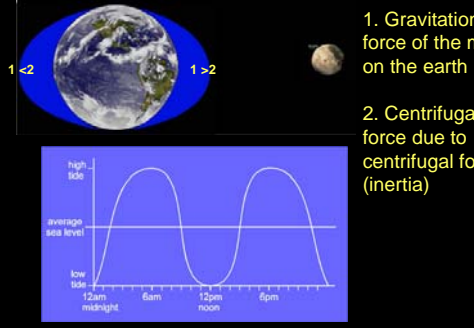
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Closer to the actual case - the causes?



The diagram shows Earth and the Moon. A blue oval represents the tidal bulge on Earth. Below it is a graph of sea level over a 24-hour period. The y-axis is labeled 'high tide', 'average sea level', and 'low tide'. The x-axis is labeled with '12am midnight', '6am', '12pm noon', and '6pm'. The graph shows two peaks (high tide) and two troughs (low tide) over the 24-hour period.

1. Gravitational force of the moon on the earth
2. Centrifugal force due to centrifugal force (inertia)

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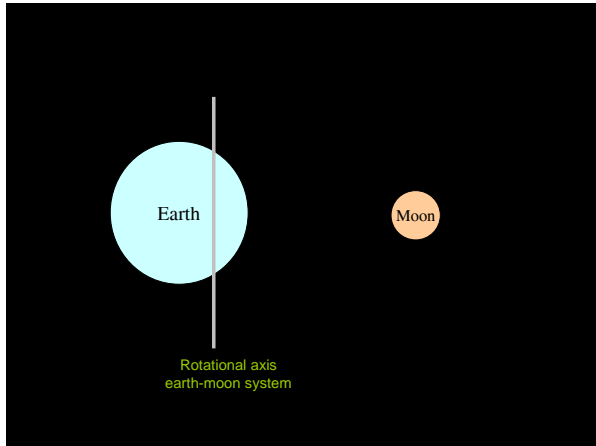
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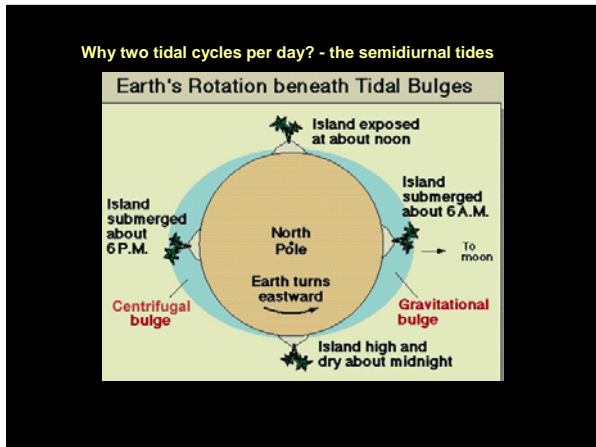
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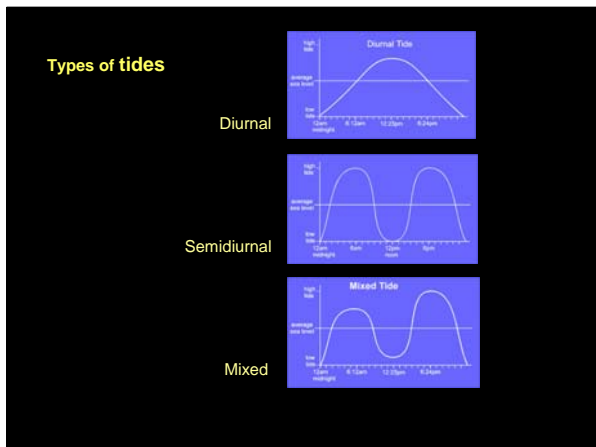
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Why are there two tide cycles a day in San Diego of unequal height?

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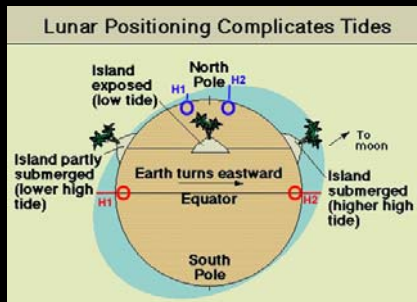
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Complications - the moon isn't orbiting over the equator



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Why are there two extreme tides every month?

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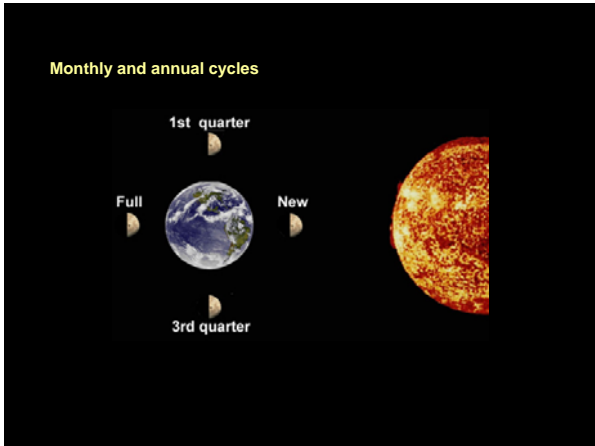
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Why do we have two extreme tides a day?

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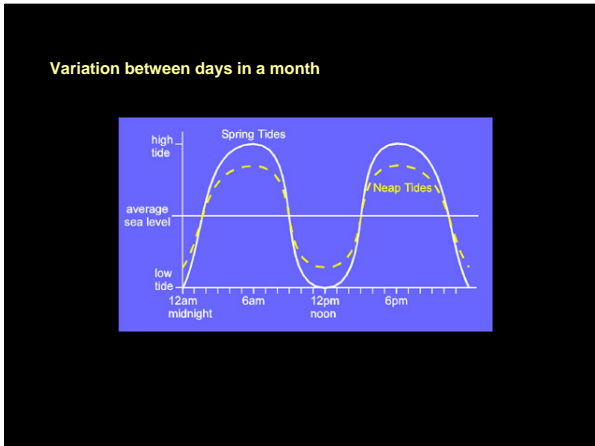
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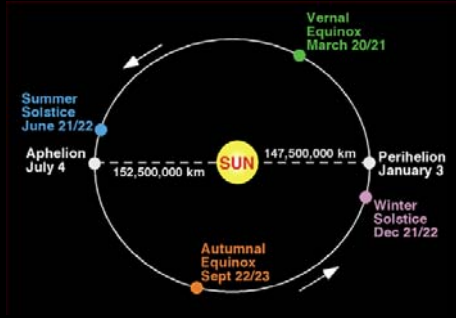
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Monthly and annual cycles



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Why isn't tide prediction straight forward?

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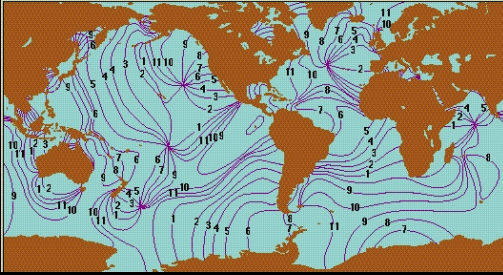
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### Amphidromic Points in the World Ocean



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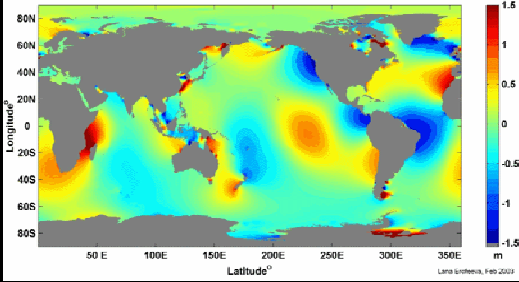
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TPX06 elevations 03:17:2003 00:00GMT



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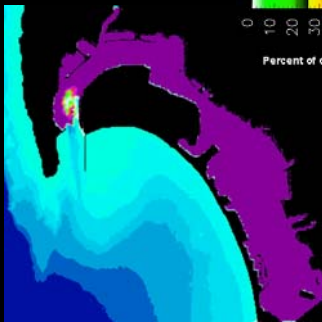
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0 10 20 30 40 50 60 70 80 90 100  
Percent of original tracer concentration

### San Diego Bay



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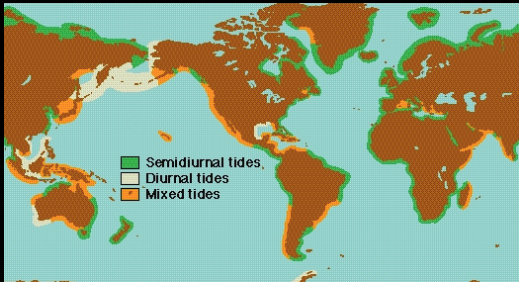
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Complication - land and the seafloor get in the way



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Slowing of the Earth's rotation

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Days in a year

Late Precambrian	900 mybp	487 days
Earliest Cambrian Period	600	424
Early Ordovician Period	500	412
Middle Devonian Period	370	398
Permo-Triassic boundary	245	386
"Jurassic Park"	180	381
End Cretaceous (Asteroid)	65	371
Today	0	365

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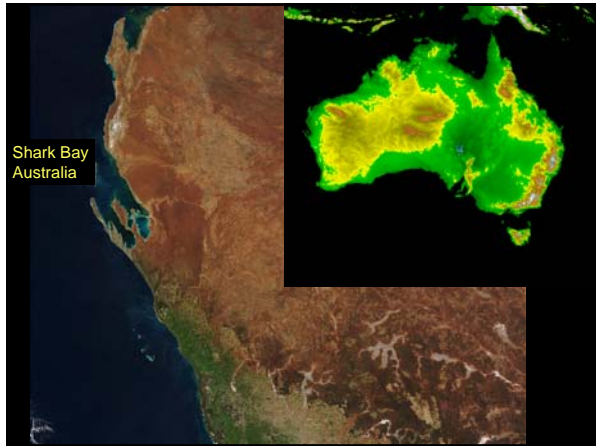
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