


AST1002




Learning From Other Worlds

Chapter 11
Earth and Lessons on Life in the Universe

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Earth & Lessons on Life

- Earth is unique
 - Plate tectonics
 - Hydrosphere
 - biosphere



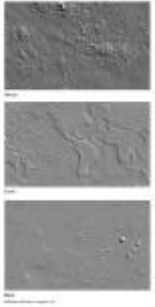
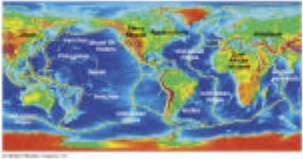
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Earth & Lessons on Life

- Unique geology
 - Erosion
 - Continental drift



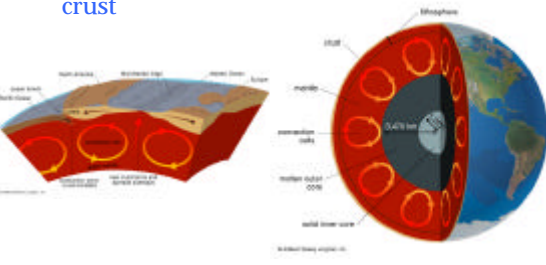
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Earth & Lessons on Life

- Convection in upper mantle shapes the crust




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Earth & Lessons on Life

- Why do we have oceans?
 - Water came from impacts
 - The “Goldilocks” effect
 - Venus too hot
 - Mars too cold
 - Earth “just right”
- Where is the CO₂?
 - In the oceans



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Earth & Lessons on Life

- Carbonate-Silicate cycle

- Release
- Dissolve
- React
- subduct

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- Where did the oxygen in the atmosphere come from?
 - At first glance this is a puzzle
 - Not from outgasing
 - Oxidation should make any O₂ disappear rapidly

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Earth & Lessons on Life

- Where did the oxygen in the atmosphere come from?
 - At first glance this is a puzzle
 - Not from outgasing
 - Oxidation should make any O₂ disappear rapidly
 - Solution: Life!
 - Photosynthesis converts CO₂ to O₂
 - The ozone (O₃) layer protects life

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- Biosphere

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Earth & Lessons on Life

- Are we altering our world?
 - Greenhouse gases
 - H₂O
 - CO₂

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Earth & Lessons on Life

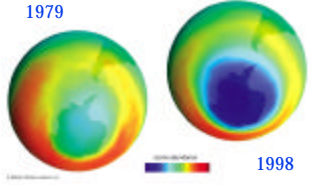
- Are we altering our world?
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- Are we altering our world?
 - The ozone hole
 - CFC's (chlorofluorocarbons)
 - From AC & hair spray
 - Inert
 - Sunlight releases Cl
 - Cl eats O₃




1979 1998

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- Life on Mars?
 - Maybe



maybe not!

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Questions and/or Comments?

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or visit <http://www.astro.ufl.edu/~oliver/>