Raising Awareness of Environmental Issues in a Statistics Course

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Global Mean Temperature

Difference (°C) from 1961 - 1990

Estimated actual global mean temperatures (°C)

- Annual mean
- Smoothed series
- 5-95% decadal error bars

<table>
<thead>
<tr>
<th>Period</th>
<th>Rate</th>
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<tbody>
<tr>
<td>Years</td>
<td>°C per decade</td>
</tr>
<tr>
<td>25</td>
<td>0.177±0.052</td>
</tr>
<tr>
<td>50</td>
<td>0.128±0.026</td>
</tr>
<tr>
<td>100</td>
<td>0.074±0.018</td>
</tr>
<tr>
<td>150</td>
<td>0.045±0.012</td>
</tr>
</tbody>
</table>

http://ipcc-wg1.ucar.edu/wg1/FAQ/wg1_faq-3.1.html
Global Mean Temperature

y = 0.013x - 26.07
Global Mean Temperature

$y = 0.019x - 37.93279$
How should we use this?

- Have students try to read and interpret the graph before covering regression.
- Cover regression.
- Go back and have students interpret again, reproduce the graph (with analysis), and explain differences.
- Good question: Is a line the best fit of this data?
This graphic shows the ratio of record daily highs to record daily lows observed at about 1,800 weather stations in the 48 contiguous United States from January 1950 through September 2009. (20-to-1 by mid-century and 50-to-1 by 2100)
Yearly U.S. Oil Production to 1955

Data to 1955

Model through 2007
Yearly U.S. Oil Production through 2007

**Original Data**

**Model**

The graph shows the yearly U.S. oil production from 1840 through 2007. The data is presented in thousand barrels per year, with the x-axis representing years from 1840 to 2020, and the y-axis representing thousand barrels from 0 to 4,000,000.
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1860</td>
<td>1</td>
<td>365</td>
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<td>404.5939535</td>
<td>3187674.751</td>
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</table>
How Should we Use This?

- According to the model, what percentage of our oil supply did we use from 1960 to 1990?
- According to the model, what percentage of our oil will we consume after 2010?
- What is the interquartile range for the model?
- In what year will we have consumed 95\% of our oil? (~2026)
Resources

- http://data.giss.nasa.gov/gistemp/maps/
- http://www.theoildrum.com/story/
  2006/1/22/04219/1102
- http://www.ithaca.edu/tpfa/tpfaff/sustainability.htm
- tpfaff@ithaca.edu