Understanding is just a visualization away…

NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

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New Mexico Tech
EPSCoR
Educational Outreach Throughout New Mexico

Sea Surface Temperature

Eunice Perez

Data

- Source: The International Research Institute for Climate and Society (IRI)
  - http://portal.iri.columbia.edu/
  - IRI has data ranging from surface temperatures and precipitation levels to atmospheric circulation
  - The dataset used here contains global sea surface temperatures obtained from ship, buoy and bias-corrected satellite data for January of 1996
  - Dataset Title: NOAA NCEP EMC CMB GLOBAL Reyn_Smith

Visualization

- Source: IRI/LDEO Climate Data Library Visualization Toolset
  - http://iridl.ldeo.columbia.edu/
  - Has existing visualizations and tools to create new visualizations of IRI/LDEO data
  - The next visualization shows surface temperatures overlaid on a global map with a smooth color gradient

Sea Surface Temperature Visualization
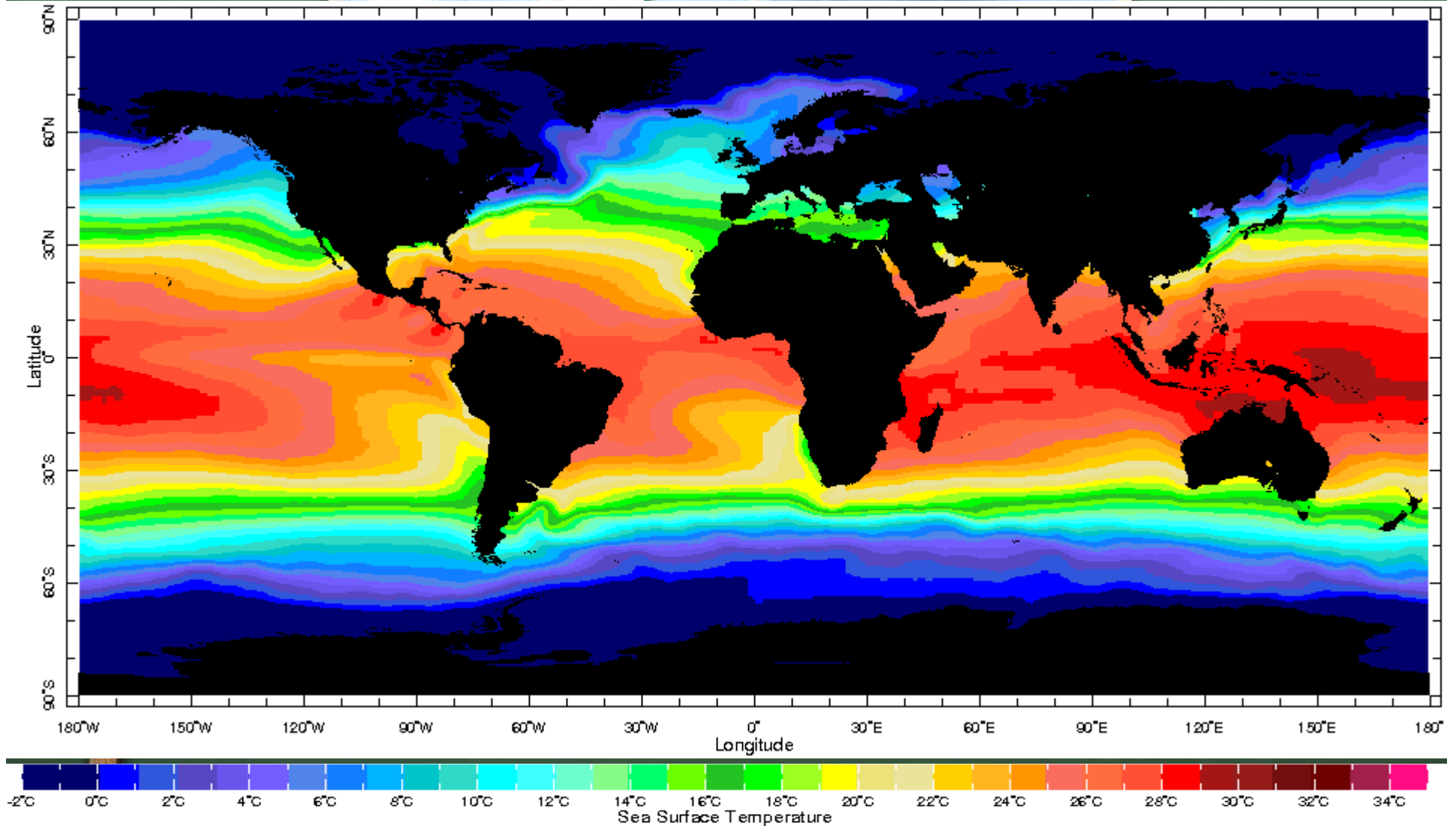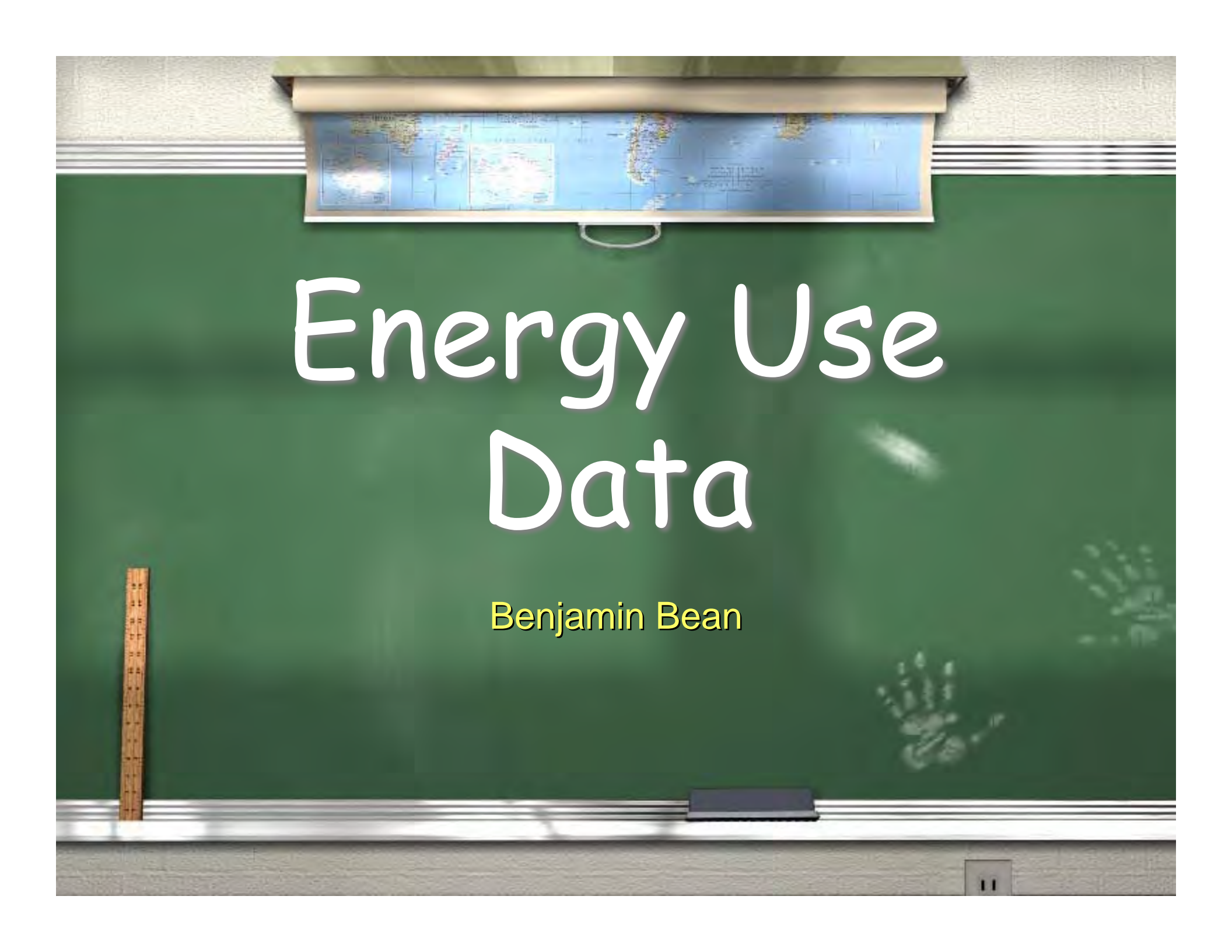

Dataset Title: NOAA NCEP EMC CMB GLOBAL Reyn_Smith

Analysis

- While the highest temperatures recorded were between Africa the central Pacific Ocean, interesting hotspots were found south of Mexico and off the western coast of Central America

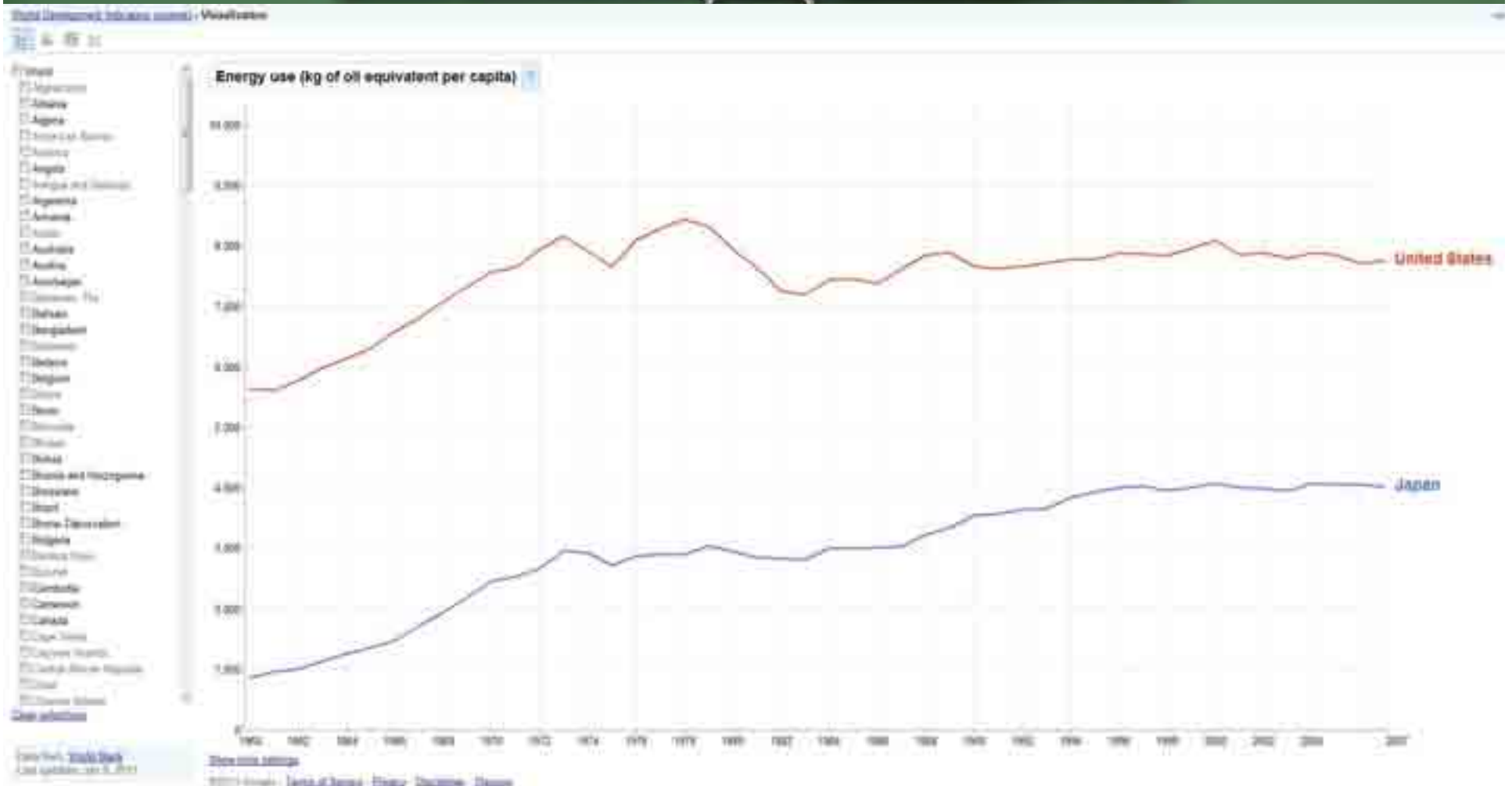# Energy Use Data

Benjamin Bean

Data

- Source: Google Public Data Explorer
  - http://www.google.com/publicdata/home
  - Aggregates public datasets
  - This dataset is from the World Bank's records on energy usage per country
  - Dataset Title: World Development Indicators: Energy Use (kg of oil equivalent per capita)

Visualization

- Source: Google Public Data Explorer
  - Once a dataset is selected, visualization options for that dataset are shown
    - Visualization type: line graph, bar chart, map overlay, and bubble chart
    - Country Selection (or World)
    - Customizable Timeline

Energy Use Visualization

Energy use (kg of oil equivalent per capita)

United States

Japan

Analysis

- For the last 30 years, US per capita energy expenditures have been roughly double Japan's per capita energy expenditure

Greenhouse Gas Emissions

Jesse Crawford

Data

- New Mexico Government Greenhouse Gas (GHG) Inventory
  - http://nmclimatechange.us/
  - Most state GHG Inventories are available online
  - Many are linked directly from the EPA
    - www.epa.gov/statelocalclimate/local/local-examples/ghg-inventory.html
  - Or Google "<state> GHG Inventory"

Visualization Software

- Source: ManyEyes
  - http://manyeyes.alphaworks.ibm.com/manyeyes/
  - Allows users to upload data and create visualizations easily in a web browser
  - Tutorial available at NMT EPSCoR Website (http://www.cs.nmt.edu/~epscor) under Visualization
  - The visualization here uses a treemap to show relative GHG emissions by sector

Visualization Process

Collect data in Excel

Copy data into Many Eyes

GHG Emissions Visualization

Energy Transportation Fuel Industry Residential

Industrial

Agriculture Waste

Note – darker boxes indicate areas of rapid growth between 1990 and 2020

Analysis

- The larger emitters of greenhouse gas are also some of the slowest growing industries.

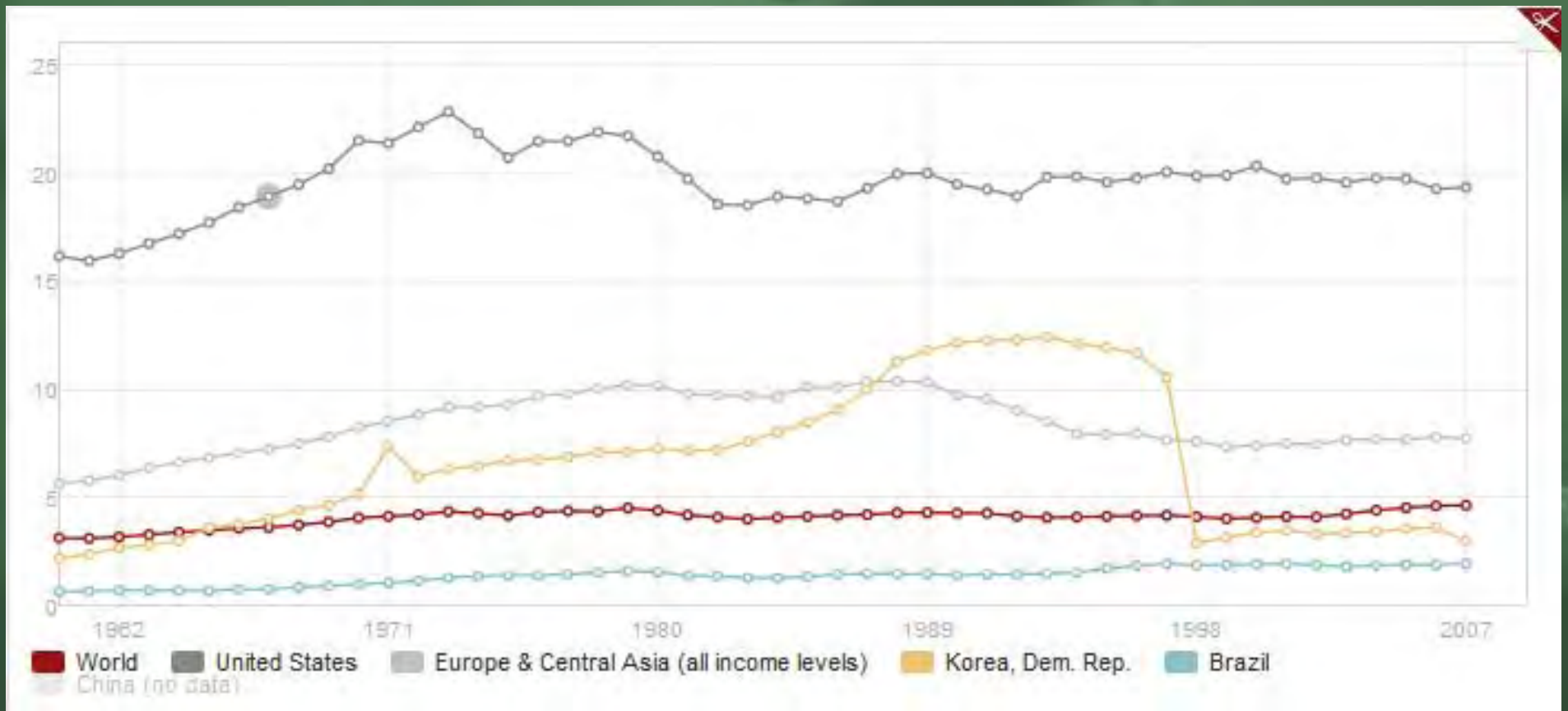# CO$_2$ Emissions

Diego Turubiantes

Data

- Source: World Bank Open Data Catalog
  - http://data.worldbank.org/
  - World Bank data collection site - collects and openly shares data sets for use by public and private sectors for free
  - This data set includes carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring
  - Dataset Title: Indicator – CO_2 Emissions (metric tons per capita)

Visualization

- Source: World Bank Open Data Catalog
  - Contains built-in visualization tools for World Bank data
    - Visualization type: raw data (table), map overlay, and line graph
    - Line graph shows countries, regions, and income levels
    - Can pick range of years to show data for table and map

CO$_2$ Emissions Visualization

Analysis

- The data represented in the graph shows that the United States produces roughly 6 times more CO_2 emissions per person than the global average.

- The significant decrease of CO_2 production for the democratic republic of Korea during 1997-1998 was due to a depression of industrial and economic activities.
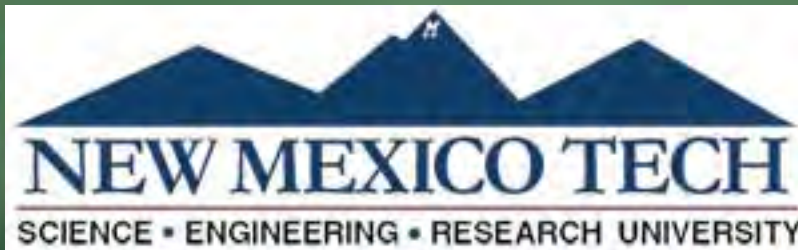
For more...

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http://www.cs.nmt.edu/~epscor

Participants...

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Databases

- Energy and climate change policy
- Climate change data

Visualization

- Tools
- Workshops
- Tutorials
- Databases
- Examples

Climate Change

- Resources for understanding and teaching climate change.
  - Government Agencies
  - For kids and teenagers
  - Scholarships
  - Professional Training
  - Projects
  - Non-government organizations
  - Educator's resources
  - …

STEM

- Tools
- Student resources
- Educator resources
- Student opportunities