IN41B-0040

What do the data show?

Fostering physical intuition with ClimateBits and NASA Earth Observations

Stephanie Schollaert Uz[1], Kevin Ward[2]

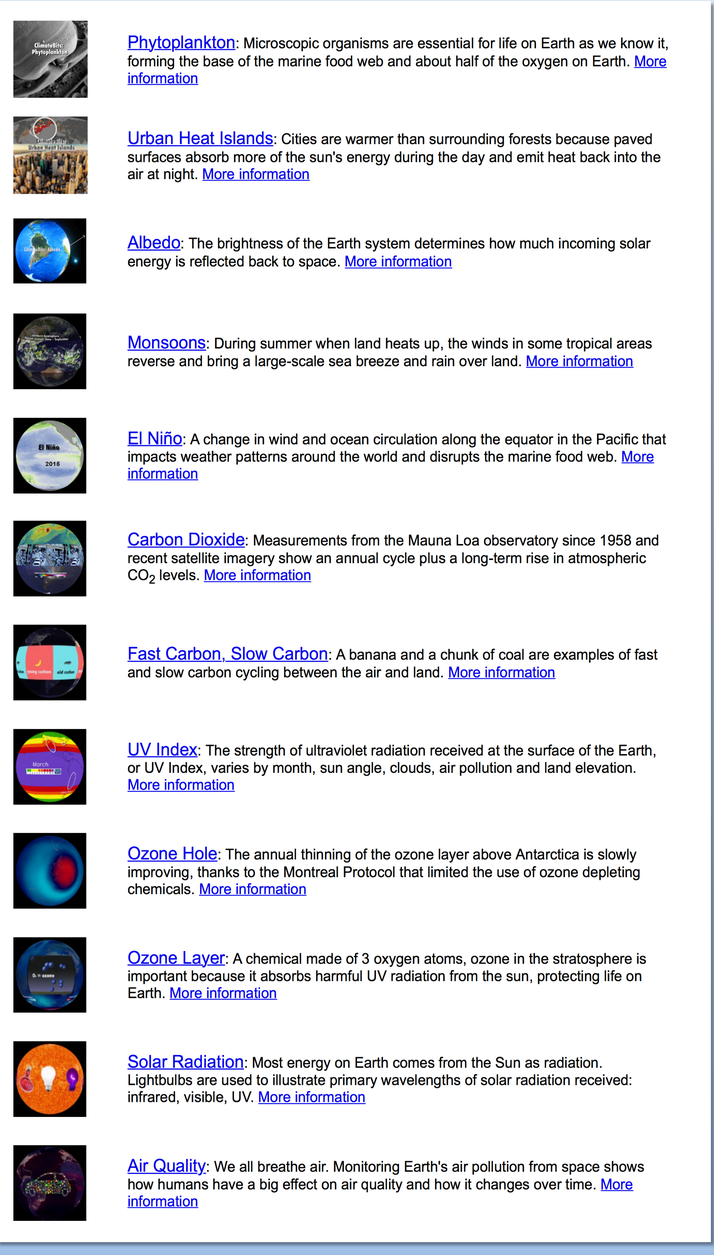
[1]Global Science & Technology, Inc., Greenbelt, MD [2]Science Systems and Applications, Inc., Greenbelt, MD

stephanie.uz@nasa.gov, kevin.a.ward@nasa.gov

Introduction

ClimateBits use global imagery to highlight an Earth science concept in short, narrated, and captioned videos. **More information** links to references and other resources.

ClimateBits
Earth science concepts made simple



Phytoplankton: Microscopic organisms are essential for life on Earth as we know it, forming the base of the marine food web and about half of the oxygen on Earth. More information

Urban Heat Islands: Cities are warmer than surrounding forests because paved surfaces absorb more of the sun's energy during the day and emit heat back into the air at night. More information

Albedo: The brightness of the Earth system determines how much incoming solar energy is reflected back to space. More information

Monsoons: During summer when land heats up, the winds in some tropical areas reverse and bring a large-scale sea breeze and rain over land. More information

El Niño: A change in wind and ocean circulation along the equator in the Pacific that impacts weather patterns around the world and disrupts the marine food web. More information

Carbon Dioxide: Measurements from the Mauna Loa observatory since 1958 and recent satellite imagery show an annual cycle plus a long-term rise in atmospheric CO_2 levels. More information

Fast Carbon, Slow Carbon: A banana and a chunk of coal are examples of fast and slow carbon cycling between the air and land. More information

UV Index: The strength of ultraviolet radiation received at the surface of the Earth, or UV Index, varies by month, sun angle, clouds, air pollution and land elevation. More information

Ozone Hole: The annual thinning of the ozone layer above Antarctica is slowly improving, thanks to the Montreal Protocol that limited the use of ozone depleting chemicals. More information

Ozone Layer: A chemical made of 3 oxygen atoms, ozone in the stratosphere is important because it absorbs harmful UV radiation from the sun, protecting life on Earth. More information

Solar Radiation: Most energy on Earth comes from the Sun as radiation. Lightbulbs are used to illustrate primary wavelengths of solar radiation received: infrared, visible, UV. More information

Air Quality: We all breathe air. Monitoring Earth's air pollution from space shows how humans have a big effect on air quality and how it changes over time. More information

climatebits.umd.edu

neo.sci.gsfc.nasa.gov

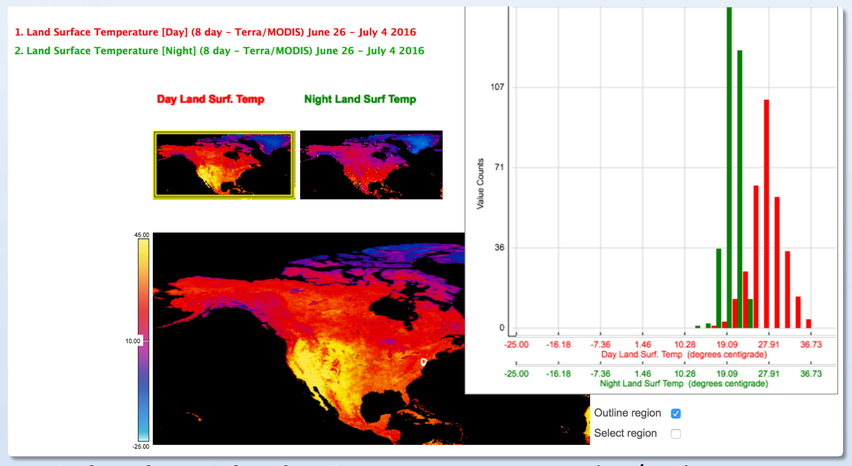
Analysis

Explore over 50 satellite data sets. Zoom into an area of interest. Compare multiple images. Conduct online analyses including line plots, scatter plots, and histograms.

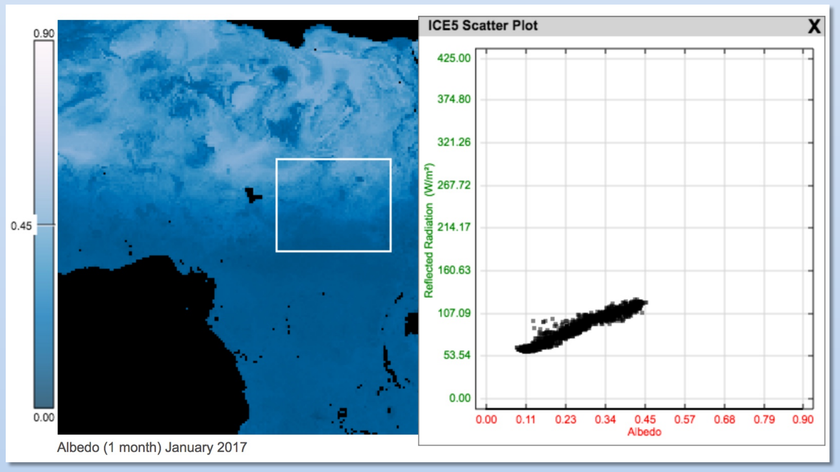
NASA NEO NASA EARTH OBSERVATIONS

- tool for scientists, non-scientists
- quickly check satellite imagery for large scale features or patterns
- download images for presentations and papers (JPEG, PNG, GeoTIFF)
- perform simple analyses as a first step before acquiring data for more rigorous analysis
- explore large scale environmental and climate patterns that impact planning and infrastructure
- requires no software or plug-ins, only a browser and internet
- imagery also available via web services (WMS)

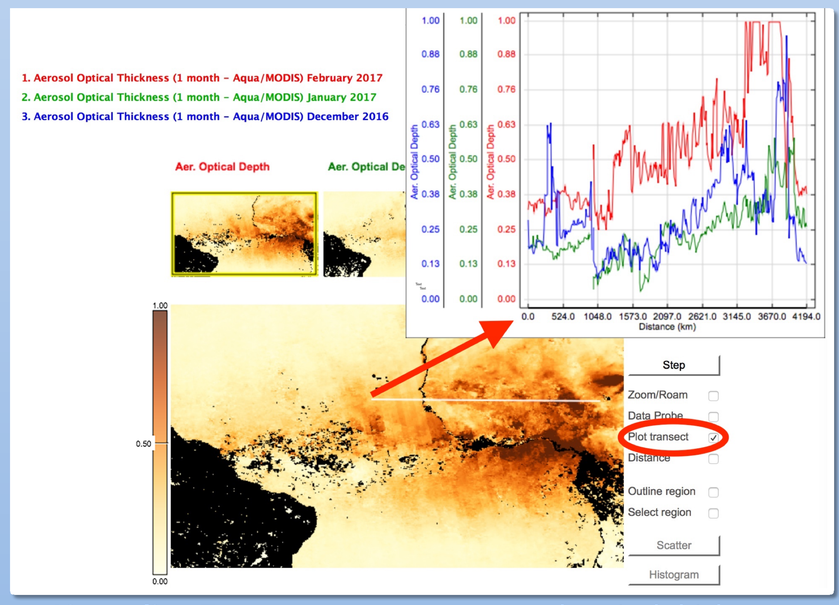
Case studies



Urban heat island : Histograms compare day/night temperature differences.



Albedo: Scatter plot shows covariation with reflected radiation.



Air quality: Transect to compare aerosol optical thickness during different months.

@ClimateBits
@NASAEarthObservations