# My NASA Data - Mini Lesson/Activity Air Temperatures Around the World

# **Grade Band**

• 6-8

## **Time**

• 15 minutes

## Overview

Students observe the map image, individually, looking for changes in surface air temperatures (using data displayed, unit of measure, range of values, etc.) and noticeable patterns.

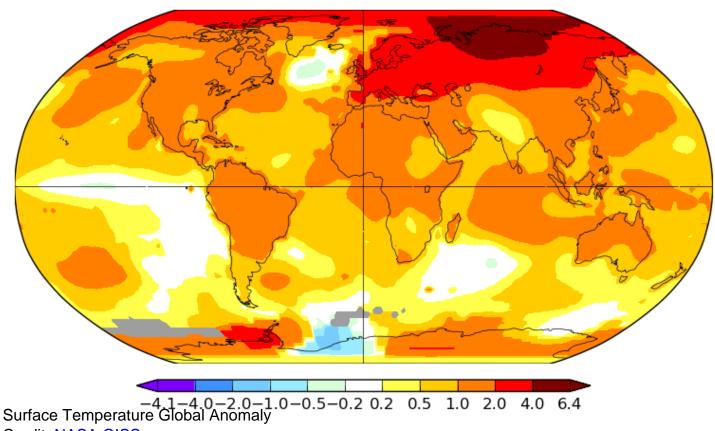
## **Student Directions**

NASA's Goddard Institute for Space Studies (GISS) provides monthly maps and graphs. <u>GISTEMP</u> is one of the main datasets scientists use to check variability and trends. They showcase surface air temperature changes for each month since 1880. This was a time meteorological stations were established around the world.

So how different are current temperatures from the past? How much have these values changed over time?

Students may access these <u>GISTEMP</u> maps to analyze the monthly anomalies of surface air temperatures. An anomaly is a departure from average conditions. A temperature anomaly shows how much warmer or colder it is than normal for a particular place and time. For this analysis, we identify normal as the average over the 30-year period (1951-1980).

The image shows the annual mean for 2020 (January - December). The number at the top right-hand corner of the map plot is an estimate of the global average anomaly.



Credit: NASA GISS

https://data.giss.nasa.gov/gistemp/maps/

## Steps:

- 1. Check with your instructor on how to submit your answers.
- 2. What does surface air temperature anomaly mean?
- 3. What is the range of values shown on the scale bar? Explain what those values mean?
- 4. Identify the locations on the map where you would find the highest and lowest values (the extremes) of the data.
- 5. Explain why your selected locations experience these extremes while other parts of the world do not.

# **Key Terms:**

- Anomaly: Difference between the mean temperature (°C) averaged over a specified mean period and time interval and the mean temperature during a given base period.
  - Example of an anomaly: The difference between average January temperatures during 2000-2020 and a base period of 1951-1980.
- Mean period: Any monthly, seasonal (3 months or 6 months) or annual mean. [January in
- Time interval: Years over which temperatures are averaged or trends are found. [2000-2020] in example]

• Base period: Time interval to which anomalies are relative. [1951-1980 in example]

#### Sources:

1. GISS Surface Temperature Analysis (v4): Global Maps. (2021, April 4). NASA Giss. Retrieved May 24, 2022, from <a href="https://data.giss.nasa.gov/gistemp/maps/">https://data.giss.nasa.gov/gistemp/maps/</a>

# **Teacher Note**

Teachers, these mini lessons/student activities are perfect "warm up" tasks that can be used as a hook, bellringer, exit slip, etc. They take less than a class period to complete. Learn more on the "My NASA Data What are Mini Lessons?" page.

Teachers who are interested in receiving the answer key, please complete the <u>Teacher Key Request</u> and <u>Verification Form</u>. We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

# **NGSS Three Dimensional Learning**

# **NGSS Disciplinary Core Ideas**

ESS2A: Earth Materials and Systems

• ESS2D: Weather and Climate

# **Crosscutting Concepts**

- Patterns
- Scale, Proportion, and Quantity
- Stability and Change

# **Science and Engineering Practices**

Analyzing and Interpreting Data

# **Document Resources**

• Surface Temperature Global Anomaly