INFLUENCES ON CLIMATE CHANGE

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INFLUENCING FACTORS

What effects the climate?

FACTORS

- Wind Patterns

- Elevation and Altitude

- Sun Rays

- Topography

- Geography

- Atmospheric Changes

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Wind Patterns:
-- "A growing number of experts believe complex wind patterns are being changed because melting Arctic sea ice has exposed huge swaths of normally frozen ocean to the atmosphere above."

Airbourne Particle Pollution:
- they can cause both cooling, by reflecting incoming sunlight back out to space, and warming, by absorbing heat energy in the atmosphere
- Particles from things like sea spray create smaller aersols which help create clouds which causes a cooling on Earth's temperature (this is because the smaller the droplets are, the more light it reflects and the brighter the clouds are. Meaning the brighter the clouds are the more it reflects the light from the sun meaning the sun's rays do not hit the Earth surface meaning it doesn't heat up Earth.)

The geography connects to airbourne particle pollution. So things based on the geography of a place such as where volcanoes are located or forest fires, or sea spray.

EXPERIMENTS & RESEARCH

How do we know all of this?

# BBC Climate Change Experiment

- Objective was to predict future climate with increasing greenhouse gases.

- Distributed Computing

- Largest number of computer models.

- Each computer calculated climate year by year.

Distributed computing is when your computer can make billions of calculations in a second. It is most common for scientist who have a lot of data to analyze. Many computer models were used because using one model could not be "gauged for accuracy". Using a greater number of models also help to decipher which parameters of climate were more important.
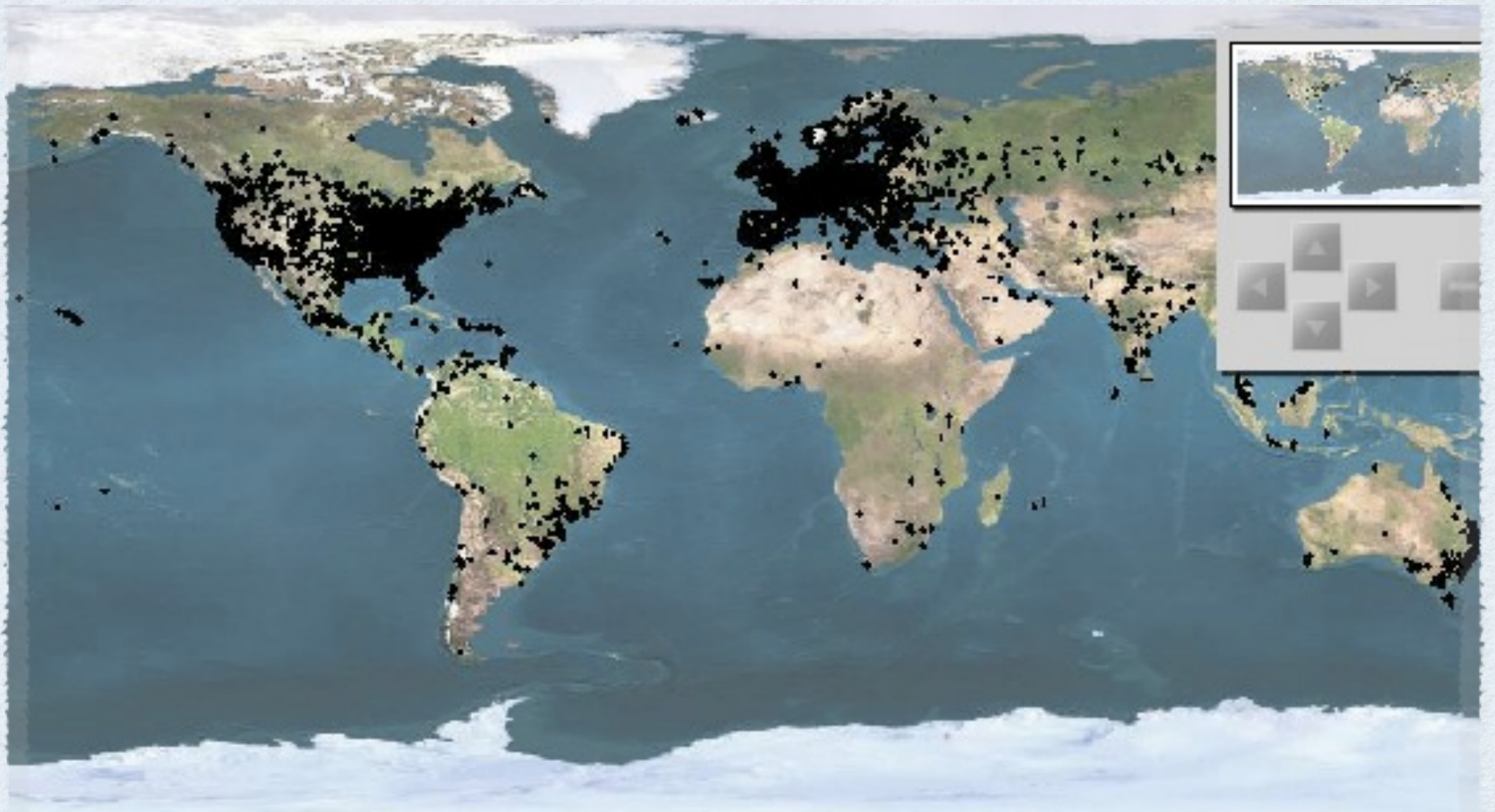
RESULTS OF BBC EXPERIMENTS

- Each line is a person who participated.

- More likely models are pink and less likely are blue/black.

- Not all the models were stable.
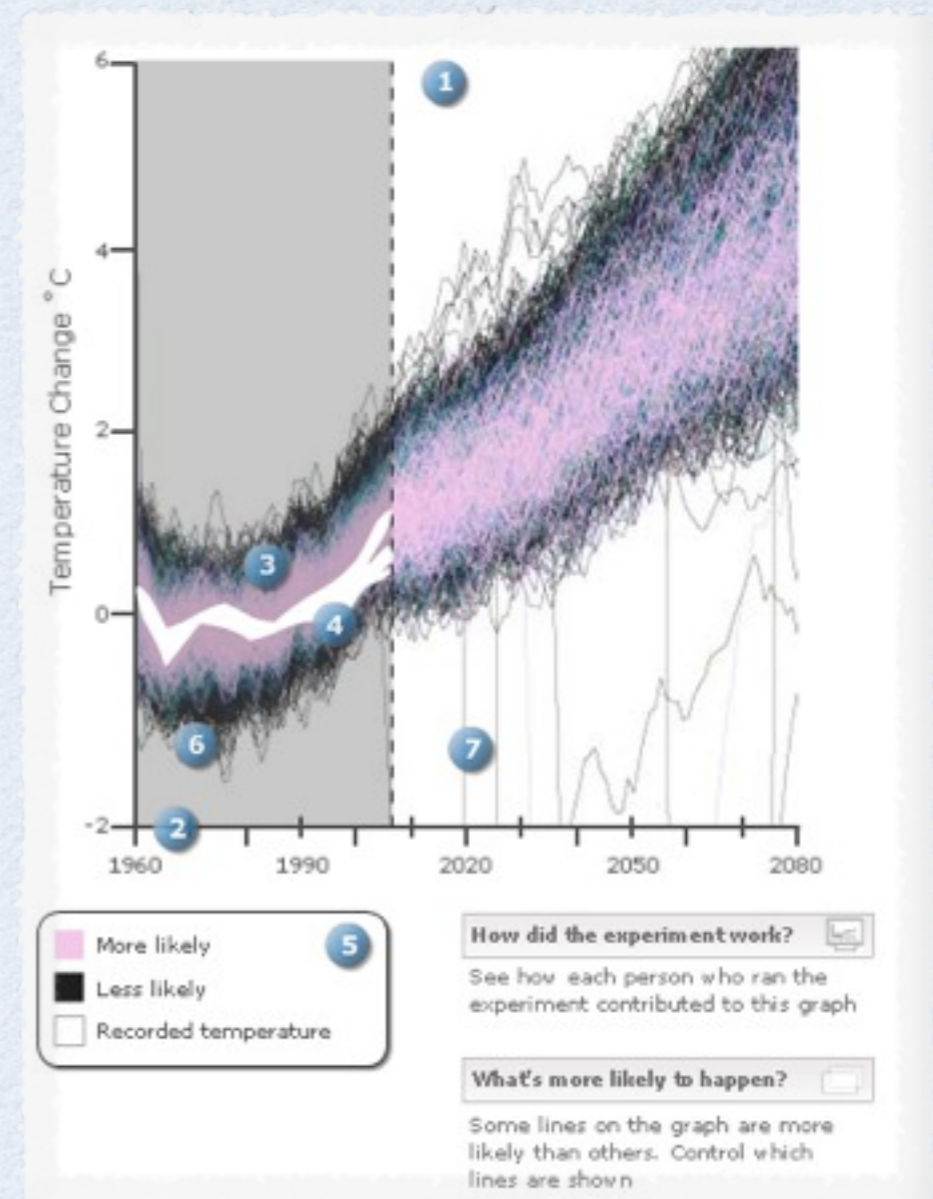
The temperature change is shown on the y-axis and the year is shown on the x-axis. The better fit with the past, the better the model is.

Each black dot represents a computer model which collects data.

THE BIG IDEA

Why do I need to know this stuff?

- Climate describes the long-term conditions of an area. An area's climate can be determined by examining weather data. There are numerous things that can influence the climate.Changes in the Earth's atmosphere in turn result in changes in the Earth's climate. Climate can also change because of the transmission,reflection, absorption, and or radiation of solar energy.

EXAMPLE QUESTIONS

How does this connect to the PSSA's?

HOW DOES THE GREENHOUSE EFFECT INFLUENCE THE AMOUNT OF INCOMING SOLAR RADIATION?

- The amount of incoming solar radiation is unchanged.

- The amount of incoming solar radiation increases.

- The amount of incoming solar radiation decreases.

- There is no incoming solar radiation.

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The explanation: The amount of incoming solar radiation depends on the output of the Sun. The output of the Sun is almost constant, and no changes to Earth's atmosphere influence the amount of incoming solar radiation. The greenhouse effect influences climate by altering how much of the incoming solar radiation remains in the Earth's atmosphere.

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"Key Idea Airborne Particles, Called "aerosols," Have a Complex Effect on Earth's Energy Balance: They Can Cause Both Cooling, by Reflecting Incoming Sunlight Back out to Space, and Warming, by Absorbing Heat Energy in the Atmosphere. Small Solid and Liquid Particles Can Be Lofted into the Atmosphere through a Variety of Natural and Man-made Processes, including Volcanic Eruptions, Sea Spray, Forest Fires, and Emissions Generated through Human Activities. (Climate Literacy Principle 2E)." *Pacific Climate Education Partnership*. Web. 16 Apr. 2012. <http://pcep.dsp.wested.org/content_items/1524182>.

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