How the sun affects the weather

Our sun is a massive nuclear fusion reactor that generates astonishing amounts of energy. The sun is the largest body in our solar system. It has a gravitational pull causing all other objects in the solar system to orbit it. Since the sun is in the neighborhood of the earth this gives the results of a greater gravitational effect on earth. “ Warmth for the planet is provided primarily by the sun’s energy. The rate of energy coming from the sun changes from day to day.

At an average distance from the sun 93 million miles” (Ahrens 4). The energy from the sun affects many things here on earth. One of the main things the sun does is warm our planet, including the atmosphere. This energy drives our weather we see daily. Temperature fluctuation the sun generates can be associated to every weather phenomenon on earth and can be traced back to the sun. All planets have an atmosphere, a layer of gases that surrounds them. The Sun's atmosphere is made up of hydrogen, while Earth's is made up primarily of nitrogen and oxygen.

Carbon dioxide, ozone, and other gases are also present. These gases keep our planet warm and protect us from the direct effects of the Sun's radiation. Without this regulation, Earth could not sustain life. To understand the weather you need to understand the layers of the atmosphere. The layers of the atmosphere from the surface rising upward are troposphere, stratosphere, mesosphere, thermosphere, and exosphere. We live in the troposphere layer, this is where the air temperature normally decreases with height, and contains all of the weather we are familiar with.

Most of the clouds you see in the sky are found in the troposphere, and this is the layer of the atmosphere we associate with weather. Extending up to

10 miles above Earth's surface, the troposphere contains a variety of gases: water vapor, carbon dioxide, methane, nitrous oxide, and others. These gases help retain heat, a portion of which is then radiated back to warm the surface of Earth. In the stratosphere is where most of the gas ozone is found. The coldest layer in the atmosphere is the mesosphere and the warmest atmospheric layer is the thermosphere.

Then we get to the region where atoms and molecules shoot off into space in the exosphere, which signify the upper limits of our atmosphere. A greenhouse gas in an atmosphere that absorbs and emits radiation withing the thermal infrared range. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Greenhouse gases greatly affect the temperature of the Earth; within them, Earth's surface would be on average of about 33 degrees Celsius or 59 degrees Fahrenheit colder than present temperature.

The earth being tilted at 23. 5 degrees on its axis and revolving around the sun makes the earth’s heat unevenly giving us different climate and weather. “ The tilt causes annual variation in the amount of sunlight that strikes the surface as well as variations in the length of time the sun shines at each latitude” (Ahrens 73). The sun heats up the equatorial regions more than the poles, so the earth has to develop circulations to distribute the heat. This keeps the equator from getting hotter and the poles from getting colder.

This is the way the earth balances out its unequal distribution of heat. With the earth’s rotation this causes the wind pattern to form east -to-west. Weather as a whole comes down to the universal circulation of cold and hot air. The sun has the greatest impact on the lower stratosphere with the

impact of ultraviolet light from the sun assist in changing temperature. “ Lower to mid stratosphere is heated greatly due to the ozone layer... ozone absorbing large quantities of dangerous solar energy... he absorption causes the warmup from 20km to 50k. The middle and upper troposphere is indeed very important for stability processes. The hotter the surface temps and the colder the mid and upper tropospheric temps... the more instability... and the stronger updrafts and stronger storms” (Haywood). Here are several examples: The sun warms up air, the area encompassing this warm air creating a warm front. Many weather developments will occur when a warm front meets up with a cold front.

Ocean’s, lakes, and soil surfaces are warmed by the sun causing warm air to rise in the atmosphere. The warm air meets up with colder air causing it to condense and produce clouds that could create hail, snow, or rain. Sun warm up air over the sea near the equator and this warm air will rise creating a cloud. Cold air will then replace the warm air that has lifted and collides creating spiraling turbulence known as a hurricanes. Sun produces warm air then it abruptly turns cold; this creates pressure and uproar which whips up a tornado.

Sun warms up the earth’s surface and this warm air will expand and rise, as it rises the air will then cool and descend. This up and down cycle of rising warm air and descending cool air will generate wind. There are many factors when it comes to weather but the main key to the weather equation is the heating from the sun for weather to occur. The sun plays a vital role in our daily lives and weather.

Works Cited

1. Ahrens, C. Donald. Meterology Today. Belmont: Brooks/Cole, 2009. 9th ed. Haywood, Lee. Meterologist with WSAV/Instructor ASSU.