

VALLEY

Sunday (12/9/18) Temperatures are warm for this time of year, with a high near 35°F. Most of the region experiences a high-pressure system with clear skies, no precipitation, and fair weather. The humidity was about average as well.

In this region, located near the Mississippi River and the Great Lakes, usually has varying temperatures and precipitation. During this time of our research, it rained and experienced cold temperatures.

Abstract

The research we conducted was an investigation into the use and benefit of using the Geostationary Operational Environmental Satellite system (GOES) in predicting weather in a certain geographical area over a period of five days. Our research showed that using the satellite with local weather data offers an accurate forecast for the designated area of focus.



Research Question

How can a GOES satellite help predict the weather in a particular area?



- ▶ **Level 9** "Mid-level water vapor." Tracks the weather in the middle of the troposphere.
- ▶ **Level 6** "Cloud Particle Size." Shows the speed of cloud development.
- ▶ **Level 5** "Snow and Ice." Tracks snow and ice during the day.
- ▶ **Level 2** "Cirrus." Displays thin cirrus clouds.

Research Methods

The region we chose to study was Upper Mississippi Valley. We chose this region because we thought it was a region with varying climate that also experienced extreme weather in the months that we researched the region, it was exceptionally cold and we thought there would be a possibility for blizzards and winter storms. We chose to specifically focus on collecting weather data for Minnesota/Minnesota. As instructed by our teacher, Mrs. Loach, we collected weather data over a five-day period from the local CBS station, WCCO. The following factors were recorded:

Temperature	Humidity	Precipitation
Pressure	Dew Point	Air Masses
Fronts		

Once the data was collected, it was organized into the following chart for analysis. A comparison amongst the data was done and the research team chose to focus on the two days on which the weather was the most dramatic.

Each day data was collected, the research team looked at and collected images of the Upper Mississippi Valley from the Geostationary Operational Environmental Satellite (GOES). The team then focused on the two chosen days and did a comparison across data collected.

The team chose to use GOES weather bands four, five, six, and nine. Each band was chosen for a specific purpose. Band four was chosen because it shows cirrus clouds. This is important because it helped us identify the types of clouds in the area and determine the visibility. We used band five to see snow and ice. During winter and the approaching months, the air is very cold and precipitation is common meaning snow and ice occur frequently.

The sixth band helped us track the speed of cloud development. The upper Mississippi valley often experiences low pressure systems, so thick clouds are common. It is important to record how quickly clouds condense and form to identify when a larger or more powerful storm is headed towards the region. The last band, band nine, shows mid-level water vapor in the mid to upper troposphere. This band is commonly used for forecasting and can help

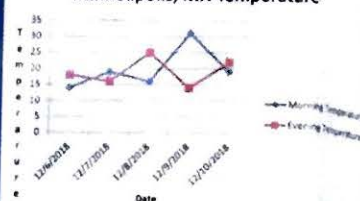
predict severe weather events in the area, such as blizzards. Satellite data is incredibly important when forecasting weather as it gives real-time information about weather in a specific area or weather systems approaching the area.

References

US Department of Commerce. NOAA. National Environmental Satellite, Data and Information Service. & Office of Satellite Data Processing. (2015 July 07). Imagery at a Glance. Retrieved from <https://www.noaa.gov>

Results

Minneapolis, MN Temperature



Region: Upper Mississippi Valley
City: Minneapolis

[illegible]

The Geostationary Operational Environmental Satellite (GOES) remains in one position over North and South America. The GOES is operated by National Oceanic and Atmospheric Administration's (NOAA). This satellite helps weather events across the area and helps meteorologists research and forecast weather.