Red At Night, Shepherds Delight. Red In the Morning, Shepherds Warning?

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Abstract

We set out to see if the old wives tale "Red at night, shepherd's delight. Red in the morning, shepherd's warning." is true. There is not much rain where we live, so we used a live webfeed from San Pedro, Belize for our data. Our research question is "Can the sky color predict the weather?" We found out that it can!

Research Question

Can the sky color predict the weather?

We set out to see if a red sky in the morning means that there will be rainfall that day, and if a red sky at night meant clear skys the next day. That saying has been around for hundreds of years, but is it true? It is important for those, such as sailors, who may not have access to the internet or other technology that could tell them what the weather will be like that day. They must rely on what they see to know what is happening that day.

Introduction

Content Knowledge

The saying "Red at night shepherd's delight, red the the morning shepherd's warning is very old. It is even referenced in the bible in (Matthew 16:2-3) "When it is evening, ye say, fair weather: for the heaven is red. And in the morning, foul weather today for the heaven is red and lowering." It was even in the Shakesphere play *Venus and Adonis* where he said, "Like a red morn that ever yet betokened, Wreck to the seaman, tempest to the field, Sorrow to the shepherds, woe unto the birds, Gusts and foul flaws to herdmen and to herds." It is something that sailors have been relying on for generations, but is it true?

According to Joe Sienkiewicz, chief of the Ocean Applications Branch and a science and operations officer with the NOAA/NWS Ocean Prediction Center in his Scientific American Article, "this saying is valid in mid latitudes if the timing of weather systems is just right. That is, clearing in the east at sunrise with approaching clouds and clearing prior to sunset in the west as clouds exit to the east. If weather systems and their associated clouds are moving from south to north (as can occasionally occur), however, then the saying does not hold." Therefore, yes it is true under certain conditions. We observed the sky color at sunrise and sunset then compared the data to the rainfall that day to see if it was true at the Blue Water Grill in San Pedro, Belize.

Research Methods

Planning Investigations

We found the idea of testing this old wives tale interesting, but we live in an area with very little rainfall. So, we set out to find an area that would be perfect for our experiment.

We decided on this location because we were able to see the sky on their webcam, they were in an area with a lot of rainfall and would be able to track the weather that day online.

Using a GLOBE Cloud Observation guide, we could make the sky observations and upload them to the GLOBE database.

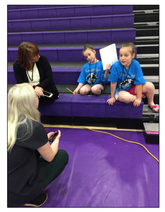
GLOBE Data Used

Using a GLOBE Cloud Observation guide we observed the cloud cover, sky color, cloud type, visibility and cloud opacity and attempted to uploaded that data to the GLOBE database, however data was not allowed from that country.

Carrying Out Investigations

Describes what happened

We took a screenshot from the webcam footage every sunrise and sunset from February 15th till March 1st of 2021. We then looked up the forecast for that day to see if it rained that day at that location. We then used our GLOBE Cloud Identification chart and GLOBE Cloud Observation protocols to import the data onto the GLOBE database. We attempted to upload the data, however data was not allowed from that country. Lastly, we analyzed the data to see if there was a connection between the sky color and the rainfall for the day.



The closest thing that we have to "Field pictures" since all data was collected online. These are from the last time that SRS was in person in 2019. (it seems so long ago)

Results

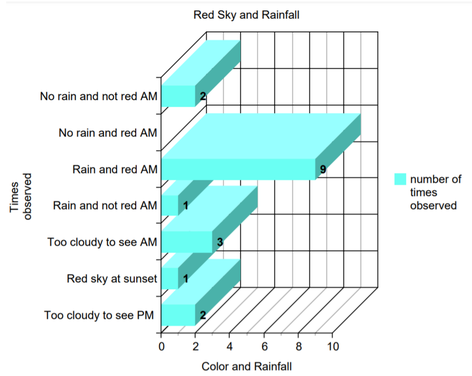
Analyzing Data

We put our data into a chart and compared sky color (red only) and rainfall in the area that day.

We found that the two days that there was no rainfall the sky at sunrise was not red. There were thirteen days with some level of rainfall that day. Only one of those days had no red in the sky in the morning. Three days, it was too cloudy to see and the other nine days had red skies at sunrise.

There was no red skies observed at sunset. The sky was always either purple, or too cloudy to see.

Figure #1



Data

Date	Rainfall?	Cloudy	Red AM	RED PM		
2/15/0221	no	yes	no	no	No RF/ no red	2
2/16/2021	yes	yes	CLOUDY	no	no rf/ red	0
2/17/2021	yes	yes	yes	no	rf/ no red	1
2/18/2021	yes	yes	yes	no	rf/ red	9
2/19/2021	yes	yes	no	CLOUDY	rf cloud	3
2/20/2021	yes	yes	CLOUDY	no		
2/21/2021	yes	yes	CLOUDY	CLOUDY	RAIN	NO RAIN
2/22/2021	no	yes	no	no	13	2
2/23/2021	yes	yes	yes	no		
2/24/2021	yes	yes	yes	no		
2/25/2021	yes	yes	yes	no		
2/26/2021	yes	yes	yes	no		
2/27/2021	yes	yes	yes	no		
2/28/2021	yes	yes	yes	no		
3/1/2021	yes	yes	yes	no		

Discussion

Interpreting Data

Can sky color predict the weather?

The answer turned out to be: yes. According to our data of the thirteen days of rainfall, the sky was red at sunrise for nine of them, which is 70% of the time. There were three days where the clouds were too thick to see through, and only one day where it rained but there was no red sky in the morning.

The sky in the evening at sunset was always purple on the webcam. This may be for several reasons, the camera may not be powerful enough to work well in the low light at sunset. It may have been hard to see the true color of the sky since the camera faces East.

We found through our research, that the reason the sky turns red is the filtration of the light through the clouds. When the clouds move from West the East the light is filtered through the approaching weather system and the red color is more visible in the sky. Which is the case in the area where we took our data.

Because we were only able to see the sky through the camera it was too difficult to tell what the sky color was behind the thicker clouds. If we were observing the sky in person we may have been able to see what the color was. Therefore, the data may have been different if we were able to observe the sky in person rather through the filter of a camera.

The reason that we choose to use Belize instead of Carlsbad was due to our lack of rainfall. We would need to wait for rainy days and they are so infrequent that we were afraid that it would be bad data.

Conclusions

Drawing Conclusions & Next Steps

In conclusion, we have found that a red sky in the morning means that it will rain that day. We observed no days where the sky was red and it did not rain. However there was a day where the sky was not red and it did rain. So, no red in the morning does not always mean that there will be no rain.

In the future, if we will be using the same location we will only observe the morning sky because the sunset footage was not good enough to be able to see sky color well. However it may be interesting to see the data in a different part of the world. Also, we will need to use an area allowed by GLOBE to upload data.

Bibliography

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