Jessica Bender
INSC 546
Dr. Frame
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Rainfall Accumulation Course Project: Summary Report

Background

Weather is both an active and passive force in everyday life. When you elect to monitor the precipitation in an area, it becomes an ever-present force. The waiting and wondering for what the weather will bring for the day is more intense than I imagined it would be. The project is the course project for the Fall 2015 session of Environmental Informatics, INSC 546 with Dr. Mike Frame.

In this instance, the precipitation was monitored in Clarksville, Tennessee, on my property for optimal data collection. The monitoring period began in September 4, 2015 and lasted until November 21, 2015, totaling eleven weeks and 79 entries. All entries are recorded in inches and the time recorded in CST; also, I decided to include the day's high and low temperatures and the temperature at the time of data collection.

Rain Gauge Deployment and Processes

I deployed two rain gauges, a manual-read gauge from La Crosse Technologies and a digital-read gauge from Acu-Rite, on my property. They are transfixed and deployed on my back porch with undisturbed views of the sky for maximum rainfall collection; the gauges were separated by four feet, one situated facing North-South and the other facing East-West. I wanted to make sure that the two gauges were collecting similar amounts, if not identical amounts, of precipitation. My intention was to test the accuracy of the digital versus manual-read gauges. The

gauges were deployed on the same date, September 4, 2015, and their data collection period concluded on November 21, 2015.

Following deployment outlined above, the processes to record data are as follows:

1. Record rainfall in gauge (first, manual gauge and then the digital gauge) each day at 6:30 PM CST.

2. Record rainfall in inches.

3. Record temperature in Fahrenheit and access daily highs and lows using the NOAA weather application.

4. Clean and empty rain gauges to reset for next day's rainfall accumulation.

5. Update digital spreadsheet with the day's data and save promptly.

6. Repeat 78 times and until 79 entries are made in the spreadsheet.

All data was original recorded by hand and transferred to the digital spreadsheet each night.

Data Analysis

My original hypothesis was that the area would get a hefty amount of rain, as per usual in Clarksville in the fall season. I predicted that we would see a large range of anywhere between 6 to 8 inches of rain. This hypothesis was conservative and in line with the Farmer's Almanac. I should have nailed down a more specific range separate by tenths of an inch rather than inches.

Rainfall Accumulation Data 20150904 to 20151121 – Clarksville, Tennessee

Date	Time	Manual (in.)	Digital (in.)	High Temp °F	Low Temp °F	Current Temp
9.4.15	6:30:00 PM	trace	0.05	94	66	78
9.5.15	6:30:00 PM	0	0	95	66	70
9.6.15	6:30:00 PM	0	0	94	66	68
9.7.15	6:30:00 PM	0	0	92	66	71
9.8.15	6:30:00	0	0	92	66	69

	PM 6:30:00					
9.9.15	PM 6:30:00	0.6	0.46	88	69	76
9.10.15	PM 6:30:00	0.2	0.19	87	65	82
9.11.15	PM 6:30:00	1	0.74	84	62	68
9.12.15	PM 6:30:00	0	0	73	52	57
9.13.15	PM 6:30:00	0	0	73	48	53
9.14.15	PM 6:30:00	0	0	78	47	53
9.15.15	PM 6:30:00	0	0	83	49	52
9.16.15	PM 6:30:00	0	0	83	54	55
9.17.15	PM 6:30:00	0	0	85	56	50
9.18.15	PM 6:30:00	0	0	88	57	75
9.19.15	PM 6:30:00	0	0	84	57	70
9.20.15	PM 6:30:00	0	0	80	55	71
9.21.15	PM 6:30:00	0	0	80	53	69
9.22.15	PM 6:30:00	0	0	85	47	49
9.23.15	PM 6:30:00	0	0	86	52	60
9.24.15	PM 6:30:00	0	0	88	56	63
9.25.15	PM 6:30:00	0.1	0.08	84	62	68
9.26.15	PM 6:30:00	0.05	0.07	77	63	65
9.27.15	PM 6:30:00	0	0	77	64	75
9.28.15	PM 6:30:00	0	0	81	63	72
9.29.15	PM 6:30:00	1	0.7	77	67	68
9.30.15	PM 6:30:00	0	0	69	63	65
10.1.15	PM 6:30:00	0	0	63	57	60
10.2.15	6:30:00	0	0	60	52	58

	PM 6:30:00					
10.3.15	PM 6:30:00	trace	trace	53	50	50
10.4.15	PM 6:30:00	0	0	75	51	54
10.5.15	PM 6:30:00	0	0	83	57	60
10.6.15	PM 6:30:00	0	0	86	60	70
10.7.15	PM 6:30:00	0	0	85	58	60
10.8.15	PM 6:30:00	0	0	85	58	61
10.9.15	PM 6:30:00	0.2	0.23	80	59	67
10.10.15	PM 6:30:00	0.5	0.42	71	48	52
10.11.15	PM 6:30:00	0	0	74	42	60
10.12.15	PM 6:30:00	0	0	83	52	59
10.13.15	PM 6:30:00	0	0	74	48	59
10.14.15	PM 6:30:00	0	0	76	43	48
10.15.15	PM 6:30:00	0	0	80	44	50
10.16.15	PM 6:30:00	0	0	68	42	51
10.17.15	PM 6:30:00	0	0	60	35	38
10.18.15	PM 6:30:00	0	0	62	31	35
10.19.15	PM 6:30:00	0	0	72	32	40
10.20.15	PM 6:30:00	0	0	73	43	50
10.21.15	PM 6:30:00	0	0	78	45	58
10.22.15	PM 6:30:00	0	0	81	49	53
10.23.15	PM 6:30:00	0	0	81	50	56
10.24.15	PM 6:30:00	trace	0.01	74	60	64
10.25.15	PM	0.3	0.27	60	55	57
10.26.15	6:30:00	3.7	3.27	58	54	54

	PM 6:30:00					
10.27.15	PM 6:30:00	0	0	61	58	60
10.28.15	PM 6:30:00	0	0	68	57	62
10.29.15	PM 6:30:00	0	0	65	41	43
10.30.15	PM 6:30:00	0	0	61	36	42
10.31.15	PM 6:30:00	0	0	63	50	52
11.1.15	PM 6:30:00	0	0	61	57	59
11.2.15	PM 6:30:00	0	0	72	55	60
11.3.15	PM 6:30:00	0	0	77	51	60
11.4.15	PM 6:30:00	0	0	76	55	58
11.5.15	PM 6:30:00	0	0	78	65	67
11.6.15	PM 6:30:00	0	0	75	57	59
11.7.15	PM 6:30:00	0	0	60	46	50
11.8.15	PM 6:30:00	0	0	61	43	46
11.9.15	PM 6:30:00	0	0	56	46	49
11.10.15	PM 6:30:00	0	0	63	42	50
11.11.15	PM 6:30:00	0	0	73	40	51
11.12.15	PM 6:30:00	0.1	0.11	65	45	50
11.13.15	PM 6:30:00	0	0	59	35	39
11.14.15	PM 6:30:00	0	0	63	30	32
11.15.15	PM 6:30:00	0	0	63	34	35
11.16.15	PM 6:30:00	0	0.07	53	43	50
11.17.15	PM 6:30:00	0.3	0.28	73	52	58
11.18.15	PM	0.38	0.42	69	49	53
11.19.15	6:30:00	0.1	0.09	62	38	44

	PM					
	6:30:00					
11.20.15	PM	0	0	56	30	46
	6:30:00					
11.21.15	PM	0.1	0.08	61	33	38
Totals	**in inches:**	**8.63**	**7.54**			

I was quite surprised to record 8.63 inches collected by the manual-read rain gauge and 7.54 total inches collected by the digital read rain gauge. The .91 inches that separate the rainfall totals per gauge is troublesome to me. They were deployed in the same area, at the same time, and yet the totals were off by more than what one could call an error. I have thought for days what could be the cause of this. Could it be the wider opening on the manual-read gauge? Could it be the directional orientation of the gauges? Could the measuring mechanisms in the digital-read gauge have been off by a hair? Could the wind have blown more wind into the manual-read opening than the actual total precipitation of the day?

Alas, I have no figured out why there was what I could call a vast difference in the accumulation totals. I wish I knew what would cause this. Maybe I should have done a bit more research and chosen another manual-read with a vertical orientation rather than horizontal orientation to reduce issues with accuracy.

Conclusion

My eyes have been opened to the multiple facets involved in monitoring an act of nature like weather. There's more to the act than just writing down the data and transcribing it to a digital format for safe-keeping. There is a depth to this research project that I am so happy to have worked very hard on; the data management plan and the repository storage are completely new concepts to process. As a researcher, I learned that there is more than my data; I have to make sure that it can be properly stored for future use. The metadata was no problem, as I had done this before. This project and all its facets seemed daunting at the beginning, but everything came together and presented a nice product.

All data and its intentions of being disseminated are outlined in the documents that follow as appendices.