Assessing the Origin of Noise in the Precipitation Gauge Geonor T-200B
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Introduction
The Geonor T-200B is an all-weather precipitation gauge that is utilized by the Research Applications Laboratory (RAL) working under the National Center for Atmospheric Research (NCAR). For over 20 years NCAR and RAL have been working to address an issue of noise within the device. Noise an uncounted for and abnormal variation in what would be expected to seen in the data. Figure 1 below shows a sample of noise in the data. The tremor like lines are during times of no precipitation where the accumulation should be a flat line. The purpose of this research was to attempt to pinpoint the cause of the Noise.

How the Geonor Works
- Three vibrating wires
- Plucked by magnets
- Bucket suspended by wires
- Collects precipitation
- More precipitation means more weight
- Frequency increases
- Program converts frequency to mm accumulation

Control Test
- Gather control data to form a baseline for experiments
- Assembled two Geonors
- Covered the top and placed 1kg weight in bucket
- One set to run inside, the other set to run outside

Grounded Wire Test
- Test for electrical interference
- Use the same Geonor set up as control for consistency
- Add a grounding wire to shield the device
- Compare to control test

Results
- Figures 6 and 7
  - Correlation Plots between frequency and temperature
  - Indoor has weak positive correlation of 50%
  - Outdoor has a strong negative correlation of 70%
  - Confirms that an increase in temp results in a decreased frequency

Future Research
To be conducted could include a correlation between wind and the frequency, or a comparison of the effect of temperature change on the datalogger panel. A panel temp test could be run by setting up heaters inside a box with the dataloggers and collecting frequency data.

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