MAPPING IONIZING RADIATION ON THE OREGON STATE UNIVERSITY CAMPUS

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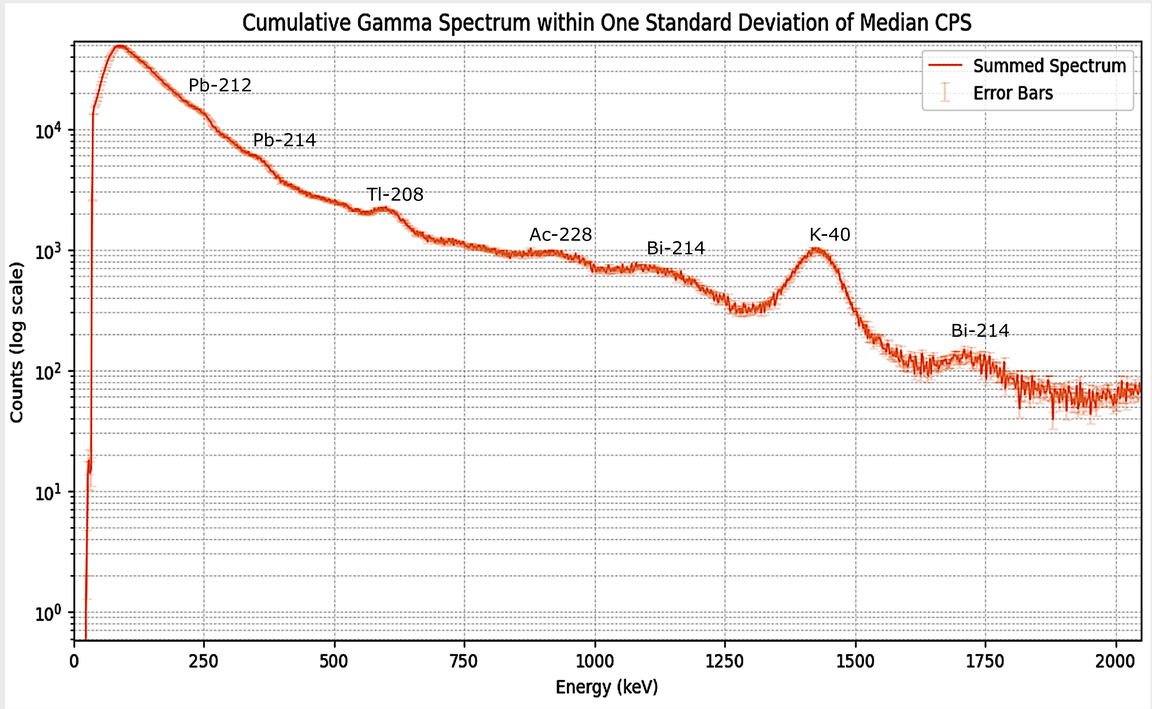
BACKGROUND

- Ionizing radiation exists everywhere on earth in small amounts, and the levels of natural, or "background" radiation vary from place to place.
- This project aimed to establish a heatmap of background radiation levels throughout the Oregon State University campus.
- A background heatmap, once made, could be used in the future for nuclear safety, as well as to further our understanding of the natural radiation sources on the Oregon State University campus.
- There is a difference between outdoor and indoor background levels of radiation, so this project only focused on the outdoor background readings.
- The project group was given a pair of Scintillation Detectors, one high quality and one low quality. The efficiency of these detectors were compared.
- Using the efficient detector, members of the group walked along every outdoor footpath on the Oregon State Unviersity campus, collecting real-time counts per second that were converted to a .csv file.
- The data was processed via Python and used to create a heatmap.



HEATMAP GUIDE

- The heatmap (as seen in the other poster) shows the counts per second readings at different places on campus.
- The highest measurement found is shown as a **red dot**.
- The highest measurement found is shown as a **blue dot**.
- The yellow areas had higher readings relative to the green areas.

RESER STADIUM LOWSPOT

There is a notable ”Lowspot” in our measurements in the Reser Stadium Parking Lot. This is likely due to the very low amount of structure or exposed material to produce gamma radiation.

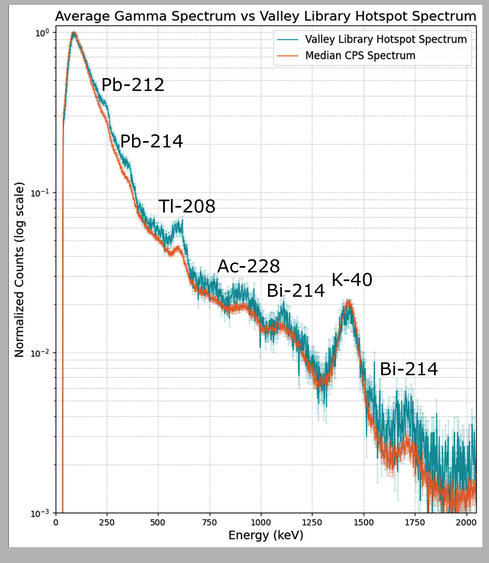
The asphalt emits very low amounts of gamma radiation and there is little to nothing else out in the parking lot to give off any more gamma rays. The asphalt also attenuates any of the gamma rays coming from the soil and preventing them from reaching the detector.

VALLEY LIBRARY HOTSPOT

The hotspot found at the Valley Library is significant. It has about three times the amount of background as the average measurement on campus.

Shown below, the main radioisotopes that seem to be elevated at the valley library hotspot are all the natural background radioisotopes other than K-40.

This is explainable due to the natural radioactive decay from uranium (U-238) and thorium (Th-232). These isotopes decay into many of these elevated isotopes we see in the spectra (e.g., Pb-212, Bi-214, and Tl-208). These uranium and thorium isotopes are in high concentrations in granite, and there is a lot of granite near this hotspot!



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