OIINK P-Wave Tomography

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This slide is fairly self explanatory, but is intended to serve as a roadmap for the audience to track with. I will stress that I am going to touch on five major points today. This gives me a way to frame some of the background information and my current research into larger ideas that the audience is familiar with. This way, if they have a question about my research, they at least have a framework to track along with. The five categories to progress logically in order.

1. What is Tomography?
2. Earth Structure/Geology
3. My Research Process
4. Current Results
5. Goals and Larger Picture
Since the term “tomography” is going to be thrown around a lot during this presentation, it is important for the audience to understand what the process is at the most basic level. Intricacies are not needed, and thus I ignore them. Instead, I choose to focus on a simple analogy that communicates the larger idea of what tomography is.

Each of the four points on here would be expanded upon, but I tried to keep text to a minimum. The general idea would be to use the comparison to a CAT scan, something that most high school students are largely familiar with, or could be explained extremely quickly, as a base for explaining tomography. I would first talk about how tomography images the interior of the earth, deeper than we can drill. It’s one of the ways we can know what the interior of the Earth looks like. To do this, we use “energy” from earthquake events. This is an understandable idea for high school students. I would then explain how my particular branch of tomography uses “first arrivals”, or the first dose of energy released from an earthquake. There are other types of tomography, but for my presentation, first arrivals will be the important factor. Lastly, I will explain how this earthquake energy travels faster or slower through different parts of the earth, much like other forms of movement are impeded by different materials. Tomography seeks to image which areas are fast, and which areas are slow. This can tell you a number of things, as different geologic structures are known to be fast or slow.
This slide has only one point, but it’s an extremely important one: the Earth is NOT uniform in velocity. I would briefly review how the Earth is made up of layers, and certain layers are faster than others. This is an important point, because I will expand on it later. I would tell the listeners to remember this, as I will come back to it when talking about “residuals”.

Another point I would briefly make is the depths as seen on the left. They are deep. My work goes down to about 650 km, which allows for a frame of reference as far as where my work is done in terms of larger earth structure.
After explaining the larger earth structure, this slide focuses on local earth structure. There are two main geologic points, and one “so what” point that I will touch on. The first is explaining what the “craton” is. This is relatively easily explained as the stable part of the continent. I would use a simple analogy of if you smash things together, you usually have a middle part that is relatively untouched. This is the craton.

My second point is explaining what “basins and ranges” are. These are quite easy to explain, as they are just local areas of high or low topography. Our focus area is in the Illinois basin. This just gives a frame of reference for the area we are studying.

Finally, I would explain how this work is being used to examine the history of the area, often thought to be boring and simple. Our work is intended to show whether or not that is the case. My specific work is a smaller piece of the larger puzzle.
My Data in 3 Key Terms

Recorded on the “OIINK Array”

~ 400 “Telesisms” – Global Earthquakes

“P-Wave First Arrivals“

This slide is getting into my project. I’ll introduce my data using three easy key terms. All the bolded terms would be explained. I like the idea of teaching my audience some new words, hence not skirting around complex vocabulary. High schoolers are teachable, and I intend to teach them new terminology in this talk.
Since my work is tomography, this slide is meant to teach the audience what tomography is, and how it works. I'd bring back the idea of the velocity layers of the earth from a previous slide, and explain “residuals” and how they are used to record deviations from standard travel times.

Then, I’d explain the idea of an inverse problem. This may seem like it’s too “sciency”, but I in fact think it is a crucial part of my research, and would thus take the time to explain it, with the assistance of the provided diagram.
Preliminary Results

Self-explanatory. Show the video and talk about the results.
Unlocking Our Continent’s History!

Sum up, connect it all together, explain how my research is a part of the larger project!
Questions?