



Engaging Contexts Data Integration
Using Sudden Ionospheric Disturbance Data

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Sudden Ionospheric Disturbance

The ionosphere is a region of Earth's atmosphere (encompassing the mesosphere, thermosphere and exosphere) that reacts to changes from both the Sun and surrounding space to the Earth below. In this area, ionization is created by the radiation from the Sun. As the sun releases energy in the form of solar flares and eruptions, it causes Sudden Ionospheric Disturbances (SID). “The ionosphere is both shaped by waves from the atmosphere below and uniquely responsive to the changing conditions in space, conveying such space weather into observable, Earth-effective phenomena -- creating the aurora, disrupting communications signals, and sometimes causing satellite problems”, (NASA/Goddard Space Flight Center, 2016).

Direct Access to Specific Data

<http://sid.stanford.edu/database-browser/>

<http://solar-center.stanford.edu/SID/data/data-access.html>

http://solar-center.stanford.edu/SID/map/#satellite_map

Space Weather

I plan to implement lessons on how to record SID's by using a SID monitor and having students build an antenna (Society of Amateur Radio Astronomers ((SARA))@ <http://sid.stanford.edu>) for receiving Very Low Frequency (VLF) wave data detected by transmitters used throughout the globe. The SARA data provides a hands-on experience with data collection and further enhances student knowledge of the sun and how it can be used to predict future behavior and its repercussions to our earth and resources. It also elevates developing evidence based inferences and could further be integrated with science literacy across many disciplines.

It is my personal view that using authentic data, with the teacher's upgraded knowledge and use of these new standards, further engages students interests in how to apply that data and its relevance to the topic and to themselves. This avoids the older pedagogy of the scientific method which often uses strict guidelines and procedures using only one method to draw conclusions and without an inquiry base to engage students in science related subjects, (Cotabish, A., Dailey, D., Robinson, A. & Hughes, G.), 2013.

It is my further opinion that data from the sun collected by building an antenna incorporates select principles from the framework for a k-12 science education, (Pratt, H., Bybee, R., Sneider, C., Duschl, R., Krajcik, J., and Merritt, J. (2012). Specifically integrating the NGSS's 3-Dimensional Pedagogy of Scientific Practices, Crosscutting Concepts and Disciplinary Core Ideas, all correlated by building an apparatus (engineering process), recording data (practices) and Space Weather (Core Idea) within the framework, which creates and maintains a rigorous scientific environment and accessibility to all students through new science practices.

The framework and NGSS reflects the true *nature* of how students interact with born instincts from a young age to high; through *natural* exploration, curiosity, and inquiry. By using authentic data, it allows for multiple resources to build evidence aligned with the NGSS. When incorporating data, those principles become even more alive with the new science standards and I could not be more enthralled by this. I am inquisitive by nature and like to model that to my students by passionate, ambitious science teaching. Excitement, produced through inquiry and capturing engagement is a large segment of the learning process that involves questioning of phenomena and personal connection that will become a building block for budding scientists.

References

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