

Sun-Earth Day Mission Highlights:

Interview with Lyndsay Fletcher (RHESSI)

[Troy Cline]

In 2012 the planet Venus will pass directly between the Sun and the Earth. This "Transit of Venus" won't occur again until the year Twenty-One-Seventeen.

[Sound clip]

My name is Troy Cline and welcome to Sun-Earth Day 2012: Shadows of the Sun.

[Music Transition]

Many of our NASA missions play an enormous part telling that incredible story: the story of our dynamic solar environment.

In this podcast, we'll continue our series about the RHESSI mission with Dr. Lyndsay Fletcher. Dr. Fletcher is a solar physicist who holds a faculty position at the University of Glasgow in Scotland.

I asked Lyndsay to tell us more about her study of solar flares and how her work ties in with the RHESSI mission.

[Lyndsay]

I study the solar flares which are violent explosions on the Sun. I'm particularly interested in how they appear when you look at them at the optical part of the spectrum, what you would see if you looked at them with your eyes, which of course you never do, and the ultraviolet part of the spectrum. I'm interested in how that supports and compliments the observations that most people here at this mission are making in the x-ray part of the spectrum. We have been exploring that a little bit. The reason we are going in that direction (the RHESSI mission has been a wonderful, eye-opening, revolutionary mission, enabling us to image the x-ray sources and understand the spectrum) but the point remains that imaging x-rays making a picture in x-rays is difficult, a difficult technical job, it is filled with problems and uncertainties, we are really do our best to get on top of. But imaging in optical and imaging in ultraviolet is simple compared to it. You just have the right commonal like a telescope, like a very big telescope. The information you get from that is easy to understand in some ways and kind of a backup a second eye on fundamentals- acceleration and other research and observing plasma.

[Troy]

I thought it would be interesting to ask Lyndsay to tell us how RHESSI data helps her with her research and how that research impacts our lives here on Earth?

[Lyndsay]

RHESSI helps with my research in particular, because of the x-rays images that are high energy x-rays that we get dosed with are produced by electrons, fundamental particles of accelerated electrons. And we also know that these x-rays are produced from electrons, those electrons carry a huge fraction of all of the energy that is released by a solar flare. So it is kind of chained from the electrons to the x-rays to RHESSI. So by looking a RHESSI we can understand something about acceleration process and that acceleration process is part of the overall energy release process the wind; the sun atmosphere gets rid of its excess magnetic energy. A big part of the energy release comes for the electrons and another big part comes out in coronal mass ejections. That's really the aspect that I guess in part is not understood, the coronal mass ejection, which is connected to the x-rays we don't quite understand but we are getting it.

Space Weather was first recognized in 1859. There was a solar flare that was observed quite late in the optical part of the spectrum, that I am interested in, by Richard Carrington, who was an amateur astronomer in England. He was observing the sun and he saw this white light flare and he marked it and called it in with some wonderful drawings of this white light flare. He also noticed that a few minutes later there was a huge deflection on the magnetometer. What you may not know is what happens to the ionosphere, the upper atmosphere, the x-rays and ultraviolet from that flare arrive, they ionize the ionosphere and that creates electrical currents which creates a magnetic field which is measured as a deflection by the magnetometer. This combination of the observation of the white light flare and the deflection of the magnetometer already told us that there was this thing called Space Weather. Back then there were many that did like this idea that the sun could influence the magnetic field of Earth. So that was a really interesting part of history, I think. As well as, after a few hours later there was a colossal aurora display. That was the coronal mass ejection that was unleashed by the flare that took longer to travel through space to impact Earth and also made the magnetometer go crazy. So the flare and the coronal mass ejection have an effect in part of our chemistry of events.

[Troy]

Towards the end of the interview I asked Lyndsay to tell 'what' or 'who' influenced her most to pursue a career in science.

[Lyndsay]

The first time I can recollect that I wanted to do science, actually physics I was never interested in biology or chemistry, was in secondary school, about 14 in the UK. I was deciding what subjects I would be taking after the following examinations and physics was always going to be one of them, I remember reading the science publications and keeping them in a folder. My physics teachers, Mr. Collins and Mr. Williams always encouraged me in my interest in Physics in fact Mr. Collins gave me a book on astronomy. I was always excited and knew I would have a career in physics. My father tells me that when I was 5 years old I used to look at the stars through a telescope- stars and galaxies I do remember looking at in the sky. So maybe at that point I was thinking about being interested in physics.

[Troy]

We'd like to thank Dr. Fletcher for taking the time to talk to us today, and look forward to future podcasts about the RHESSI mission. You can also read a great interview about her at www.solarweek.org.

You can find all of the information about this year's theme, "Shadows of the Sun", on Sun-Earth Day website at sunearthday.nsa.gov. We'll continue to populate that website the latest information about our upcoming programs, background resources, activities and registration information. With the help of our friends from the Solar Dynamics Observatory mission we've even include a new event based Google Map! One of our main goals is to help you join thousands of people in learning more about the Transit of Venus on June 5-6, 2012, and then again for a total solar eclipse on November 13-14, 2012. I'll share more with about those events in upcoming podcasts.

I hope you enjoyed this Sun-Earth Day Highlights podcast. Upcoming podcasts will include interviews with additional NASA scientists, astronomers, educators and media specialists from the award winning NASA Edge team!

Don't forget to 'like' us on Facebook and follow us on Twitter to join in on the discussion with our growing Sun-Earth Day community.

For all other details about the Sun-Earth Day program including information about our past SED themes be sure to visit our website at sunearthday.nasa.gov.

While there, don't forget to register in order to receive Sun-Earth Day updates!

You can learn more about NASA by simply visiting www.nasa.gov.