Citizen Scientists Help to Explore the Mysterious STEVE Phenomenon

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Citizen scientists using the Aurorasaurus project have provided critical observations to better understand the aurora-like phenomena now called STEVE (Strong Thermal Emission Velocity Enhancement). This phenomena typically occurs at regions closer to the equator (sub-auroral region) than is typical for aurora (usually closer to the poles). Scientists are still working to understand STEVE, but what they do know is STEVE is not a normal aurora – or some think maybe it's not an aurora at all. The more it's observed, the closer we are to understanding this newly-discovered phenomena.

Citizen scientists made observations of STEVE and another sub-auroral structure called SAR (stable auroral red) arcs along with more typical aurora on September 28, 2017. A nearby all-sky camera also measured it, allowing determination of the height of occurrence of the STEVE (~225–275 km) and 300–350 km for the SAR arc. This is the first time citizen scientist data and scientific data from an all-sky imager were combined to show the Sep. 28, 2017 STEVE.

Citizen science has proven to be a vital way for scientists to gain a better understanding of a difficult region of the ionosphere, a region that is a crucial connection between our atmosphere, space, and space weather.

Composite Panorama of aurora and strong thermal emission velocity enhancement (STEVE) observed on September 28, 2017 constructed from six individual frames showing green aurora to the North, reddish-purple aurora almost at zenith, and a mauve-white STEVE to the South.

C. Martinis (Boston U.), Y. Nishimura (Boston U.), J. Wroten (Boston U.), A. Bhatt (SRI International), A. Dyer (Citizen Scientist), J. Baumgardner (Boston U.), and **Bea Gallardo-Lacourt** (675), 2021: "First simultaneous observation of STEVE and SAR arc combining data from citizen scientists, 630.0 nm all-sky images, and satellites," Geophysical Research Letters: https://doi.org/10.1029/2020GL092169.