Lend Me Your Ears: Space Weather Citizen Science Through Harnessing Sonification

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The changing conditions in near-Earth space cause space weather. This poses a risk to our everyday lives through the technology we rely upon through impacts on crucial power, communications, navigation, and transport systems. Analogues of sound in the space plasmas around our planet, known as Ultra Low Frequency (ULF) waves, are one means by which energy is circulated from the solar wind to the radiation belt, auroral, and ionospheric regions. Time-series data of ULF waves is often analysed visually, however, such data lends itself more naturally to our sense of sound. Guided by experts in audio, citizen science, and public engagement, we have developed sonification tools that render ULF waves audible. Alongside this, a graphical user interface has been developed, enabling citizen scientists to highlight signals within this audible data that standard methods can struggle to identify. These efforts are part of a NASA-funded pilot project called HARP (Heliophysics Audified Resonances in Plasmas), where high-school students and members of the public contribute to space weather science through listening. We provide an overview of how we carefully developed and tested this citizen science project before launching it publicly.