Case Studies in Geophysical Acoustics

Dr. Daniel Bowman, Senior Scientist at Sandia National Laboratories

Forces imposed on the atmosphere may generate low frequency sound waves that can propagate across the globe. These signals carry information about their source and the medium through which they travel. The discipline of geophysical acoustics is analogous to seismology, but the field is still relatively young and filled with open questions. In this talk, I will discuss the use of high altitude balloons to capture sounds that otherwise are missed, and how this has implications for the energy budget of the upper atmosphere. I will also mention how balloon-borne microbarometers could be used to do "seismology" on planets with no solid surface (i.e. Jupiter and the gas giants). Then, I will describe how geophysical acoustics can be used to infer the size and depth of buried explosions, with implications for nuclear test ban treaty monitoring. I will focus on a particular case in which a buried explosion produced sound waves very different from those we would have predicted from previous experiments.