Characterization of Atmospheric Infrasound for Improved Weather Monitoring[1] ARNESHA THREATT, BRIAN ELBING, Oklahoma State University — Collaboration Leading Operational UAS Development for Meteorology and Atmospheric Physics (CLOUD MAP) is a multi-university collaboration focused on development and implementation of unmanned aircraft systems (UAS) and integration with sensors for atmospheric measurements. A primary objective for this project is to create and demonstrate UAS capabilities needed to support UAS operating in extreme conditions, such as a tornado producing storm system. These storm systems emit infrasound (acoustic signals below human hearing, <20 Hz) up to 2 hours before tornadogenesis. Due to an acoustic ceiling and weak atmospheric absorption, infrasound can be detected from distances in excess of 300 miles. Thus infrasound could be used for long-range, passive monitoring and detection of tornadogenesis as well as directing UAS resources to high-decision-value-information. To achieve this the infrasonic signals with and without severe storms must be understood. This presentation will report findings from the first CLOUD MAP field demonstration, which acquired infrasonic signals while simultaneously sampling the atmosphere with UAS. Infrasonic spectra will be shown from a typical calm day, a continuous source (pulsed gas-combustion torch), singular events, and UAS flights as well as localization results from a controlled source and multiple microphones.

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