

Promotion of an Open-Science Activity of the Earth Science - Coordinated Observations and Data Analyses of meteor-associated Low-Frequency Radio Emission and Anomalous Hearing

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In the Open Science era, collaborations between researchers and citizens are strongly endorsed, but selection of a “good” project will be essential to involve many citizen scientists. Simultaneously audible “sounds” associated with the flight of very bright meteors (fireballs) have been reported by many people including citizens and researchers in many years, even in the modern science era. Keay (1980, 1992) proposed that the anomalous hearing is caused by the very strong radio emission from fireball at very low frequencies, mainly in the ELF/VLF region. Although the mechanism of the proposed strong radio emission is sensed as “sound” is unknown, the detection of very low-frequency radio noise from fireballs will be a challenging research objective in the field of earth science because many fireballs are observed in the lower ionosphere at the altitudes between 80 to 120 km. The first detection of the meteor-associated VLF radio emission was reported by Watanabe et al. (1988) for a -6 mag Perseid fireball appeared at about 03:53:41 (JST), 13 August 1981, as a burst-like VLF emission with peculiar spectral characteristics. Since the discovery, several papers on observations of meteor-associated VLF radio emission in the period of prominent meteoric showers but one-to-one connections with individual meteors were not made and distinction from ordinal spherics (e.g. radio pulses caused by lightning activity) were not clearly examined. We are planning to perform a research program between researchers and citizen scientists in Japan involving optical, radio, and Video observers for prominent meteoric showers. The Perseid appearing every year in the mid of August will be the best target because many observational groups of universities and high schools and Video observers will be involved to this project. We will collaborate with members of Japan Meteor Society to assemble and archive observational data. We will also to correct reports of anomalous hearing of meteoric sound from observes. This project will be organized by T. Watanabe (WDS-IPO, NICT), H. Oya (Chiba Univ.), K. Shiokawa (ISEE, Nagoya Univ.), Y. Kato (ISEE, Nagoya Univ.) and K. Suzuki (Nippon Meteor Society).

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