Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

G04-03 Room:423 Time:April 29 10:00-10:15

Multi-site observation program of sprites in collaboration with high schools and universities: from 10-year activities

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As one of the educational projects in geoscience, TLE (Transient Luminous Events: sprites, elves, etc.) triangulation has been carried out since 2004 with collaborating many high schools in Japan and Kochi University of Technology (KUT). Since 2006, some high schools has been funded by Japan Science and Technology Agency (JST). In this decade, collaboration has been improved educationally and scientifically, resulting almost full-coverage of Northern sky over Japan by high-sensitivity CCD video cameras (Wat-100N) and motion-detective software (UFOCapture V2) operated by high school students. The activity generated the largest TLE observation network in the world by participating 30 or more high schools. After ended the funding from the JST as the SSH consortium or Core SSH, high school teachers and students continued their relationship to study the science of TLEs with having internal meetings twice per year until now.

The first sprite detection was made in Dec. 2004. More than 3000 TLE events were detected by high school students, creating many scientifically interesting results, i.e., the world first triangulation of elves in 2008, a few examples of gigantic jets with VLF signals. Existence of an elf with apparent stripe wave pattern was clearly confirmed by simultaneous observation of the elf, suggesting modulation by gravity waves. Such results were and will be presented by high school students with their impression at the domestic scientific meetings like JpGU high school student session as well as some international conferences (see Shirahata et al., 2014; a scientific paper submitted by Iwata Minami high school team).

Thus, the campaign was very successful to obtain new results of TLE as well as the special educational project for high school students. Their research activities were widely introduced to people in Japan by NHK special TV program ”The cosmic shore” in 2012. In this talk, 10 years collaboration between high schools and universitiy activities will be presented.

Reference: Shirahata et al., Striped structure observed in the elves: Relation to turbulences in the upper atmosphere, AS28 session, AOGS 2014, Sapporo, 2014.

Keywords: high school student, collaboration with high school and university, Astro-HS, Super Science High school (SSH), multi-site observation, sprite