

## Radiation Protection of Humans in Space and Aviation: Current States and Future Needs on the Warning System for Aviation Exposure to SEP (WASAVIES)

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Forecast of radiation doses for astronauts as well as aircrews due to the exposure to solar energetic particles (SEP) is one of the greatest challenges in space weather research. In last 5 years, we have developed a WArning System for AVIation Exposure to Solar energetic particles: WASAVIES. In this system, the SEP fluxes incident to the atmosphere are calculated by physics-based models, and they are converted to radiation doses using a database developed on the basis of air-shower simulation. However, it takes approximately 2.5 hours to determine the parameters used in the physics-based models after the detection of GLEs, and thus, the current WASAVIES cannot predict doses during the peak of GLEs. Therefore, we are trying to reduce the time for evaluating the parameters, as well as to develop a nowcast system for the radiation dose due to SEP exposure, under the framework of Project for Solar-Terrestrial Environment Prediction (PSTEP, <http://www.pstep.jp/>) in Japan. A brief outline of WASAVIES together with our future strategy will be presented at the meeting.

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