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Radiation Measurements at the Summit of Mount Fuji to Improve the Reliability of Cosmic Radiation Exposure Management

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The intensity of cosmic radiation in the atmosphere increases with altitude; the dose level at the cruising altitude of a civilian aircraft are nearly 100 times higher than that on ground. Accordingly, the exposure accompanying to the operation of jet aircraft is considered to be occupational exposure and, in some countries such as European countries and Japan, the management of cosmic radiation exposure for aircraft crew is performed. Its main task is the evaluation of crew doses by calculation. To obtain reliable estimations, it is desirable to monitor actually the cosmic radiation exposure at high altitude in addition to improvement of calculation models. For this purpose, we have started to utilize the former Mount Fuji Weather Station located at the summit of Mount Fuji, the highest place in Japan (3,776m asl) and measured cosmic radiation using several radiation instruments in the facility during the summer of 2008, 2009 and 2010. From September 2010, unattended continuous measurement was carried out using an energy-extended neutron monitor coupled with rechargeable batteries and a wireless LAN system. It was observed that the measured radiation dose levels were stable during those periods, as expected from the quiet condition of solar activity. Some variation which did not agree to both atmospheric pressure and the pattern of solar activity was observed, which suggests the uncertain effects of atmospheric condition. Spatial variation of shielding condition in the facility was also confirmed by neutron measurements. The unattended measurement operation continued for 4 months up to early January 2011. We like to establish a whole-year measurement in near future by solving the problems such as the fast falling of battery voltage.

Keywords: cosmic, radiation, Fuji, neutron, exposure, aircraft