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Stratospheric Neutron Detection Using Personal Neutron Dosimeters ANISA TAPPER, St. Catherine University, UNIVERSITY OF MINNESOTA MORRIS COLLABORATION, UNIVERSITY OF MINNESOTA TWIN CITIES COLLABORATION — High Altitude Balloon flights provide a platform for measuring galactic cosmic ray interactions in the Regener-Pfotzer maximum (R-P max 15-25 km) where ionizing particle count rate reaches an apex. The flux of secondary galactic cosmic ray (GCR) particles, such as, pions, muons, electrons, positrons, photons; depends on altitude, latitude, solar activity, and atmospheric composition. Through interactions, these particles undergo energy loss and decay while traveling through the atmosphere; neutrons are a part of the secondary interaction. Flux and fluence measurements allow for the categorization of particles from GCR interactions to determine the number of neutrons relating to the R-P max range. It is hypothesized that neutrons are generated in the upper atmosphere due to collisions between the GCR and nuclei of atmospheric oxygen and nitrogen, causing the nuclei to break into atomic and subatomic particles and cause higher numbers of neutrons to occur lower in altitude. An investigation was conducted using a personal neutron dosimeter, paired with a digital camera and Geiger-Müller omnidirectional counter to establish a correlation between neutron counts and the altitude of charged particle maxima. A minority of neutrons detected passed through the dosimeter at higher altitudes than the measured R-P maxima, confirming the hypothesis. A greater occurrence of neutrons appeared at or below the main interaction layer in the upper atmosphere showing the importance of having charged and neutral detectors used in conjunction with each other to better understand the dynamics of the charged and uncharged particles in the atmospheric environment.

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