EP 8: Poster ISWI

Time: Wednesday 16:30–19:00 Location: Poster.IV

EP 8.1 Wed 16:30 Poster.IV

Longterm Monitoring of Ambient Dose Equivalent Rates at Aviation Altitudes — •B. Heber[1], J. Briese[2], O. Burda[3], S. Burmeister[1], T. Klages[3], F. Langner[3], J. Marquardt[3], D. Matthiae[4], T. Möller[1], G. Reitz[4], E. Scharrenberg[1], and F. Wissmann[3] — [1]Institut für Experimentelle und Angewandte Physik, Christian-Albrechts-Universität zu Kiel, 24098 Kiel, Germany — [2]Deutsche Lufthansa AG, Frankfurt, Germany — [3]Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig Germany — [4]German Aerospace Center, Institute of Aerospace Medicine, Linder Höhe, 51147 Cologne, Germany

The complex radiation field at flight altitudes results mainly from the interaction of energetic charged particles with atmospheric molecules and atoms and consists of secondary neutrons, protons, gamma rays, electrons, positrons and muons. Due to the continuous interactions of primary and secondary particles within the atmosphere, the intensity of each component depends on the height. Since the Earth's magnetic field acts as rigidity filter for the charged primary particles, the flux of the primary particles into the atmosphere and the resulting intensity of secondary particles depend on the geomagnetic latitude being highest over the geomagnetic poles. The main primary component consists of Galactic Cosmic Rays (GCRs), mainly protons and alpha particles, whose flux is modulated in the heliosphere. Beside this slowly varying galactic component, solar energetic particle events may temporarily increase the intensity of this radiation field.

In the frame of the Radiation Monitoring on Board Aircraft (RAMONA) collaboration, three NAVIgation and DOSimetry (NAVIDOS) systems were installed in 2008 and 2009 on board of three Lufthansa Airbus A340 aircraft. They have been maintained since then by the consortium. Two of the NAVIDOS units rely on the DOSimetry TELescopes (DOSTELs), one is based on a LIULIN detector. This unique setup is ideally suited to investigate variations in the radiation field at different flight altitudes and geomagnetic positions and has been used to measure the radiation exposure during the recent extended solar minimum and thereafter. With increasing solar activity in 2010 the measured dose rates have been decreasing. Since these variations depend on the location of the aircraft, a detailed data analysis is required and will be presented.

EP 8.2 Wed 16:30 Poster.IV

Verschiedene technische Ansätze zum Monitoring vom Weltraumwetter im Radiobereich — •Thomas Bayer, Wolfgang Andree und Albrecht Weidermann — DLR_Campus, Neustrelitz, Deutschland

Seit über 100 Jahren ist es bekannt, dass Radioübertragungen durch natürliche Einflüsse gestört werden können. Jedoch seit mitte der 90iger Jahre beschreiben wir diese Störungen als Weltraumwettereinflüsse. Durch solare Flares und den damit verbundenen ionosphärischen Störungen wird zum Beispiel die Langwellenübertragung beeinträchtigt. Dieses Phänomen kann man schon mit einem Software Radio und einer einfachen Antenne untersuchen. Mit einem einfrequenz Empfänger können Langwellen Sendungen kontinuierlich untersucht werden. Um diverse physikalische Phänomene simultan zu untersuchen ist im DLR ein SDR Breitbandempfänger entwickelt worden. Der vorliegende Beitrag beschreibt technische Lösungen zum Monitoring der beschriebenen Weltraumwettereffekte und wie diese im Rahmen des DLR School Lab Neustrelitz mit Schülergruppen umgesetzt wurden.

EP 8.3 Wed 16:30 Poster.IV

A Case-Study: Correlation of GNSS Distortions and the Aurora During Increasing Solar Activitity — •Michael Danielides[1], Mike Rietveld[2], Mike Kosch[3], Andrew Senior[3], and Norbert Jakowski[1] — [1]DLR Institut für Kommunikation und Navigation, 17235 Neustrelitz, Germany — [2]EISCAT Scientific Association, Tromsö, Norway — [3]Lancaster University, Lancaster, UK

Space weather impacts at high latitudes are often related to particle precipitation as displayed by the Aurora. It is known that transionospheric radio signals utilized by Global Navigation Satellites Systems (GNSS) are disturbed by these space weather impacts. The total electron content (TEC), derived from GNSS signal measurements along the ray path between satellite and ground receiver, is used to identify localized ionospheric disturbances. TEC is then correlated with simultaneously detected aurora structures. The EISCAT UHF radar is used to record ionospheric electron density and temperature height distributions along the magnetic field-line and along the GNSS line of sight.

The present case study reports on a multi-instrumental measurement campaign consisting of GNSS signal measurements, all-sky optical observations and EISCAT UHF radar measurements at quiet and disturbed geomagnetic conditions during increasing solar activity and discusses related ionospheric phenomena.