Geophysical Research Abstracts
Vol. 19, EGU2017-9912, 2017
EGU General Assembly 2017


# Radiation Belt Indices from NOAA's Geostationary Weather Satellites

Juan Rodriguez (1,2), Brian Kress (1,2), Athanasios Boudouridis (1,2), and Terrance Onsager (3)

(1) Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, Colorado USA (juan.rodriguez@noaa.gov), (2) National Centers for Environmental Information, NESDIS, NOAA, Boulder, Colorado USA, (3) Space Weather Prediction Center, National Weather Service, NOAA, Boulder, Colorado USA

This paper reviews the current radiation belt indices produced from observations by NOAA's geostationary weather satellites and describes their future with the recent launch of the first in the new GOES-R series of satellites (GOES-16). Currently, SWPC issues a radiation belt alert when the >2 MeV electron fluxes observed by the GOES-East satellite exceed 1000 electrons/(cm**2 s sr). This alert threshold was determined in consultation with the satellite industry. The current instrument is a dome detector with a 0.123 g/cm**2 aluminum moderator and two 1500-micron, 25 mm**2 silicon detectors connected in parallel, and coincidence logic involving three discriminator levels on this detector combination. This is a relatively simple instrument with demonstrated good consistency among various flight units. However, it provides no pitch angle resolution and moreover suffers from serious contamination during SEP events as well as large dead time corrections during extreme events. Also, highly relativistic electrons are measured in only three integral channels (>0.8, >2 and >4 MeV), providing only crude spectral resolution.

Starting with GOES-16 (launched 19 November 2016), the >2 MeV channel is provided by a five-telescope instrument for which pitch angles are derived from the GOES-16 magnetometer observations. This instrument exhibits reduced dead time at extreme event levels and improved energetic proton rejection. Besides the integral channel, the new instrument has several differential channels above 0.8 MeV, providing improved spectral resolution for internal charging diagnosis. In addition to improved spectral resolution in the GOES 13-15 energy ranges, the GOES-R series also flies a new electrostatic analyzer-based electron and ion spectrometer providing observations at 15 energies in the 0.03-30 keV range and 14 angular zones. These observations will support a real-time indication of surface charging on the GOES satellites and therefore will provide useful situational awareness for operators of satellites in the vicinity of GOES.