

Forecasting SEP Events with Solar Radio Bursts

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Solar Energetic Particle (SEP) events from the Sun occur when particles associated with solar bursts like CMEs and flares are propelled into space. These events can cause substantial damage to objects in their paths, like satellites, by penetrating into them and causing radiation. A past study devised a method of forecasting the occurrence of an SEP event using properties of the type II and type III radio bursts measured from WIND/WAVES (Winter & Ledbetter 2015). This study analyzed 27 SEP events from 2010 to 2013. We now present an analysis of type II and type III bursts in solar cycle 23, associated with the 63 SEP events from 2000-2003. Parameters including the peak flux of type II bursts, integral flux of type II and II bursts, and the duration of type III bursts are used to create a radio index. This index is used to predict whether or not an SEP event will occur. Cycle 23 was more active than cycle 24, with significantly more radio bursts and SEP events. Our results show that the radio index successfully predicts the occurrence of SEPs for the events in the more active solar cycle 23. We also find that, in general, the higher the radio index the higher the peak proton flux will be following the burst.