High-Intensity, Long-Duration, Continuous AE Activity (HILDCAA) events: solar and interplanetary causes

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High-Intensity, Long-Duration, Continuous AE Activity (HILDCAA) events are characterized by an intense AE index lasting for more than 2 days. In the strict definition of a HILDCAA, the AE index must reach a peak value of 1000 nT and the index must not fall below 200 nT for intervals longer than 2 hours at a time. Also, the event must occur outside main phases of geomagnetic storms. ACE data (plasma and magnetic field) and geomagnetic indices were used to identify 14 HILDCAA event occurrences between years 1998 to 2001. All of these events were associated with high solar wind speeds. In 10 out of 14 events, these increases are clearly related to high speed streams. The solar wind magnetic waves in these streams are analyzed, and it is found that 13 out of 14 events have high solar wind alfvenicity. The solar origin of the high speed streams are analyzed using solar coronal maps (from Kitt Peak Observatory). For some of the events, the solar origin is a single coronal hole or extension of a polar coronal hole to the solar equator. Other events are related to groups of small coronal holes with the same polarity located at low to middle solar latitudes. Only one event does not have a coronal hole of origin.