

Galactic Cosmic Ray Intensities during the Space Age and the Holocene

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Both ground-based and space-based measurements have shown clearly that the intensity of galactic cosmic rays (GCRs) measured in the inner solar system varies over the 22-year (Hale) solar cycle. In addition, measurements of radioactive isotopes including ^{14}C found in tree-rings and ^{10}Be in found in ice cores have demonstrated even larger periodic intensity variations on time scales ranging from ~100 years to thousands of years.

During the extended solar minimum of 2009 measurements of GCR heavy-ions from C to Fe reached their highest levels of the space era. At the same time the count rates of many ground-based neutron monitors also reached their highest recorded levels. As of this writing, the ACE GCR heavy-ion intensities have approached within a few percent of the 2009 levels, suggesting that even higher intensities may be in store in the next year or two.

This talk will compare cosmic-ray intensities over the space era with measurements of related solar/interplanetary properties including sunspot number, interplanetary magnetic field and solar wind properties, and the tilt of the interplanetary current sheet. It will also compare the present-day GCR intensities with estimates by others based on ^{14}C and ^{10}Be data, and with forecasts for this and coming solar minima.