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Solar extreme ultraviolet and X-ray irradiance variations

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## Résumé / Abstract

The solar extreme ultraviolet (EUV) radiation at wavelengths shortward of 120 nm is a primary energy source for planetary atmospheres and is also a tool for remote sensing of the planets. For such aeronomic studies, accurate values of the solar EUV irradiance are needed over time periods of minutes to decades. There has been a variety of solar EUV irradiance measurements since the 1960s, but most of the recent observations have been broadband measurements in the X-ray ultraviolet (XUV) at wavelengths shortward of 35 nm. A summary of the solar EUV irradiance measurements and their variability during the last decade is presented. One of the most significant new solar irradiance results is the possibility that the irradiance below 20 nm is as much as a factor of 4 higher than the reference Atmospheric Explorer E (AE-E) spectra established in the 1970s and 1980s. The primary short-term irradiance variability is caused by the solar rotation, which has a mean period of 27 days. The primary long-term variability is related to the solar dynamo and is known best by the 11-year sunspot cycle. The solar cycle variability as a function of wavelength can be characterized as 20% to 70% between 120 and 65 nm and as a

factor of 1.5 to 10 between 65 and 1 nm. The variability of the total solar EUV irradiance, integrated from 0 to 120 nm, is estimated to be 30-40% for a large 27-day rotational period and a factor of about 2 for the 11-year solar cycle during the recent, rather active, solar cycles.

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