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Space Weather Monitoring with GOES-16: Instruments and Data Products

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Since their inception in the 1970s, the NOAA GOES satellites have monitored the sources of space weather on the sun and the effects of space weather at Earth. The GOES-16 spacecraft, the first of four satellites as part of the GOES-R spacecraft series mission, was launched in November 2016. The space weather instruments on GOES-16 have significantly improved capabilities over older GOES instruments. They will image the sun's atmosphere in extreme-ultraviolet and monitor solar irradiance in X-rays and UV, solar energetic particles, magnetospheric energetic particles, galactic cosmic rays, and the Earth's magnetic field. These measurements are important for providing alerts and warnings to many worldwide customers, including the NOAA National Weather Service, satellite operators, the power utilities, and NASA's human activities in space. This presentation reviews the capabilities of the GOES-16 space weather instruments and presents initial post launch data along with a discussion of calibration activities and the current status of the instruments. We also describe the space weather Level 2+ products that are being developed for the GOES-R series including solar thematic maps, automated magnetopause crossing detection and spacecraft charging estimates. These new and continuing data products will be an integral part of NOAA space weather operations in the GOES-R era.