

Modern and Historical Reconstructions of Solar UV Irradiance Variability

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It has been for long known that UV solar radiation affects the Earth's atmosphere and its climate. Similarly, UV radiation of the hosting star plays a key-role in determining the habitability of exoplanets, and it affects the interpretation of bio-markers measurements. We present a method to reconstruct irradiance UV indices on the secular temporal scales. The method combines semi-empirical and proxy approaches and assimilates the Sunspot number, full-disk observations, and modern UV irradiance measurements by SORCE. It allows to reconstruct the UV color index, as well as the area coverage of facular and network regions, from which it is possible to reconstruct irradiance variability at different wavelengths. We present here reconstructions from 1749 to 2015 of UV solar indices, namely the UV color, and core-to-wing ratio of MgII and CaII lines. The agreement between our reconstructions and modern composites measurements makes us optimistic about the use of the proposed approach to reconstruct irradiance variability in the past, at times when full-disk measurements were not available, or when studying active star hosting exoplanets that cannot be resolved spatially.