

Validation of the Group Sunspot Series

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Solar activity e.g. as measured by the number of active regions (sunspot groups) on the disk at any time varies on time scales ranging from solar rotation to centuries. Solar activity (telescopically observed for four centuries) manifests itself both by variations of wave radiation (e.g., EUV flux and TSI) and of particle emission (e.g., solar wind and energetic particles). These variations influence the Earth's environment (e.g., the ionosphere and the Van Allen Belts) with consequences that are observable on the ground as variations in the geomagnetic field. Two centuries of systematic (and an additional earlier century of more sporadic) observations serve as direct measurements of solar activity influence and can reliably be employed to reconstruct said activity for centuries past. These reconstructions validate the recent revisions of the (difficult to calibrate) telescopic observations (the Sunspot and the Group Numbers) that show no significant long-term trend over the past three hundred years. This is particularly important for historical reconstructions of total solar irradiance, such as the recently released Climate Data Record which shows a trend not compatible with the neither the geomagnetic record nor with the revised sunspot records.