

New Re-Calibrated Sunspot Numbers and the Past Solar Output

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For the first time since its creation by R. Wolf in 1849, the reference Sunspot Number series was submitted to a critical end-to-end revision. Given the large disagreement with the widely used Group Number, a more recent equivalent long-term sunspot index, this second series was also entirely revisited and reconstructed. Both re-calibrated series were officially released in July 2015.

After summarizing the diagnostics and the corrections brought to those reference series, we explain the main changes relevant to long-term reconstructions of the solar irradiance and particle output. Past discrepancies between the Sunspot and Group number series have largely been eliminated. Now, both series indicate that solar activity varied between rather constant limits since the Maunder Minimum, without a steady upward trend up to the mid-20th century. Detailed corrections in the sunspot number over the last decades and the extension of the past Group number from 1995 up to 2015 also lead to a closer match between the multi-century sunspot record and modern direct solar measurements.

This epochal revision thus provides a stronger base for extrapolating the current direct flux and irradiance measurements over secular scales, backward and potentially forward. We finally discuss new key objectives to be pursued in coming years to build on and to extend those improved sunspot data series: detailed sunspot catalogs, digital historical archives, image-based sunspot indices and advanced sunspot-based proxies.