

An Upper Limit on Sunspot Activity during the Maunder Minimum

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Maunder minimum is amazingly well covered by sunspot observations, however some of these data are based not on direct daily routine drawings/counts of sunspot but on general statements on the absence of spots during long periods. Although such statements were done by highly qualified astronomers, this fact leads to some speculations that the actual sunspot activity level could be higher than suggested in the group sunspot number series, in the earlier part of the Maunder minimum. Here we have estimated the conservative upper and lower limits of sunspot activity as obtained from sunspot observation records. We use the concept of active day fraction during the Maunder minimum, using raw information on individual daily observations. Establishing the relation between the sunspot activity and active day fraction after 1850, we evaluate the upper limit of annual group sunspot number during the deep Maunder minimum (1645-1700) which does not exceed 4. The earlier finding of a dominant 22-year periodicity during the Maunder minimum is verified and shown to be robust. Also we confirm that the start of the Maunder minimum was very abrupt.