

# WAS ONE SUNSPOT CYCLE LOST IN LATE XVIII CENTURY?

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We suggest that one solar cycle was lost in the beginning of the Dalton minimum because of sparse and partly unreliable sunspot observations during 1790s. So far this cycle has been combined with the preceding activity to form the exceptionally long solar cycle #4 in 1784–1799 which has an irregular phase evolution (known as the phase catastrophe) and other problems discussed in earlier literature. Based on a re-analysis of available sunspot data, we have suggested that solar cycle #4 is in fact a superposition of two cycles: a normal cycle in 1784–1793 ending at the start of the Dalton minimum, and a new weak cycle in 1793–1800 which was the first cycle within the Dalton minimum. Including the new cycle resolves the phase catastrophe and leads to a consistent view of sunspot activity around the Dalton minimum. It also restores the Gnevyshev-Ohl rule of cycle pairing across the Dalton minimum. Here we summarize these findings and show that the existence of a new cycle is supported by the auroral occurrence in Europe in late XVIII century.