

As for the brightness of the Carrington event.

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The brightness of the Carrington Event's aurorae aligned with the IBC Class IV [1], where the Earth's overall illumination is comparable to that during a full moon. Such aurorae have not been recorded by instruments at low latitudes since then [1], although, I should add, the ICMEs frequently 'visit' our Earth. Unlike the unexplained aurorae brightness in the case of CMEs' impact in 1859, the Deep Impact mission to Comet Tempel showed an increase in brightness caused by scattered sunlight on ejected dust [2]. Similarly, cometary or meteor dust could have contributed to the brightness of the 1859 Event. At this Event, dominant aurorae exhibited red and white colours [1]. Still, white aurorae are numerous during the increase of ^{14}C in the Earth's atmosphere, with subsequent accumulation due to solar energetic particles [3]. The paradox is that high levels of ^{14}C were not detected in the 1859 deposits [4]. But, as noted in [5], the Andromedids appear reddish at brightness magnitude (+3) and white at (−3).

[1] Hayakawa, H. et al. (2018) ApJ. 869 57. [2] Thornhill, W. & Talbot, D. (2006) 33rd Int. Conf. on Plasma Sci. <https://www.thunderbolts.info/pdf/ElectricComet.pdf> [3] Abbot, D. & Jull, R. (2016) AdvSpRes. 58 2181–2246. [4] German, B. (2025) 18 SB8 Abs. #EPSC-DPS2025-12. [5] Astapovich, I. (1958) Meteors, Ed. Phys-Math.Sci. p. 455.