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Impact of small-scale photospheric magnetic reconnection events on the upper atmosphere

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Ellerman bombs are sites of magnetic reconnection in the deep solar atmosphere. They can be observed as strong enhancements of the hydrogen Balmer lines and display rapid variability on small spatial and temporal scales. They are typically found in young active regions with vigorous emergence of magnetic fields. High-spatial resolution observations with the Swedish 1-m Solar Telescope in La Palma showed that Ellerman bombs can be also be found in large numbers in the quiet Sun. These quiet Sun Ellerman bombs are typically smaller and shorter lived than their active region counterparts. A recent study in the Balmer H-epsilon line showed that the quiet Sun may host more than 750,000 Ellerman bombs at any time. We analysed co-temporal SST and IRIS observations and found that a number of the longer lived quiet Sun Ellerman bombs can be associated with signal in the IRIS transition region SJI 1400Å and Si IV spectral lines. In another study, we found a number of examples that suggest a connection between quiet Sun Ellerman bomb events and spicule activity. This suggest that at least some spicules are driven by magnetic reconnection in the deep atmosphere.

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