ELLERMAN BOMBS: OBSERVATIONS AND SIMULATIONS

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Ellerman bombs (EBs) are short-lived, small-scale solar activities that occur in or near active regions. In this talk, we will show recent observations and simulations of EBs. The GST/FISS and IRIS observations show clear evidence of heating in the lower atmosphere, indicated by the wing enhancement in H$\alpha$, Ca II 8542 Å, and Mg II triplet lines and also by brightenings in images of the 1700 Å and 2832 Å ultraviolet continuum channels. Considering these particular features, we propose a two-cloud model to fit the observed line profiles and find a temperature increase of 600-2300 K in EBs relative to the quiet Sun. Radiative hydrodynamic simulations of EBs using both non-thermal and thermal models can generate line profiles that are similar to observations. However, in non-thermal models we find dimming in the H$\alpha$ line wings and continuum when the heating begins, while for the thermal models dimming occurs only in the H$\alpha$ line core, and with a longer lifetime. This difference in line profiles can be used to determine whether an EB is dominated by non-thermal heating or thermal heating. We will also talk about the relation of EBs and UV bursts.