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Small-scale heating events in the solar atmosphere: lifetime, total energy and magnetic properties

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Small-scale heating events (SSHEs) are believed to play a fundamental role in the heating of the solar corona, the pervading redshifts in the transition region, and the acceleration of spicules. We present a method to identify and track SSHEs over their lifetime and apply it to two simulation models. We identify the locations where the energy dissipation is maximum inside the SSHEs volume and we trace the SSHEs by following the spatial and temporal evolution of the maximum energy dissipation inside the SSHEs volume. The method is effective in following the SSHE and allows us to determine their lifetime, total energy and properties of the plasma as well as the magnetic field orientation in the vicinity of the SSHEs. We conclude that the SSHEs that have the potential to heat the corona live less than 4 minutes. Moreover, the typically energy release ranges from 10^{20} erg to 10^{24} erg. In addition, the directional change of the magnetic field lines on both sides of the current sheet constituting the SSHEs at the time of the absolute maximum energy dissipation ranges from 5 to 15 degree. This work is very relevant for the interpretation and the potential observational evidence of the SSHEs from upcoming data from the Spectral Imaging of the Coronal Environment instrument (SPICE) and the Extreme UV imager (EUI) onboard the Solar Orbiter Mission.