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On the relation between in situ properties and coronal source regions of ~0.1-200 keV electrons at quiet times

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We present a statistical study of interplanetary ~0.1-200 keV electrons using Wind/3DP measurements at quiet times from 1998 to 2014, by comparing their in situ properties at 1 au (e.g., power-law spectral index, flux intensity) and the locations of their coronal source regions in the solar atmosphere. According to the backmapping of magnetic field line from 1 au to 1 Rs solar surface and the proximity of the footpoints to coronal structures in the SOHO or STEREO EUV Carrington images, the coronal source regions are classified into four types: active region (AR), quiet Sun (QS), coronal hole (CH), and helmet-streamer associated region (HS). We find that the ~20-200 keV superhalo electrons from QS appear to have smaller power-law spectral index than those from AR, while CS-superhalo or HS-superhalo show no significant difference from QS- or AR-superhalo. And superhalo electrons from different regions have similar densities. For ~0.1-1.5 keV strahl electrons, QS-strhal and CH-strahl appear to have larger kappa index than AR-strahl and HS-strahl, and QS-strahl appear to have smaller density than AR-strahl. The halo electrons generally show the similar relation with their source regions to strahl electrons, while halo electrons show similar densities for all sorts of source regions. Furthermore, we find no clear correlation between superhalo electrons and strahl/halo electrons. The possible scenarios of the formation of superhalo and strahl/halo electrons are discussed.