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On the 3-dimensional structure of the streamer belt of the solar corona

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We investigate the three-dimensional structure of the streamer belt of the solar corona using a model that allows us to simulate its quasi-stationary configuration. Starting from the National Solar Observatory photospheric magnetograms, the position of the neutral line at the source surface ($2.5R_{\odot}$) is determined. A plasma sheet is centered around the current sheet represented as the radial extension of the neutral line. Comparing the synoptic maps of the streamer belt obtained with the SOHO/LASCO-C2 coronagraph and the simulated synoptic maps constructed from our model of the warped plasma sheet, we confirm earlier findings by Wang et al. (1997, 2000) that the streamers are associated with folds in the plasma sheet. Although the large-scale structure of the streamer belt is described reasonably well, some features, however, cannot be explained in this framework. We propose that two types of large-scale structures take part in the formation of these additional features. The first one is an additional fold of the neutral line, which does not appear in the modeled source surface neutral line, but is well visible in photospheric magnetograms. The second one is a plasma sheet with a ramification in the form of a secondary short plasma sheet. We show that if these structures are taken into account we can better describe the observed configurations of the streamer belt. The secondary plasma sheet can be formed between two secondary current sheets connected with the main current sheet. Our results suggest that the potential source surface model is unreliable for the description of the fine structure of the streamer belt.