



Figure 3. (a) Directions of the reconnected field lines' dragging and merging are schematically illustrated as green arrows for positive B_{yIMF} case. (b) Expected regions of observing heavy ions in yz plane cut of magnetotail. (c) Using the same data in Figure 2, all heavy ions measurements in y (GSM' coordinate) versus the x component of magnetic field measured at magnetotail by ARTEMIS. Green circles are corresponding to the solar wind positive B_{yIMF} and the blue circles are corresponding to the negative B_{yIMF} on average during the even. The location of green data points are well-correlated (90% agreement) with the expected locations of measurements down the tail as depicted in panel (b) with the similar shaded colors corresponding to the same $\overline{B_{yIMF}}$ orientation (green is positive and blue is negative). (d) Quadrant plot for the same data. Magenta circles are corresponding to the solar wind positive B_{zIMF} and the black circles are corresponding to the negative B_{zIMF} . The yellow-shaded regions are loaded (number 2 and 4) quadrants. Data points (circles) in (c-d) are down-sampled to one-minute cadence. IMF data are the OMNI data. The data in (c-d) are in GSM' coordinate system which is same as GSM but rotated 4 degrees downward to account for the aberration due to the orbital motion of the Earth with respect to the sun. In the GSM' coordinate, the OMNI data are time shifted by 40 minutes to account for the delay between arrival of the solar wind at the location of the ARTEMIS spacecraft (the lunar orbit) and the location of the magnetopause at the dayside nose of the magnetosphere. The loaded quadrants occurrence rate is more than $\sim 90\%$ of the total data points. Panel (a) is adapted from Gosling et al., 1985, and panel (b) is adapted from Figure 1.2 of <http://urn.fi/URN:ISBN:952-91-5949-8> courtesy of Minna Palmroth.