

Figure 1. (a) A typical case of magnetic storm in June, 2013. (b, c) Observed lifetime (case results) of  $H^+$  and  $O^+$  as a function of L in five different energies.

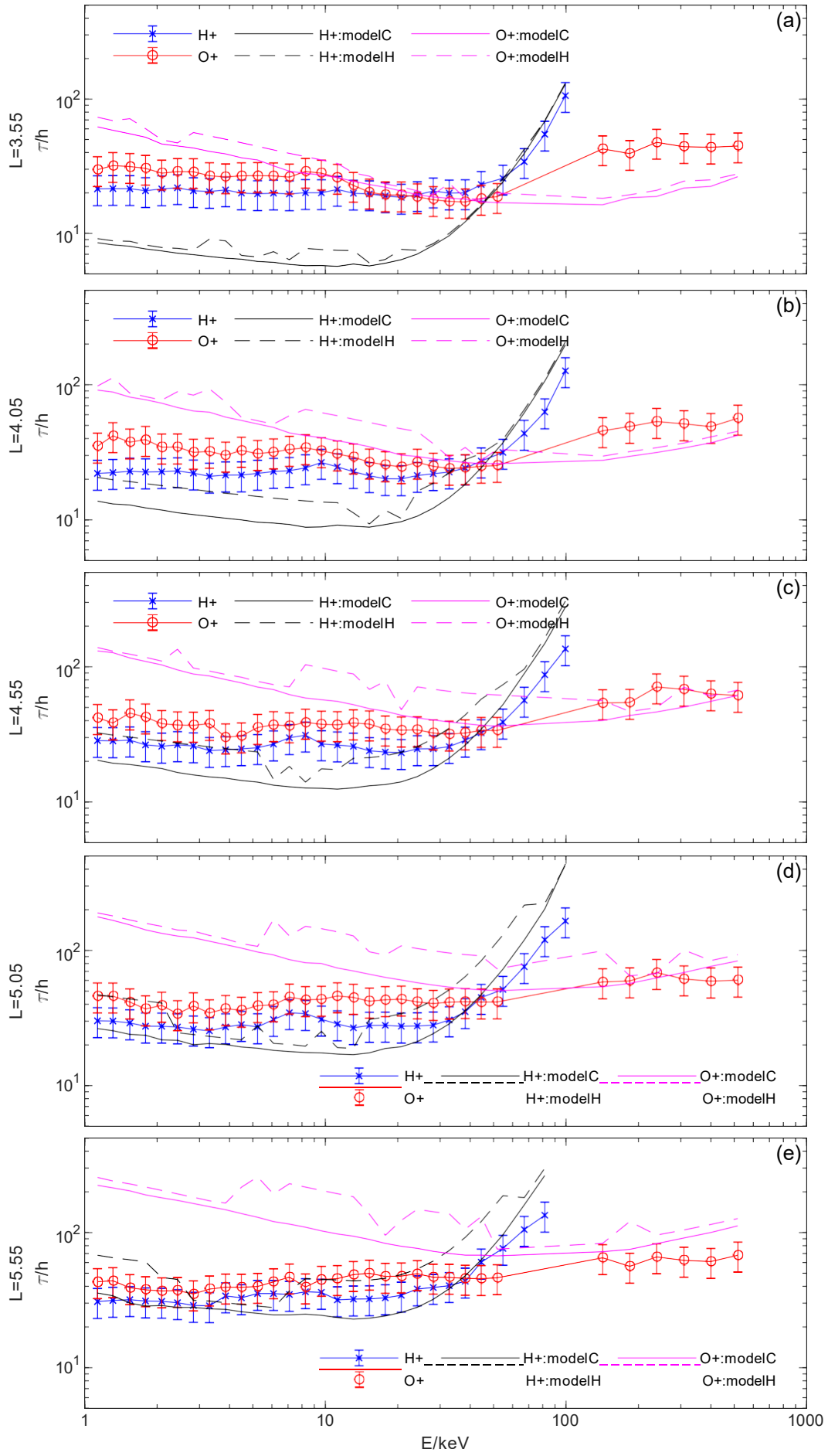


Figure 2. Statistic results presented in a line plot format. (a-e) Blue solid line is observed lifetimes of  $H^+$ , with  $\pm 25\%$  error bars. Red solid line is observed lifetimes of  $O^+$ , with  $\pm 25\%$  error bars. Dark solid line is theoretical predicted lifetimes of  $H^+$ , using Chamberlin model. Dark broken line is theoretical predicted lifetimes of  $H^+$ , using Hodges model. Magenta solid line is theoretical predicted lifetimes of  $O^+$ , using Chamberlin model. Magenta broken line is theoretical predicted lifetimes of  $O^+$ , using Hodges model.

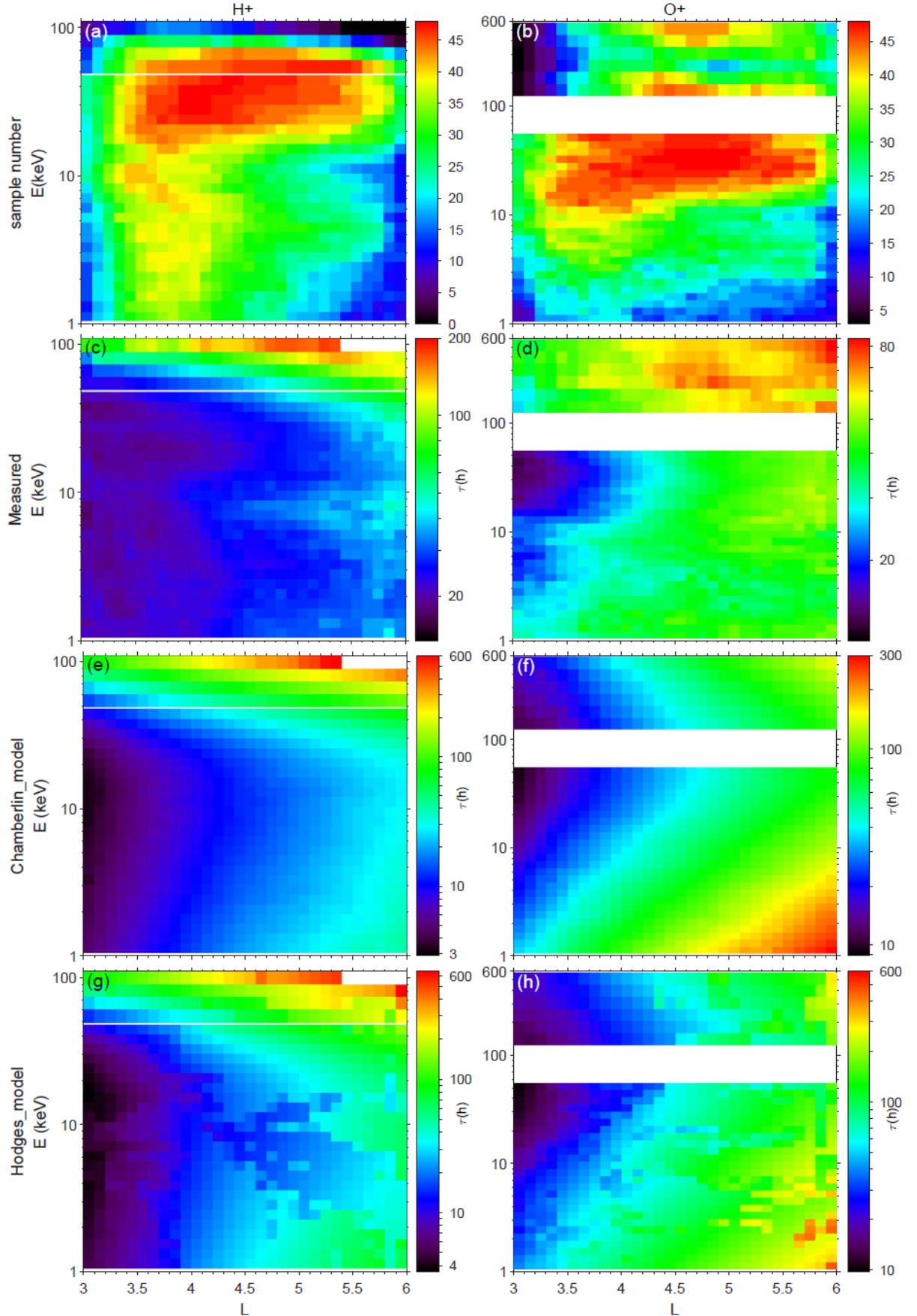


Figure 3. (a, b) Number of available cases in every pixel of  $E$  and  $L$ . (c, d) Observed lifetimes. (e, f) Theoretical predicted lifetimes by using Chamberlin model. (g, h) Theoretical predicted lifetimes by using Hodges model. Note that left column shows the results of  $H^+$ , while right column shows the results of  $O^+$ .

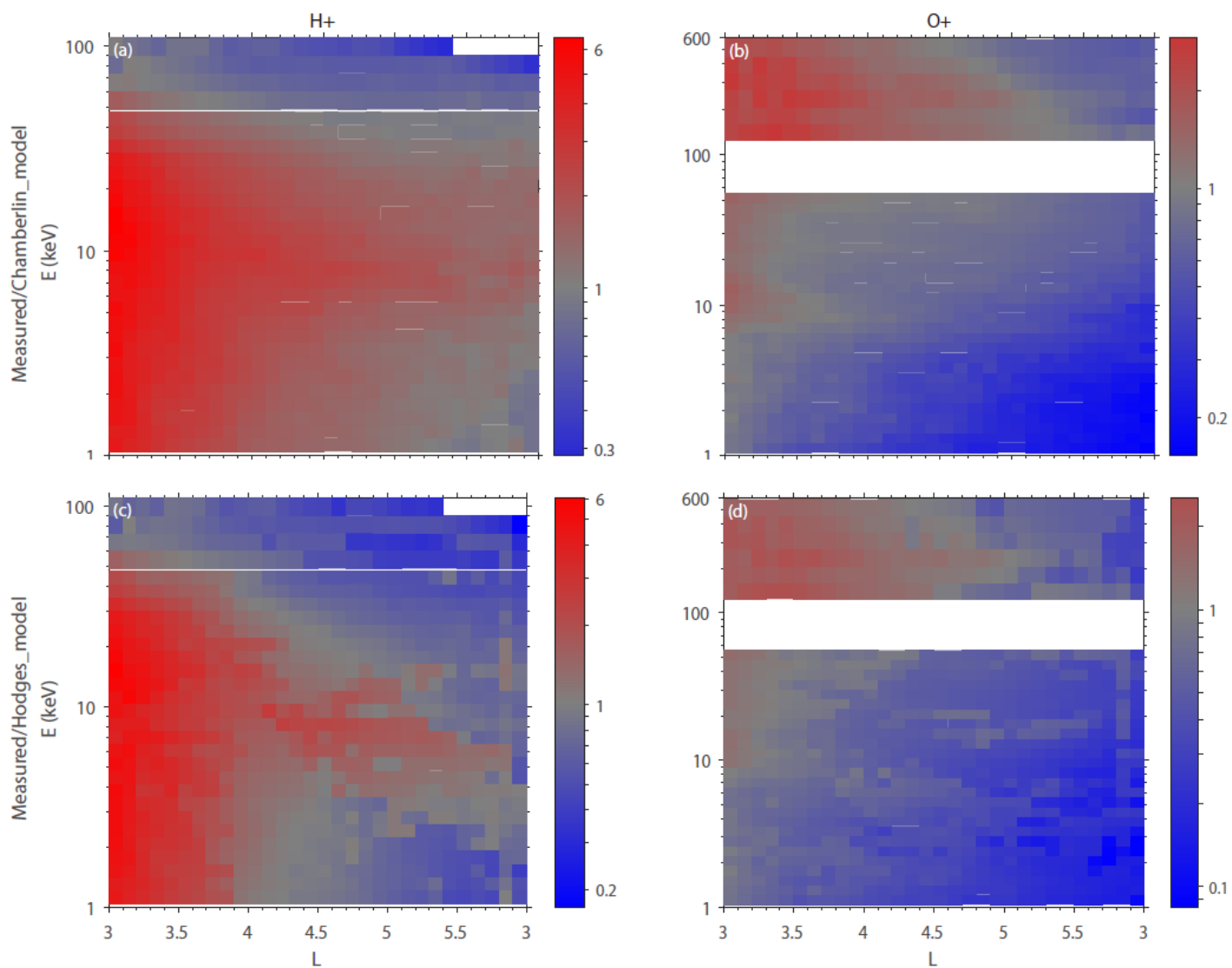


Figure 4. Comparison between observed lifetimes and theoretical predicted lifetimes of  $H^+$  and  $O^+$ .