

Supplementary Information

1. Inspection of the results

Here we equally divided the data into two sub-datasets and obtained the same tidal signal in each case, as shown in Fig. S5. This not only eliminates the possibility of data anomalies, but also increases the credibility of our results.

2. Visualizations of the lunar tide in plasmasphere

The Movie S1 shows tidal changes at the plasmopause using the same observational data as those in Fig. 2a (Here the smoothing window is 12 hours for a clearer display). In panel (a), the dashed line represents the background plasmopause position from all the 50,778 crossings and the solid line shows the perturbed plasmopause locations in different LPs, while the red cross represents the center of the high tide for different LPs. Panel (b) shows the perturbations of plasmopause positions as a function of MLT for different LPs. This movie shows that the “high tide” peak of the perturbations moves regularly with the LPs. Note that the plasmopause perturbations are multiplied by 40 here.

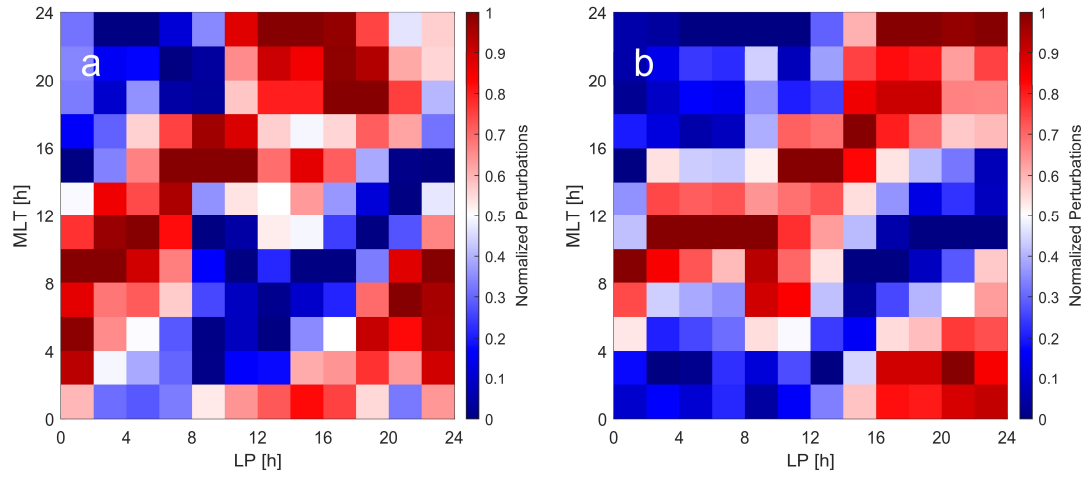


Fig. S5. The database is equally divided into two parts to eliminate special data interference. (a-b) The distribution of perturbations of plasmapause positions in MLT-LP frame for these two parts.