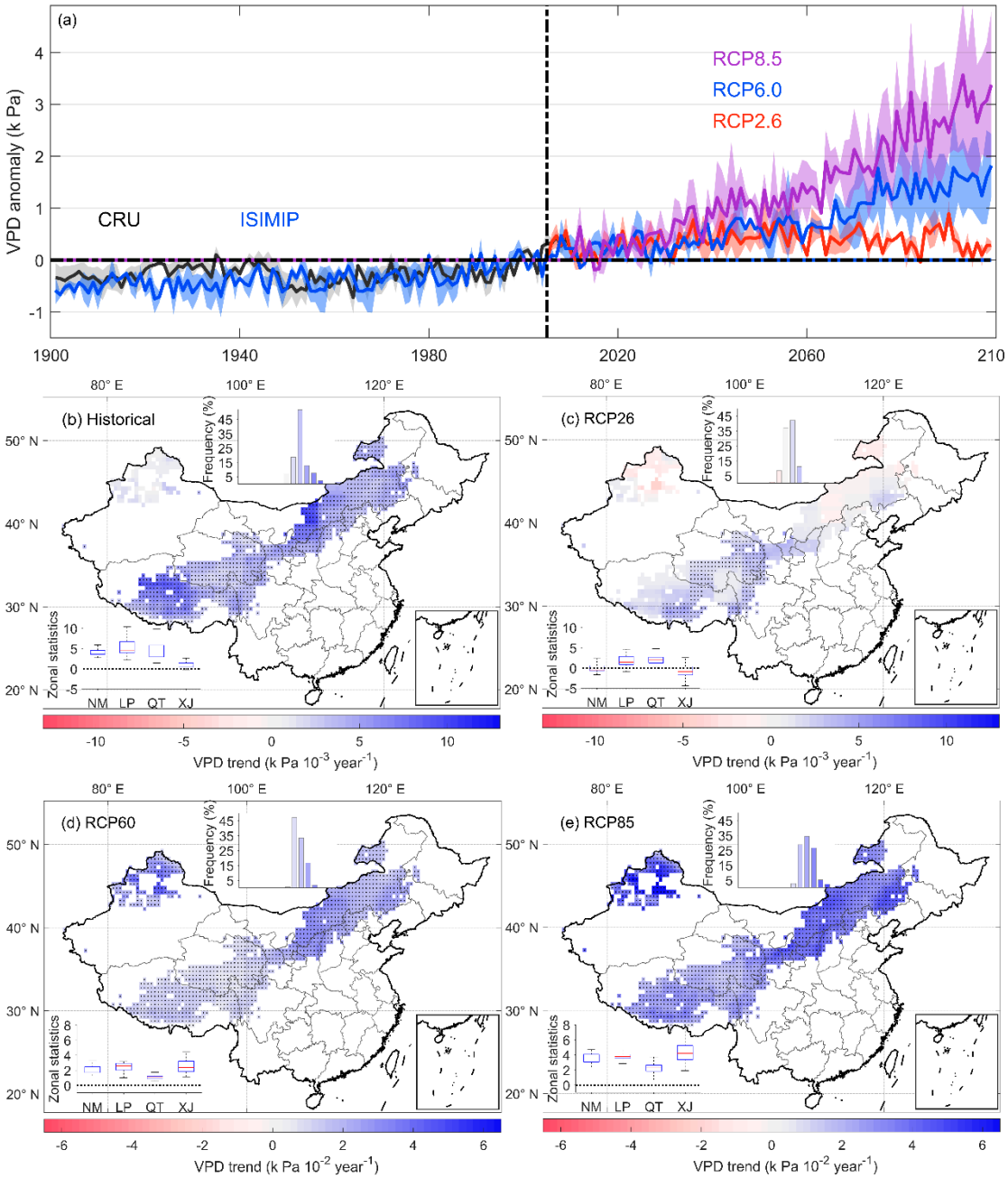

Supplementary Figure 1. Spatial and temporal variability of annual mean vapour pressure deficit (VPD) based on process model simulations. (a) represents the long-term dynamics of VPD over two centuries in China's grasslands, and the VPD anomalies in all datasets are relative to the distance level during 2006-2015. The ISIMIP (simulated, blue line) and CRU (observed, black line) datasets provide VPD changes for the historical period (1901-2005), respectively. ISIMIP also provides VPD changes for the future period (2006-2099) VPD projections for different emission scenarios (RCP2.6, RCP6.0, and RCP8.5), and the line colors in the figure correspond to the annotation colors. The black short-wave vertical line is the 2005 cut-off line, and the dash shading represents the doubled standard deviation between the four models. (b-e) indicates the spatial pattern of VPD trends in China grasslands under different climate scenarios in the past (b) and in the future (c-e). VPD units are k Pa 10^{-3} $year^{-1}$ for the historical and RCP2.6 scenarios and k Pa 10^{-2} $year^{-1}$ for the RCP6.0 and RCP8.5 climate scenarios. black dots in the figure represent significance tests passed at P<0.05.