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Fire–precipitation interactions amplify the quasi-biennial variability in fires over southern Mexico and Central America

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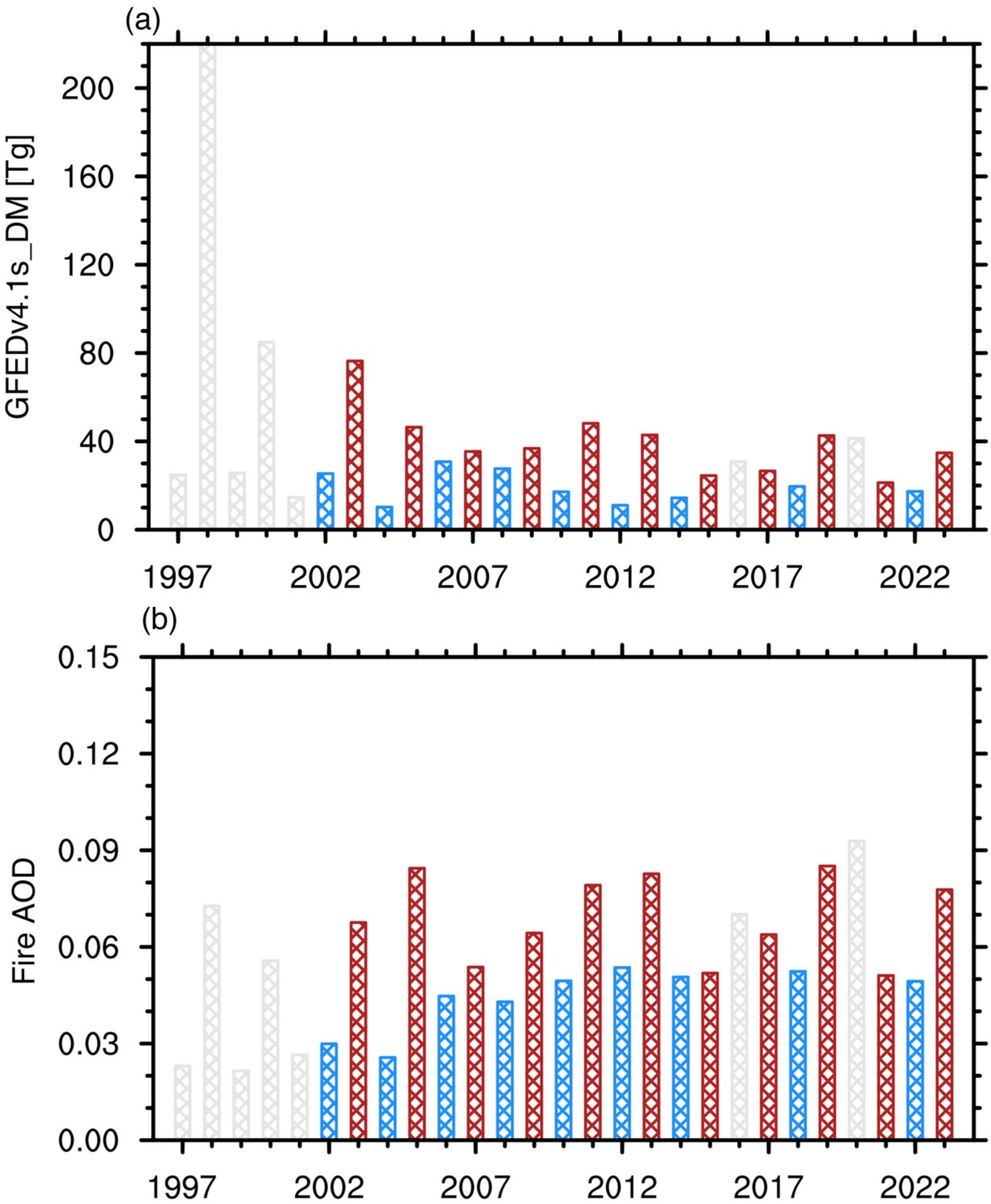

Figure S1. Interannual variations of different fire characteristics during the peak burning season (Apr-May) over Southern Mexico and Central America (SMCA). (a) The regional sum of the total dry matter consumed by fire activities based on the GFEDv4.1s emission data over 1997-2023. (b) Regional mean aerosol optical depth (AOD) of black carbon aerosols from MERRA-2 reanalysis over 1997-2023.

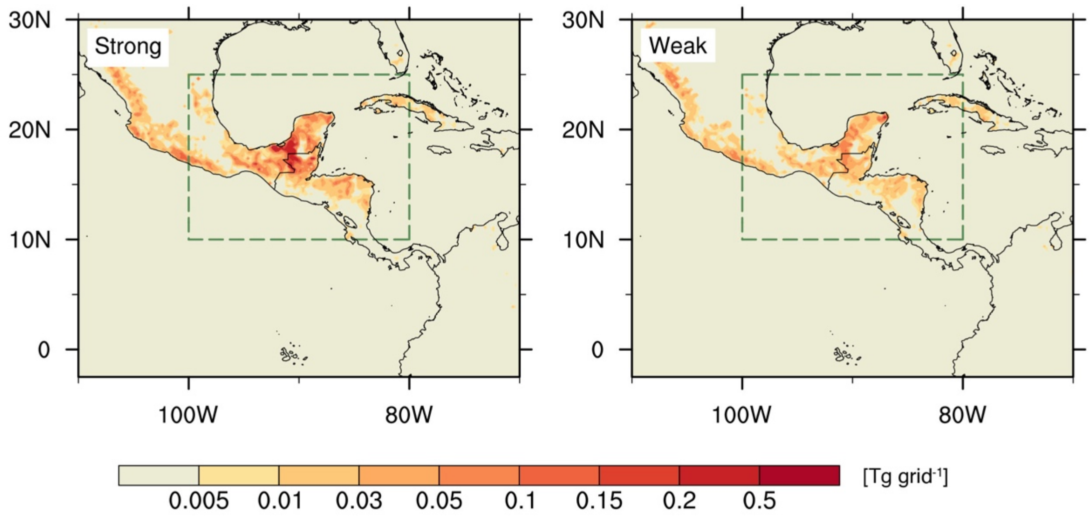

Figure S2. Comparison of fire activities during strong and weak fire years over SMCA. Spatial distributions of fire-consumed total dry matter composited in strong and weak years respectively.

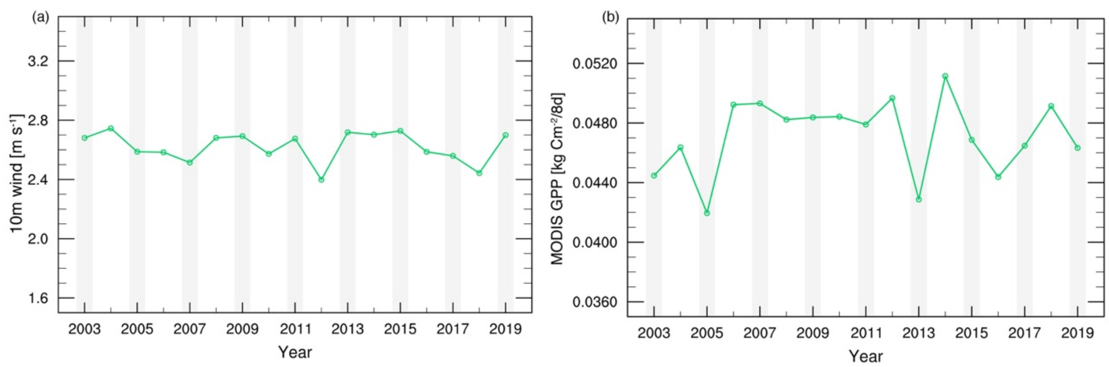

Figure S3. Temporal variations of the regional mean (a) 10m wind speed averaged over SMCA in the peak burning season (Apr-May) and (b) gross primary productivity in the month prior to fire season.

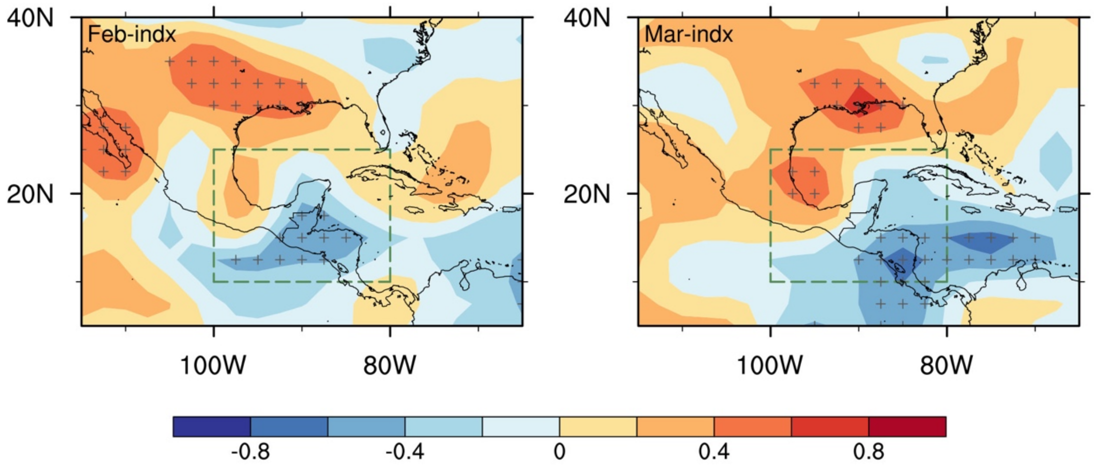

Fig. S4 Spatial distributions of correlations of EP/NP index in February and March with the mean vertical pressure velocity (reversed signs) in the peak fire months (Apr-May) during 2003-2019. Stippling indicates the correlations are statistically significant based on the student's T-test.

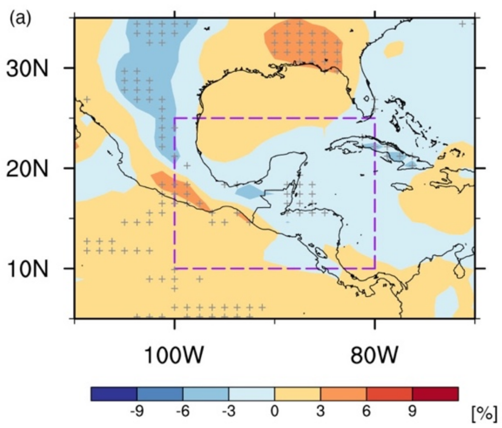

Fig. S5 Changes in meteorological variables induced by fire-emitted aerosols. Differences in near surface (2m) relative humidity between Case_Strong and Case_Weak. Stippling indicates the differences are statistically significant at the 90% confidence level based on T-test.