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Supporting Information for

Multi-Season Evaluation of CO_2 Weather in OCO-2 MIP Models

Li Zhang[1], Kenneth J. Davis[1,2], Andrew E. Schuh[3], Andrew R. Jacobson[4], Sandip Pal[5], David Baker[3], Sean Crowell[6], Frederic Chevallier[7], Marine Remaud[7], Junjie Liu[8], Brad Weir[9,10], Sajeev Philip[11], Matthew S. Johnson[12], Feng Deng[13], Sourish Basu[10,14]

[1]Department of Meteorology and Atmospheric Science, Pennsylvania State University, University Park, PA, USA

[2]Earth and Environmental Systems Institute, Pennsylvania State University, University Park, PA, USA

[3]Cooperative Institute for Research in the Atmosphere, Colorado State University, Fort Collins, CO, USA

[4]University of Colorado Boulder and NOAA Earth System Research Laboratory, Boulder, CO, USA;

[5]Department of Geosciences, Atmospheric Science Division, Texas Tech University, Lubbock, TX, USA

[6]University of Oklahoma, School of Meteorology, Norman, OK, USA

[7]Laboratoire des Sciences du Climat et de L'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, Gif-sur-Yvette, France

[8]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA

[9]Universities Space Research Association, Columbia, MD, USA

[10]NASA Goddard Space Flight Center, Greenbelt, MD, USA

[11]NASA Academic Mission Services by Universities Space Research Association at NASA Ames Research Center, Mountain View, CA, USA

[12]NASA Ames Research Center, Moffett Field, CA, USA

[13]Department of Physics, University of Toronto, Toronto, ON, Canada

[14]Earth System Science Interdisciplinary Center, University of Maryland, MD, USA

Correspondence to: Li Zhang (alex.zhang@psu.edu)

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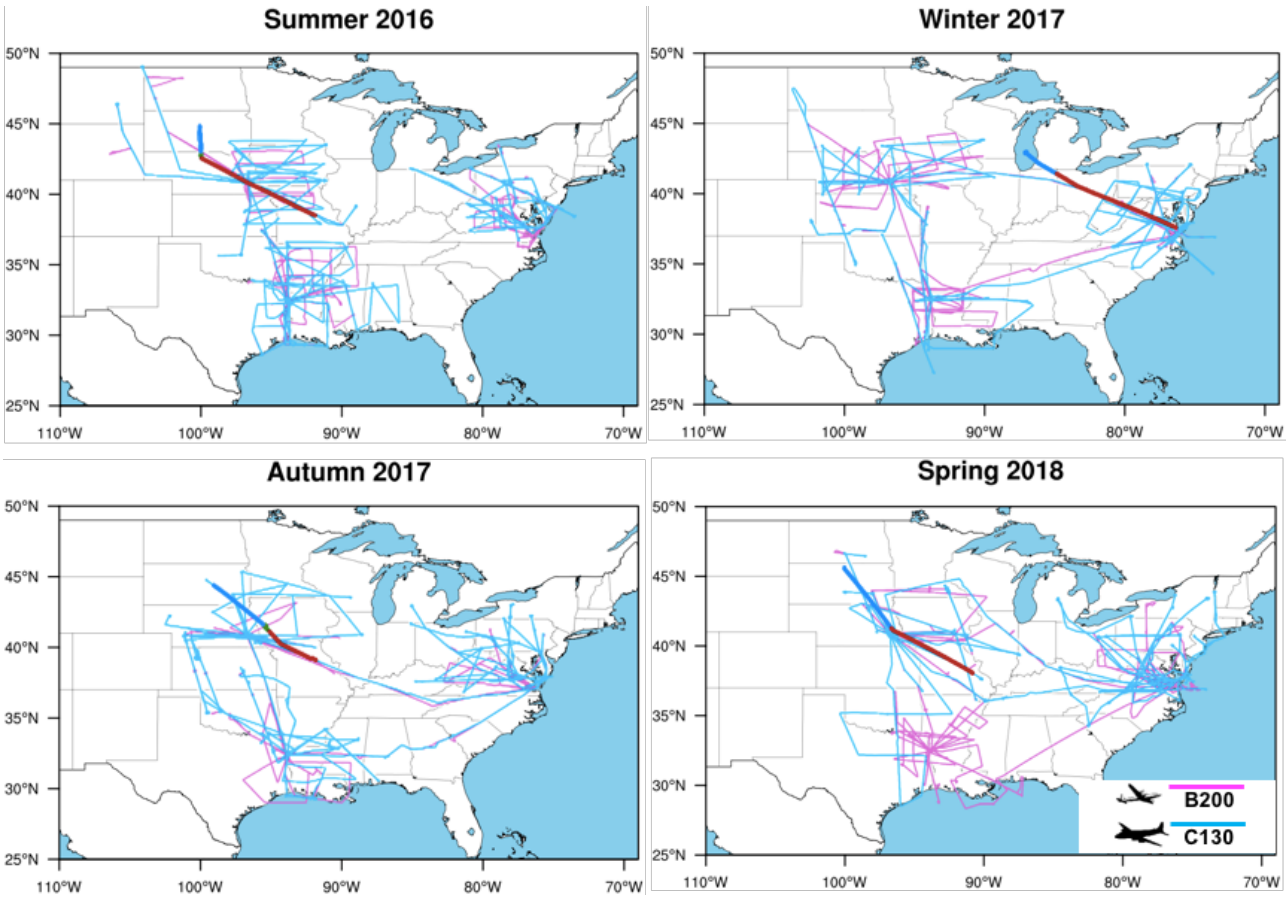

Figure S1. Flight tracks of B200 (purple) and C130 (light blue) in summer 2016, winter 2017, autumn 2017, and spring 2018. Thick lines on maps represent the tracks of four selected frontal flights, i.e. August 4, 2016, March 7, 2017, October 26, 2017, and May 2, 2018, that are analyzed in detail in this study (flight tracks in warm sectors of the four frontal systems are colored in dark red while cold sectors dark blue).

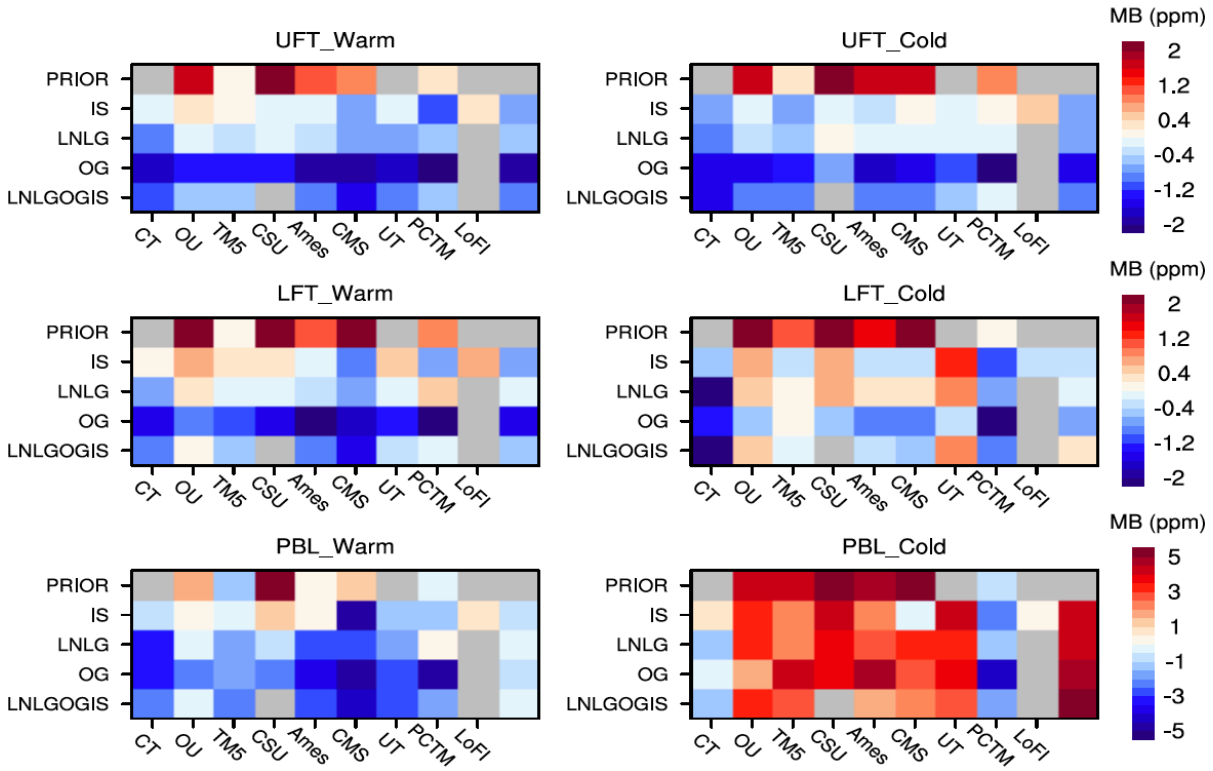

Figure S2. Mean model bias (MB, ppm) in cold and warm sectors of frontal systems within the planetary boundary layer (PBL), lower free-troposphere (LFT), and upper free-troposphere (UFT) in Summer 2016.

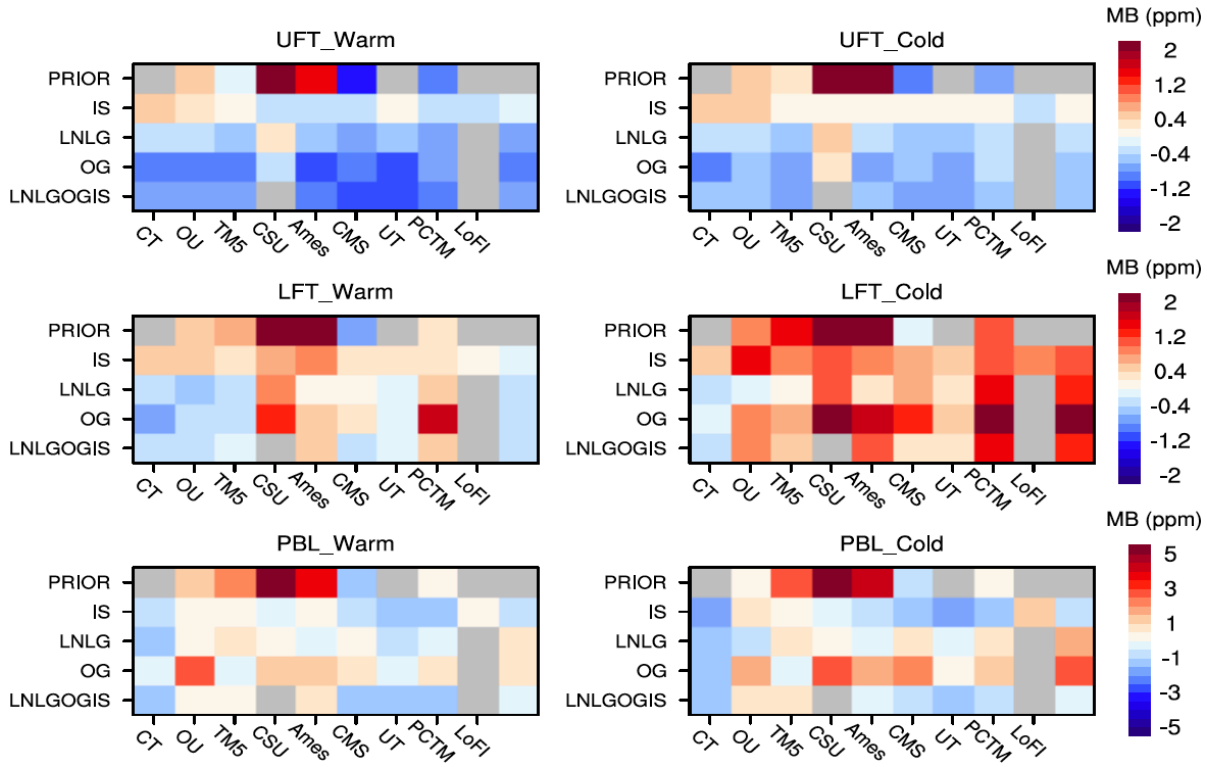

Figure S3. Same as Figure S2, but for Winter 2017.

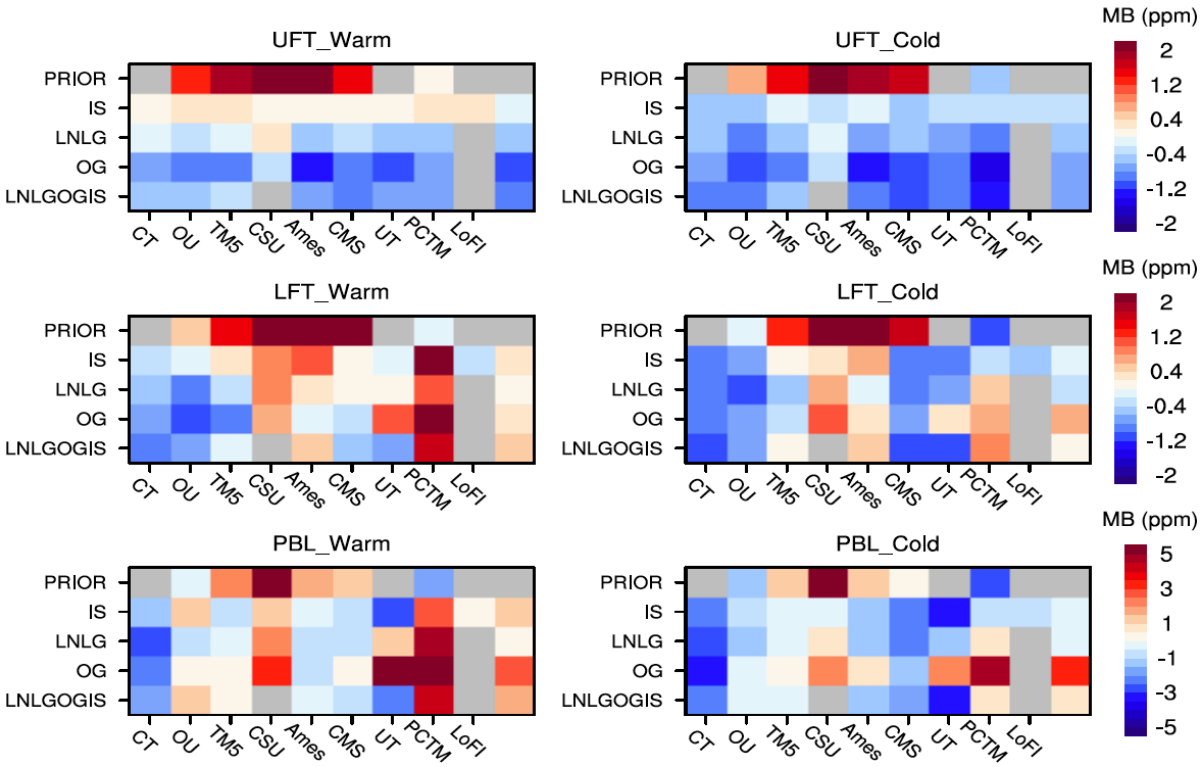

Figure S4. Same as Figure S2, but for Fall 2017.

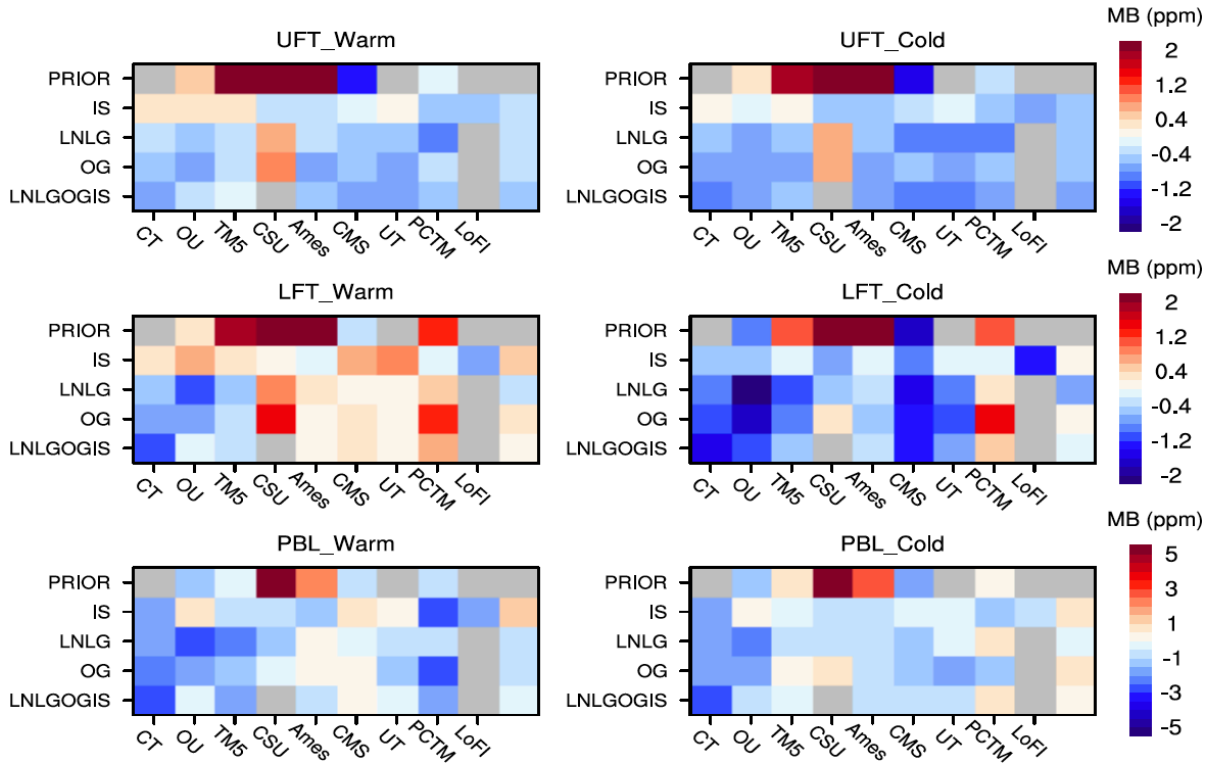

Figure S5. Same as Figure S2, but for Spring 2018.

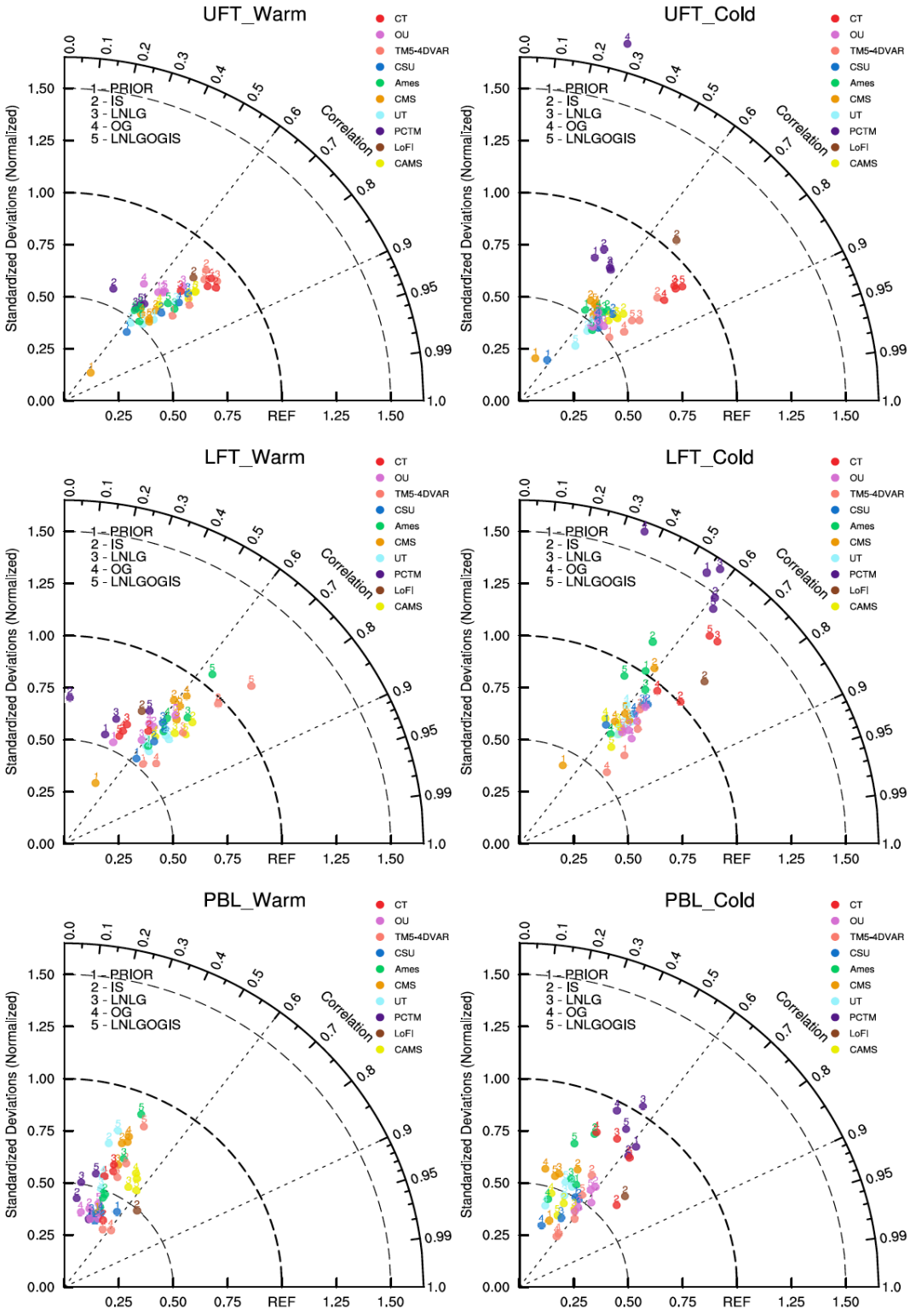

Figure S6. Taylor diagram for [CO_2] performances of OCO-2 MIP members in cold and warm sectors of frontal systems within the planetary boundary layer (PBL), lower free-troposphere (LFT), and upper free-troposphere (UFT) in Summer 2016.

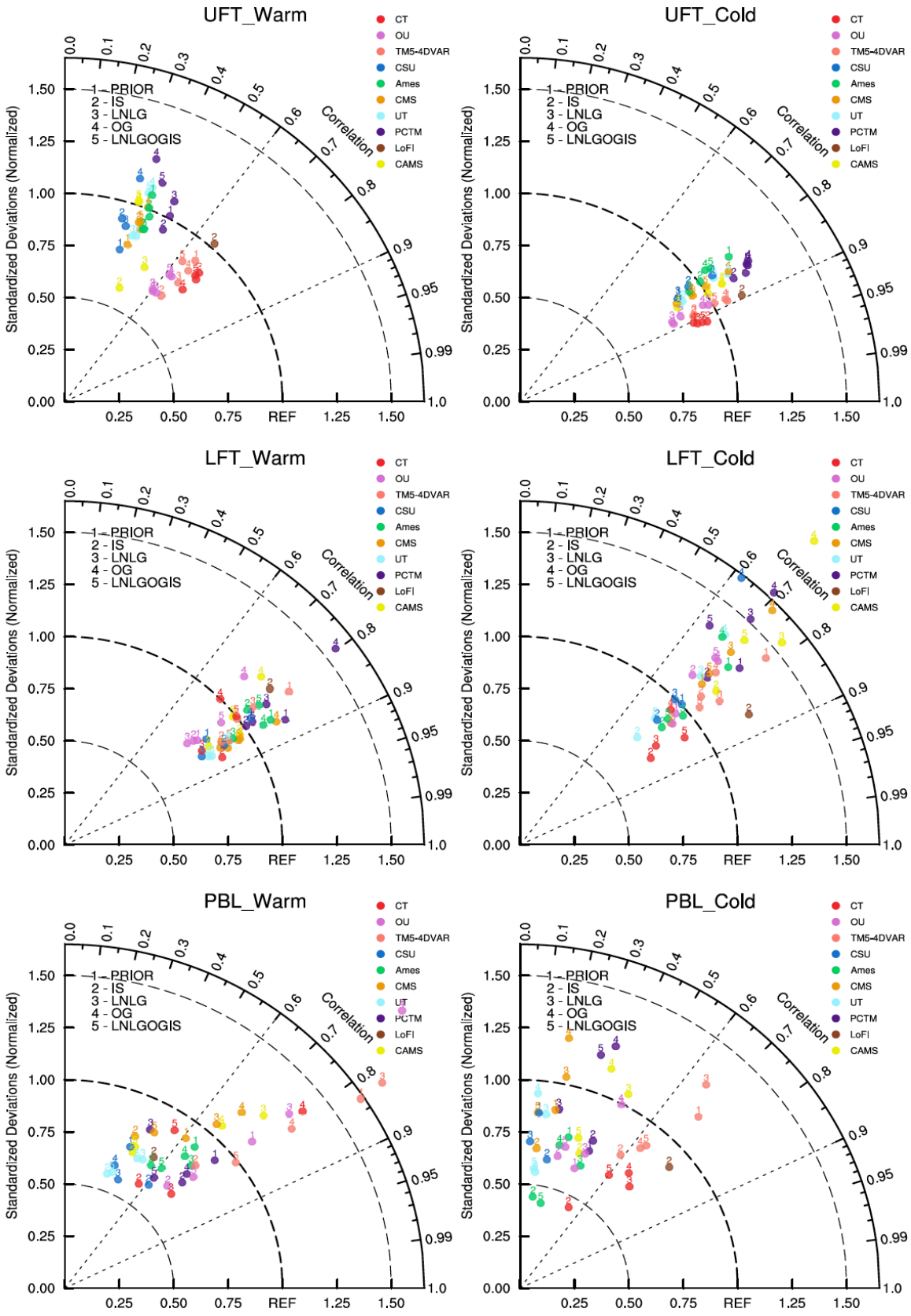

Figure S7. Same as Figure S6, but for Winter 2017.

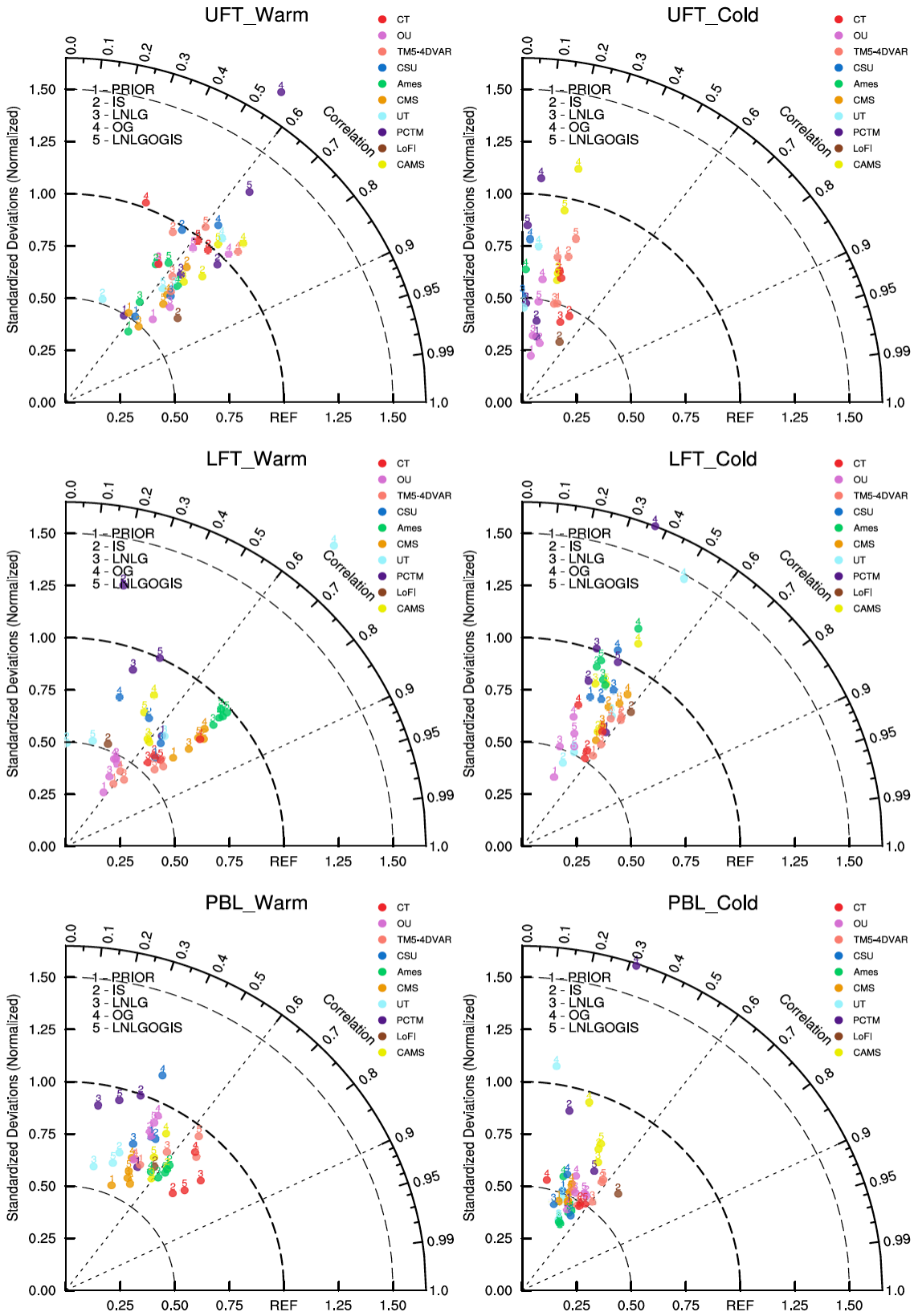

Figure S8. Same as Figure S6, but for Autumn 2017.

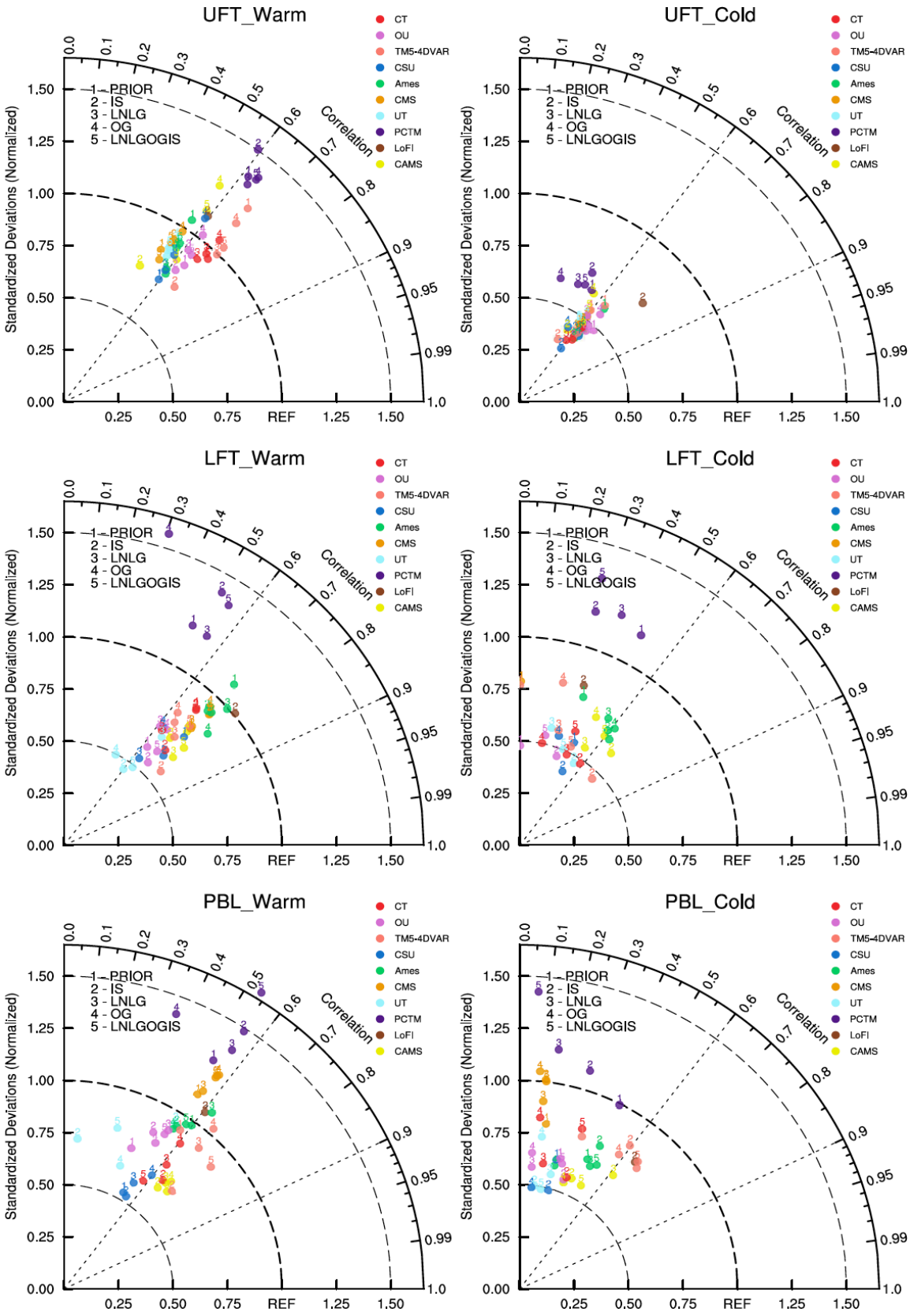

Figure S9. Same as Figure S6, but for Spring 2018.

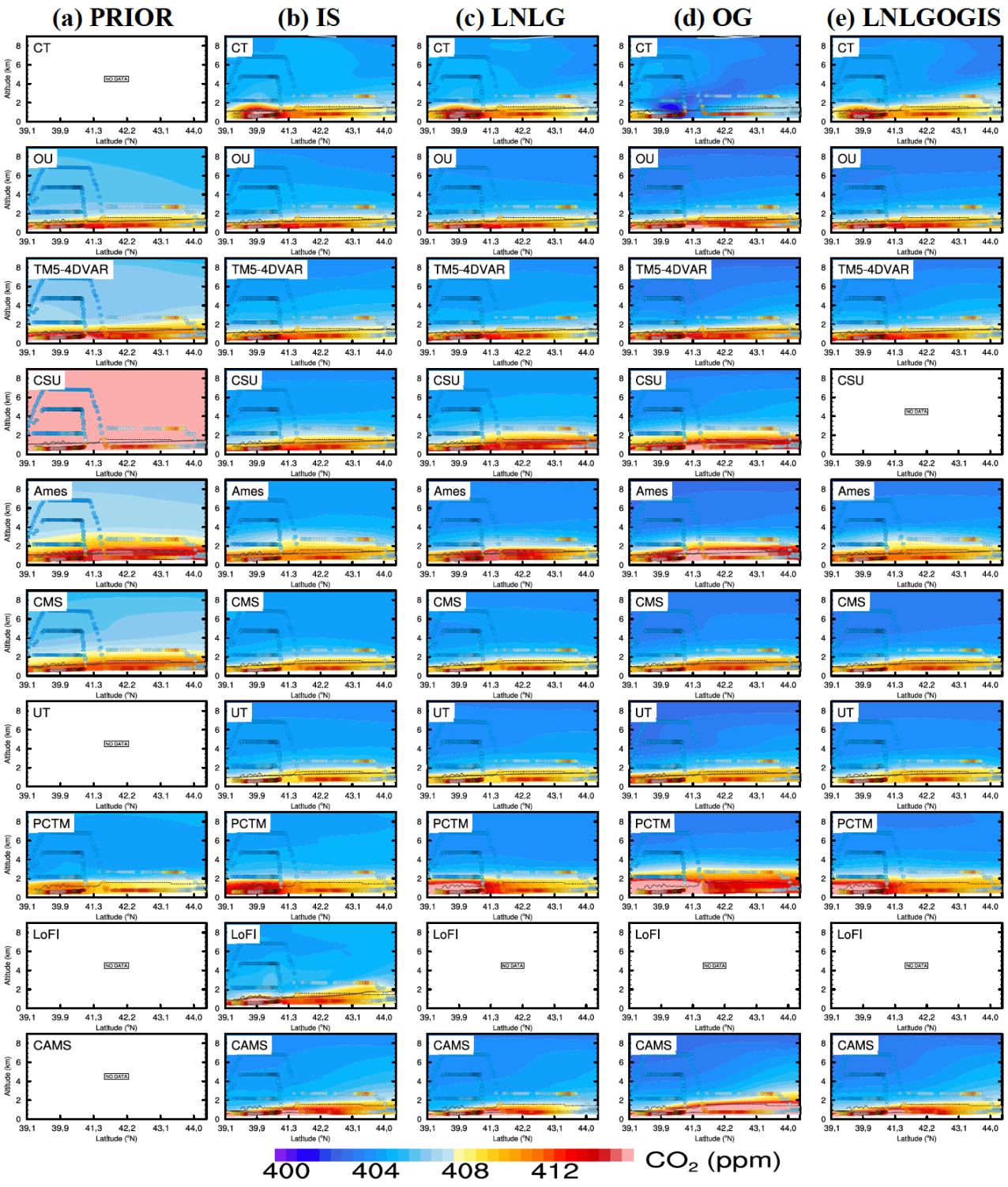

Figure S10. Latitude-height curtains of model-simulated CO_2 mole fraction (color shading) in (a) PRIOR, (b) IS, (c) LNLG, (d) OG, and (e) LNLGOGIS experiments along the flight track crossing the mid-west on October 26, 2017 (thick line in Figure S1). The color-coded circles denote measurements of CO_2 by two aircrafts (C130 and B200), the dashed line represents boundary layer height measured by the airborne lidar on C130, the solid grey lines denote model-simulated boundary layer height, and the white lines are isentropic surfaces.

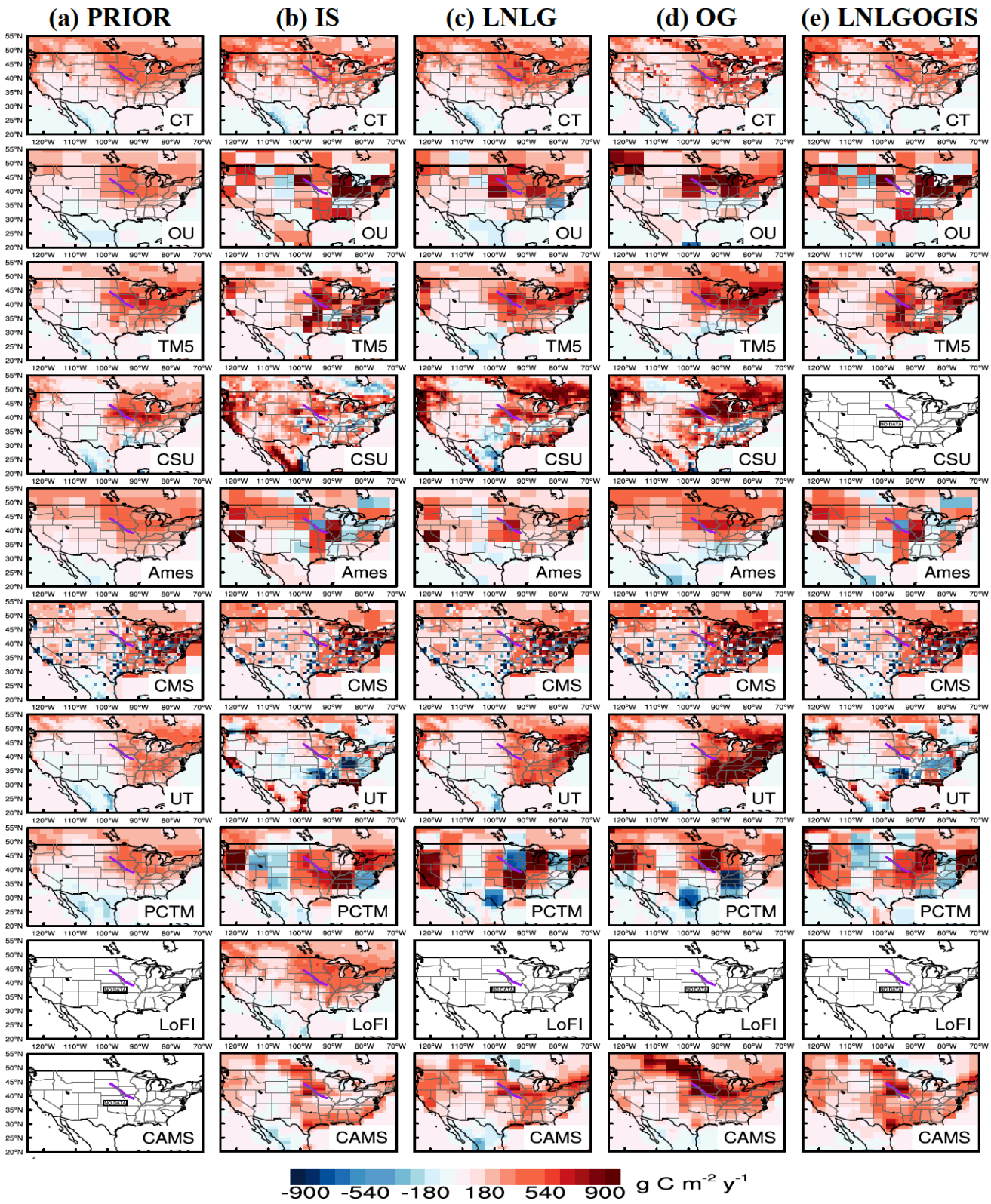

Figure S11. Maps of surface CO_2 fluxes (including net biosphere exchanges, air-sea net exchanges, and fire emissions) from the OCO-2 MIP in (a) PRIOR, (b) IS, (c) LNLG, (d) OG, and (e) LNLGOGIS experiments in Fall 2017.

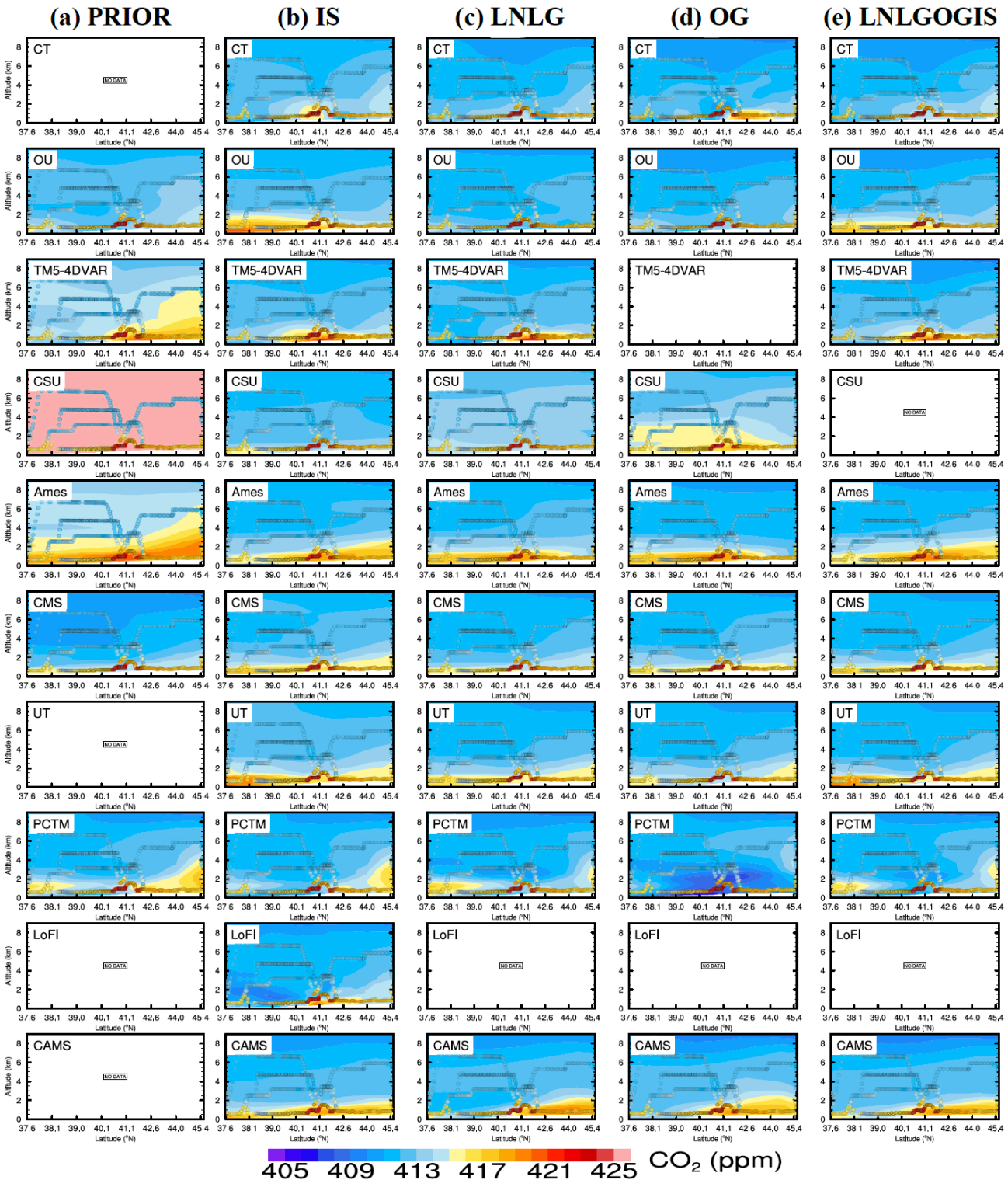

Figure S12. Same as Figure S10, but for May 2, 2018.

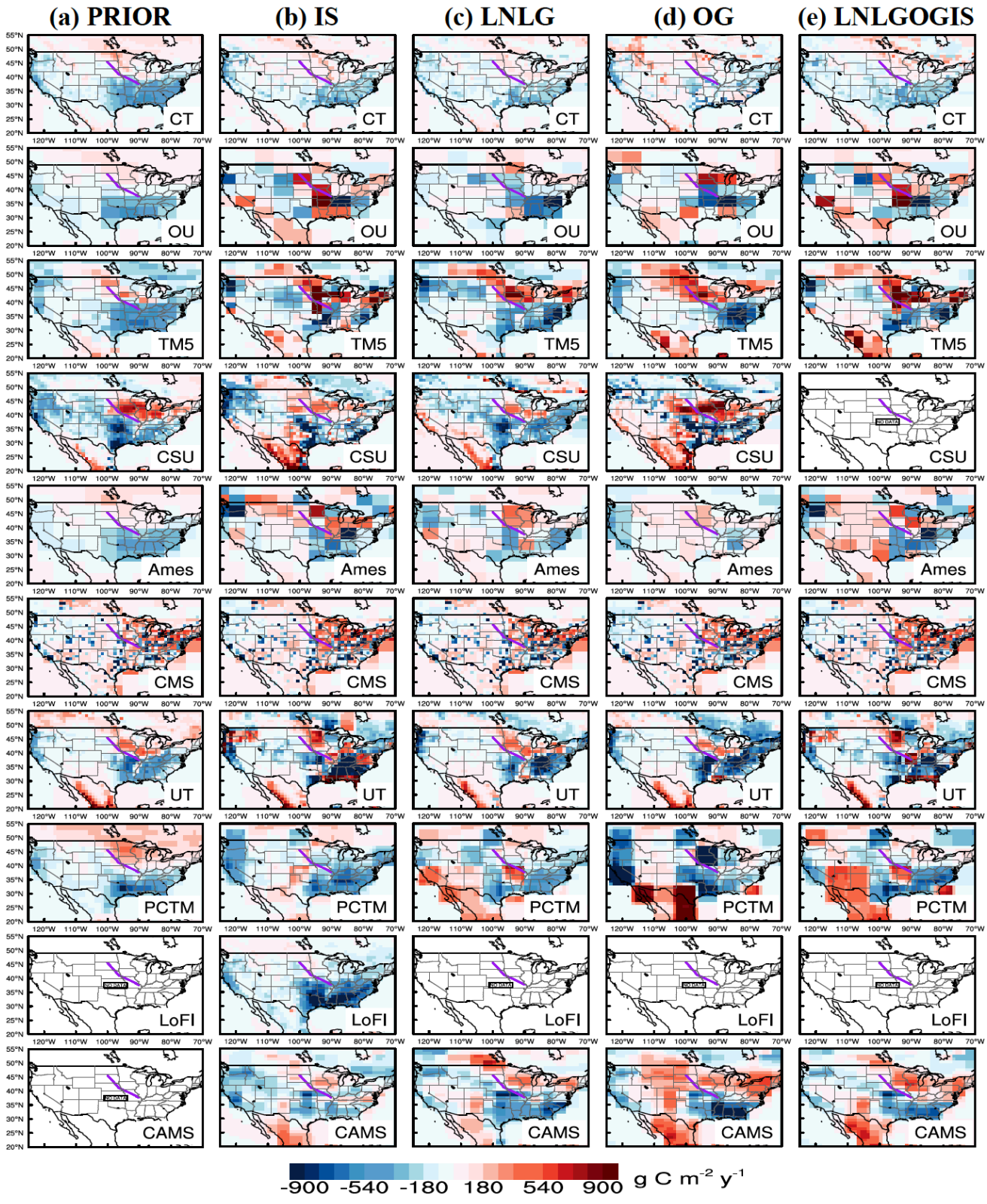

Figure S13. Same as Figure S11, but for Spring 2018.