Supporting Information for "CAPE is predictable from large-scale environmental parameters"

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Figure S1.

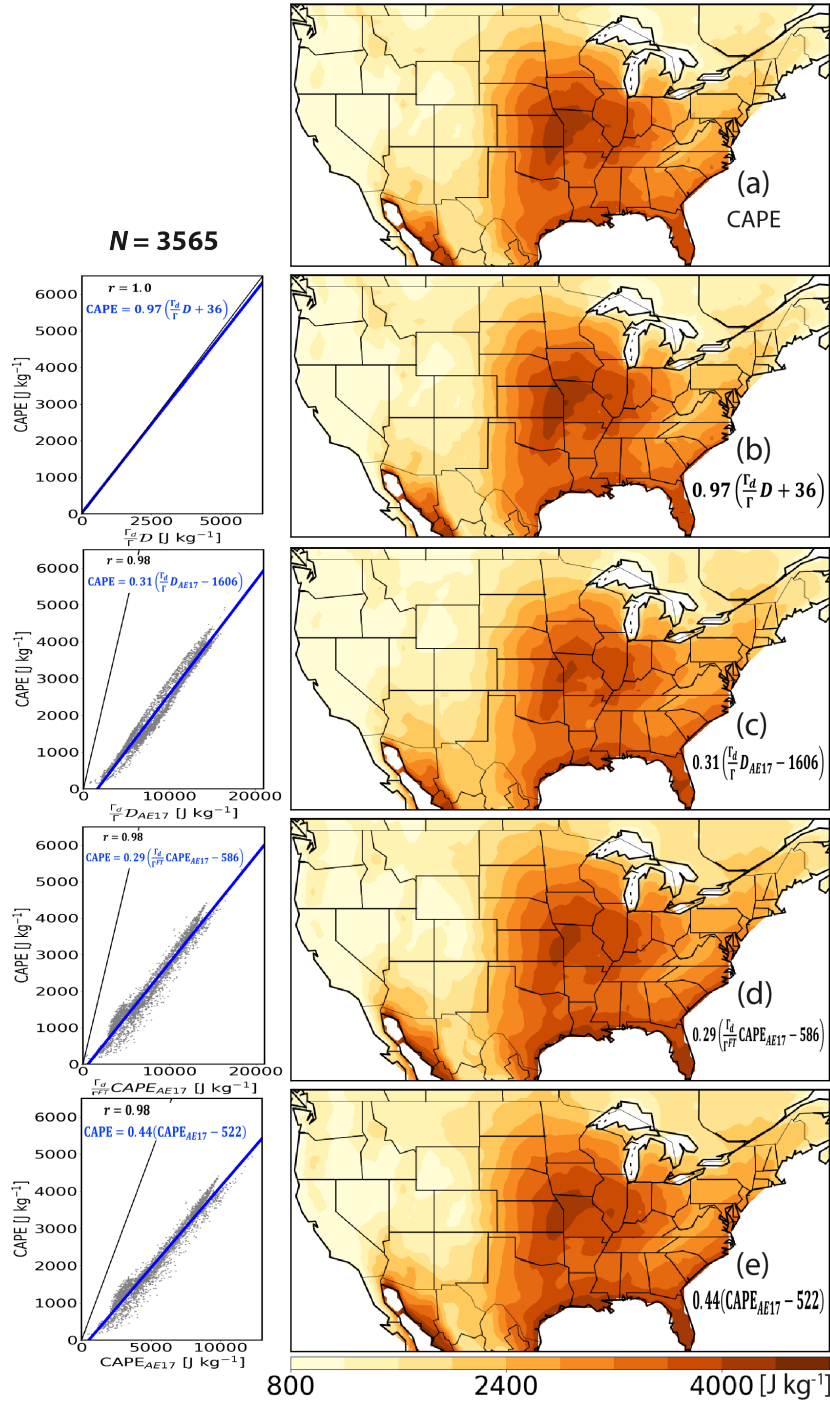**Figure S2.**

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$N = 3565$

$r = 1.0$
$\text{CAPE} = 0.97\left(\frac{\Gamma_d}{\Gamma}D + 36\right)$

CAPE [J kg^{-1}]

$\frac{\Gamma_d}{\Gamma}\mathcal{D}$ [J kg^{-1}]

$r = 0.98$
$\text{CAPE} = 0.31\left(\frac{\Gamma_d}{\Gamma}D_{AE17} - 1606\right)$

$\frac{\Gamma_d}{\Gamma}\mathcal{D}_{AE17}$ [J kg^{-1}]

$r = 0.98$
$\text{CAPE} = 0.29\left(\frac{\Gamma_d}{\Gamma^{FT}}\text{CAPE}_{AE17} - 586\right)$

$\frac{\Gamma_d}{\Gamma^{FT}}\text{CAPE}_{AE17}$ [J kg^{-1}]

$r = 0.98$
$\text{CAPE} = 0.44(\text{CAPE}_{AE17} - 522)$

CAPE_{AE17} [J kg^{-1}]

(a) CAPE

(b) $0.97\left(\frac{\Gamma_d}{\Gamma}D + 36\right)$

(c) $0.31\left(\frac{\Gamma_d}{\Gamma}D_{AE17} - 1606\right)$

(d) $0.29\left(\frac{\Gamma_d}{\Gamma^{FT}}\text{CAPE}_{AE17} - 586\right)$

(e) $0.44(\text{CAPE}_{AE17} - 522)$

800   2400   4000 [J kg^{-1}]

Figure S1. Extreme values of (a) CAPE compared to estimated CAPE from (b) $\frac{\Gamma_d}{\Gamma}\mathcal{D}$, (c) $\frac{\Gamma_d}{\Gamma}\mathcal{D}_{AE17}$, (d) $\frac{\Gamma_d}{\Gamma^{FT}}\text{CAPE}_{AE17}$, and (e) CAPE_{AE17} using their respective linear regression equation shown in the left (blue text). The (a) and (e) are the same as Figure 1.
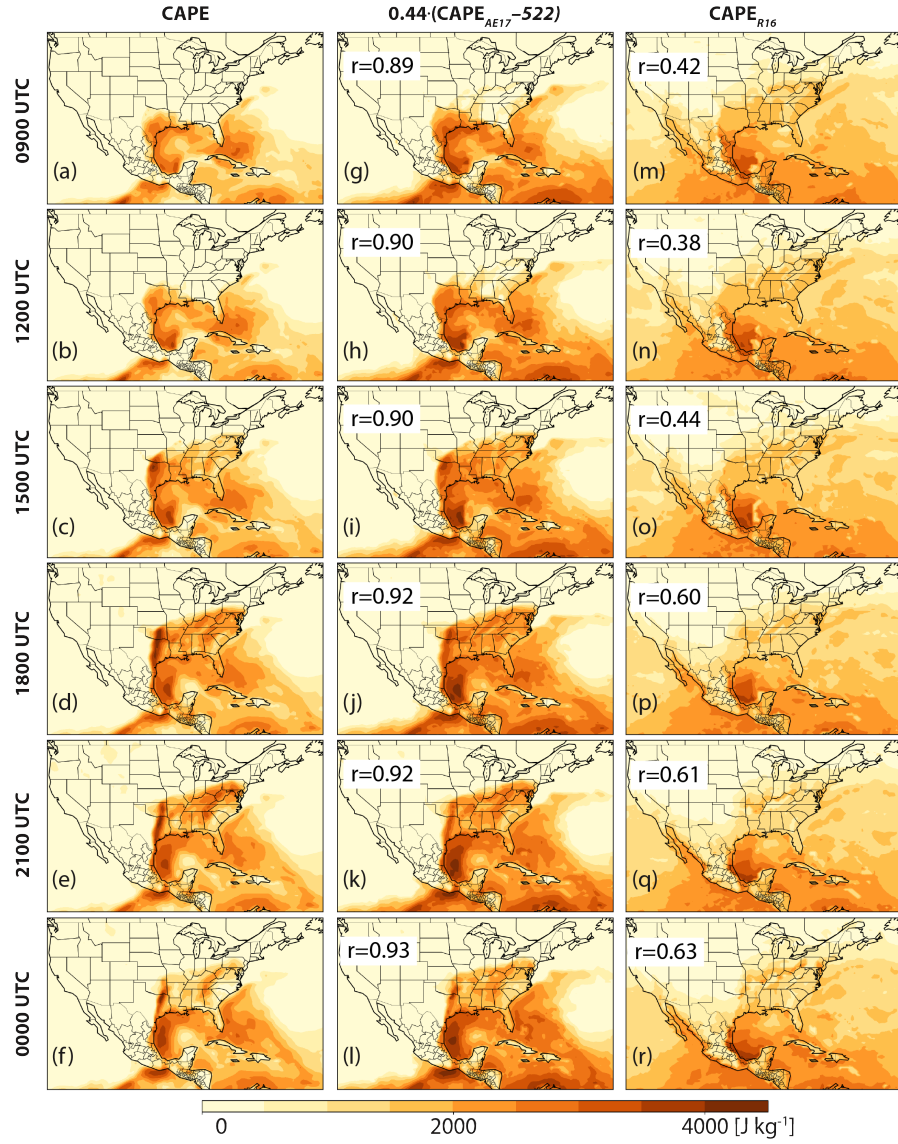
Figure S2. As in Figure 2, but includes both the U.S. continent and tropical ocean area for spatial distributions of (a–f) CAPE vs. (g–l) predicted CAPE from $CAPE_{AE17}$, and (m–r) $CAPE_{R16}$, at (top–bottom) 0900, 1200, 1500, 1800, 2100, and 0000 UTC on April 25, 2011 from the MERRA-2 reanalysis data. The r indicates its pattern correlation coefficient with CAPE conditioned on gridpoints with CAPE $\geq$ 100 J kg^{-1}.

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