

1 Figure S1. U.S. seasonal soil moisture anomalies (mm) during the 12-month period
2 antecedent to the occurrence of dry May-August conditions over the central Great
3 Plains during 2012 (lower right panel). Soil moisture has been estimated by driving
4 a one-layer bucket water balance model with observations of monthly temperature
5 and precipitation. The data set spans 1948-present, and the method is described in
6 Huang et al. (1996).

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8 Figure S2. Composite U.S. seasonal precipitation anomalies (mm) during the 12-
9 month period antecedent to the occurrence of dry May-August conditions over the
10 central Great Plains during historical droughts. Based on the average of the 9 driest
11 May-August events during 1895-2011, including 1934, 1936, 1901, 1976, 1913,
12 1988, 1953, 1911, and 1931. Data source is the NOAA U.S. Climate Divisions.

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14 Figure S3. (top) Observed climatological May-August 700 hPa specific humidity
15 (left, g/kg) and 700 hPa meridional wind magnitude (right, m/s). (bottom)
16 Anomalous May-August 2012 700 hPa specific humidity (left, g/kg) and anomalous
17 700 hPa meridional wind magnitude (right, m/s). Data source is the NCEP/NCAR
18 reanalysis. Departures are relative to a 1981-2010 reference.

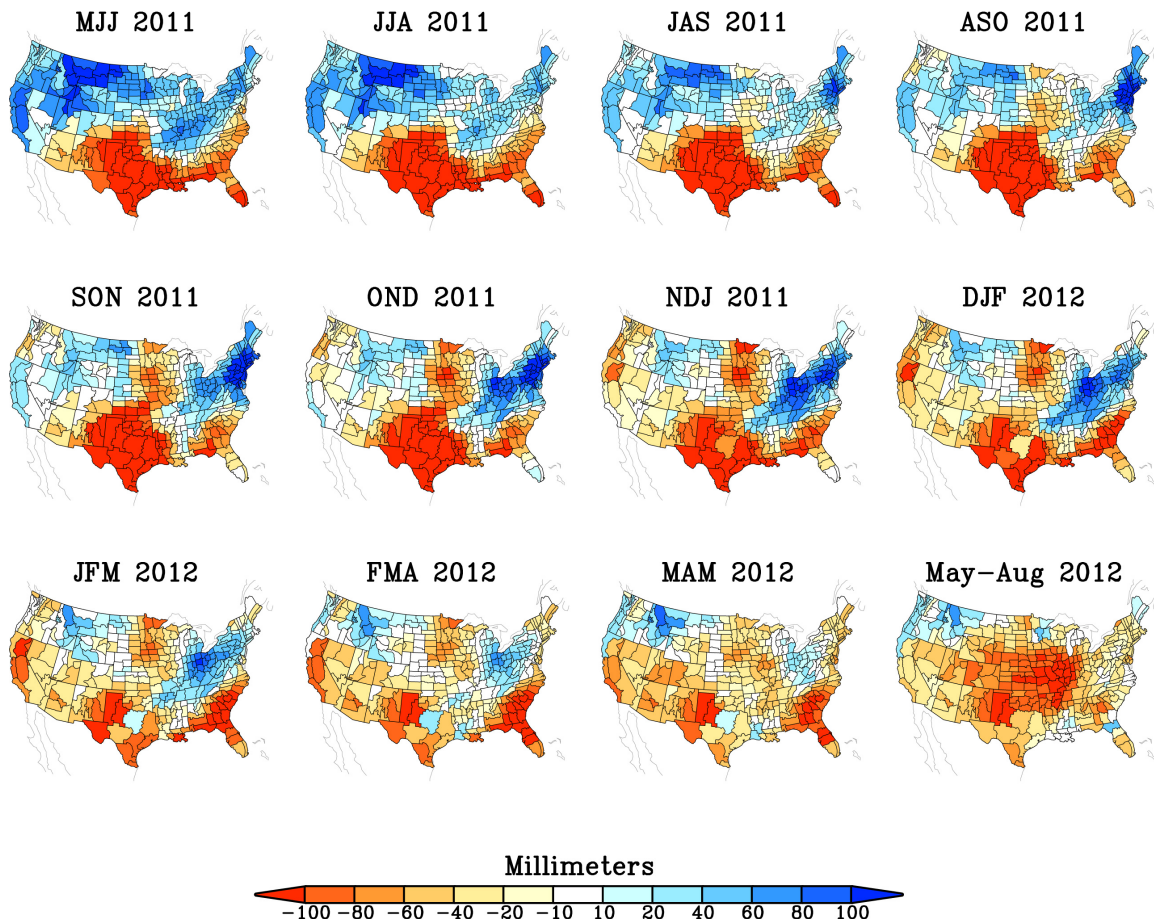
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20 Figure S4. The linear correlation between an index of observed May-August U.S.
21 central Great Plains summer rainfall (see Fig. 6) and May-August surface
22 temperatures. Period of analysis is 1895-2011. Statistically significant correlations
23 are confined to the central U.S. where there is a strong inverse correlation between

24 summer rainfall and summer land surface temperature. Data source is the monthly
25 NOAA Merged Land-Ocean surface temperature analysis (MLOS).

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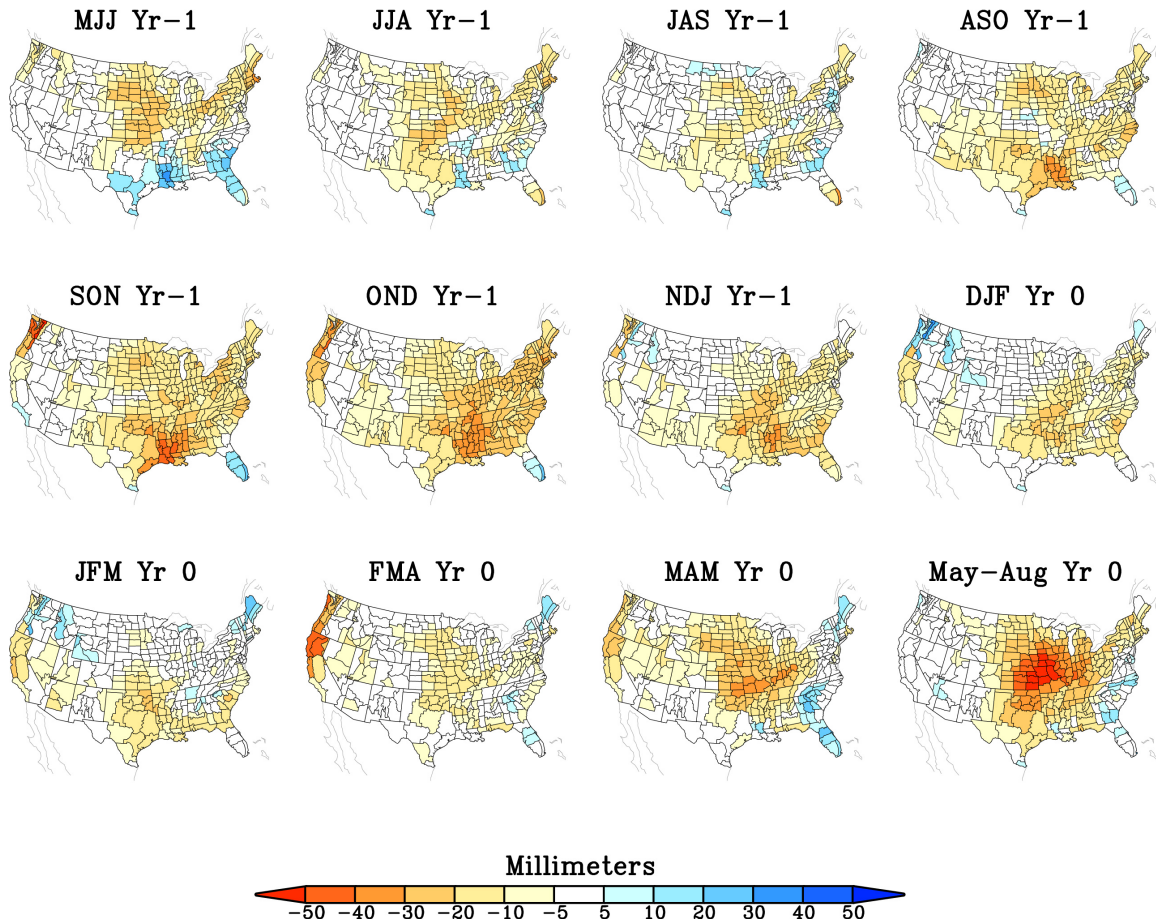
Estimated 2012 Soil Moisture: MJJ 2011 to May–Aug 2012



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Figure S1. U.S. seasonal soil moisture anomalies (mm) during the 12-month period antecedent to the occurrence of dry May–August conditions over the central Great Plains during 2012 (lower right panel). Soil moisture has been estimated by driving a one-layer bucket water balance model with observations of monthly temperature and precipitation. The data set spans 1948–present, and the method is described in Huang et al. (1996).

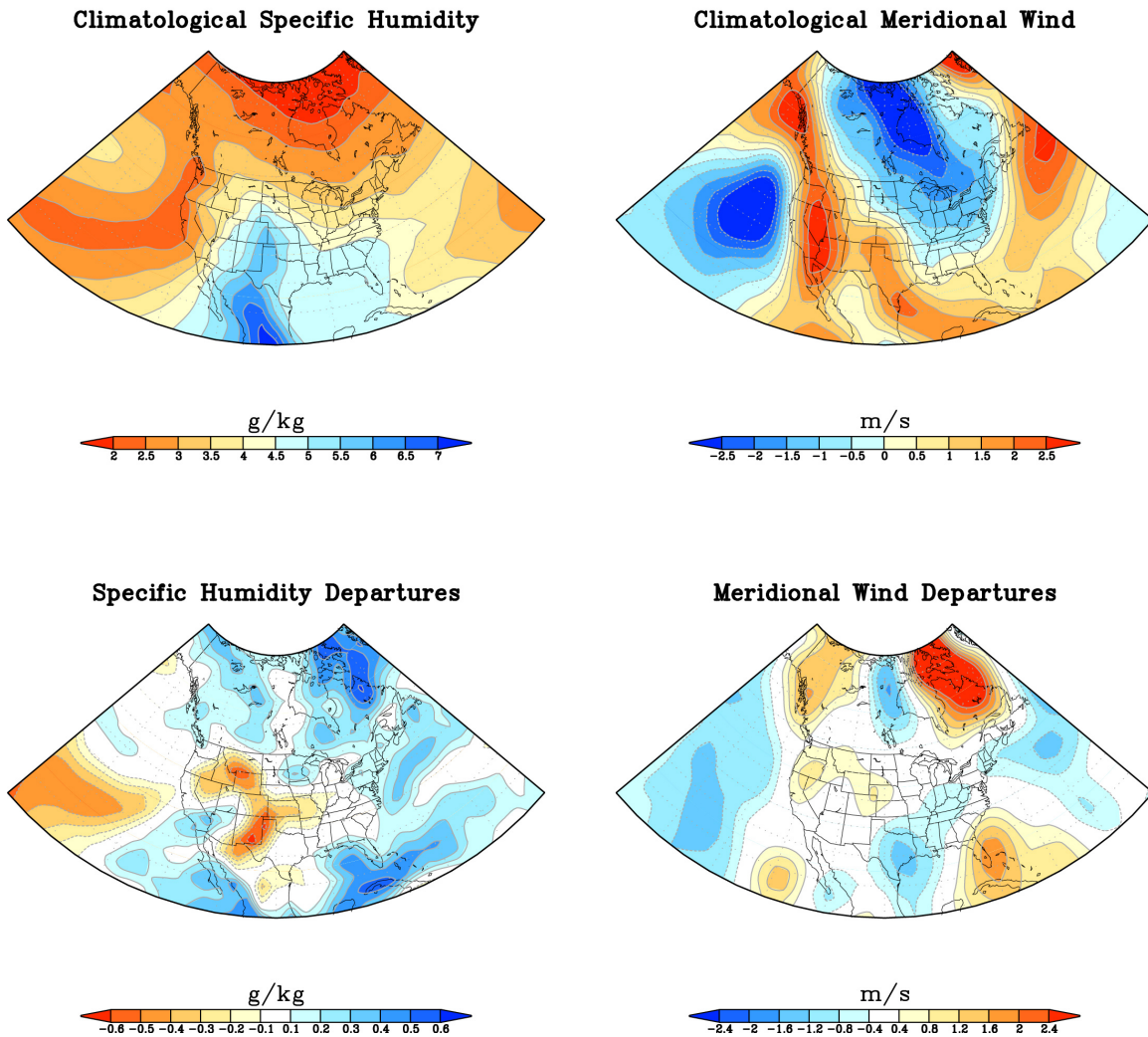
Observed PPT Departures: MJJ Yr-1 to May-Aug Yr 0



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Figure S2. Composite U.S. seasonal precipitation anomalies (mm) during the 12-month period antecedent to the occurrence of dry May-August conditions over the central Great Plains during historical droughts. Based on the average of the 9 driest May-August events during 1895-2011, including 1934, 1936, 1901, 1976, 1913, 1988, 1953, 1911, and 1931. Data source is the NOAA U.S. Climate Divisions.

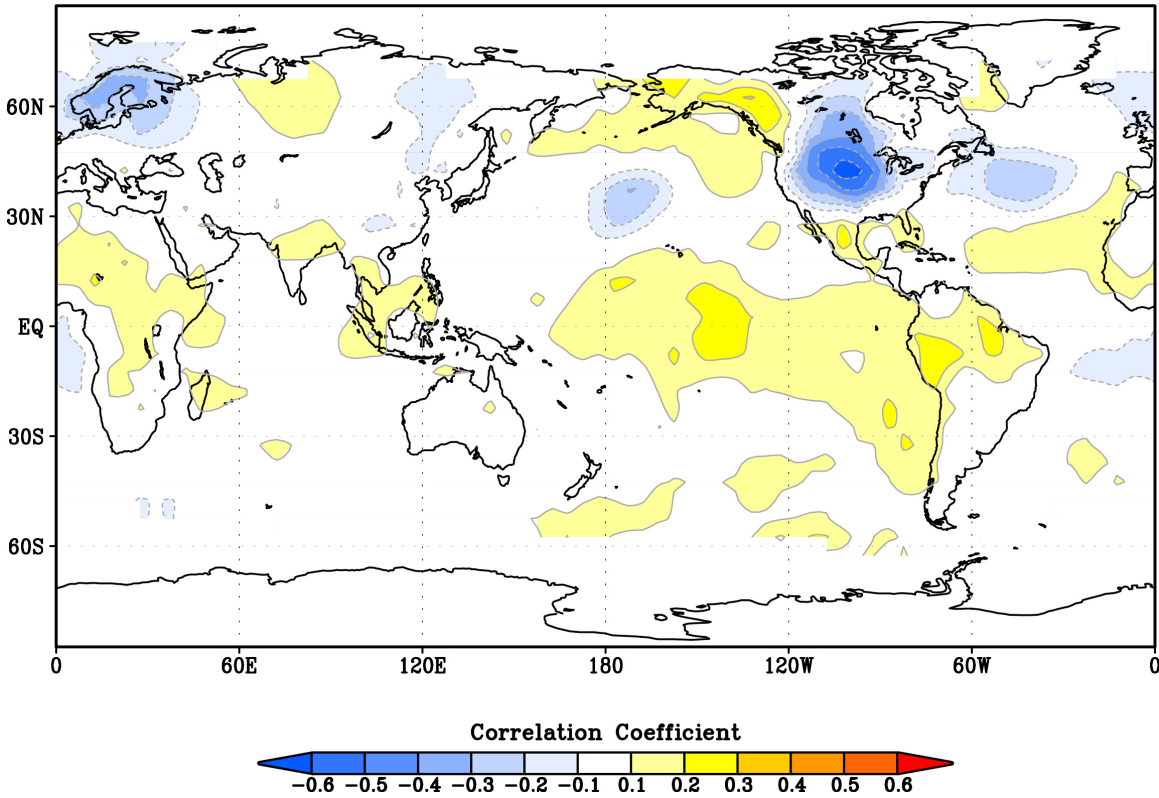
May–August 2012 700 hPa



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Figure S3. (top) Observed climatological May-August 700 hPa specific humidity (left, g/kg) and 700 hPa meridional wind magnitude (right, m/s). (bottom) Anomalous May-August 2012 700 hPa specific humidity (left, g/kg) and anomalous 700 hPa meridional wind magnitude (right, m/s). Data source is the NCEP/NCAR reanalysis. Departures are relative to a 1981-2010 reference.

Central U.S. May–Aug PPT vs. May_Aug Tmp
1895–2012, N=118



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86 **Figure S4.** The linear correlation between an index of observed May-August U.S.
87 central Great Plains summer rainfall (see Fig. 6) and May-August surface
88 temperatures. Period of analysis is 1895-2011. Statistically significant correlations
89 are confined to the central U.S. where there is a strong inverse correlation between
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91 NOAA Merged Land-Ocean surface temperature analysis (MLOS).