Summary of data

Selected 2-D fields (listed below) from the ensemble forecasts generated daily from 1 June 2015 through 15 July 2015 by the MAP research group at the University of Oklahoma are available for download. In short, the data were generated from an ARW-based ensemble, initialized daily at 1300 UTC after 12 hours of data assimilation (conventional observations from NCEP NDAS data stream) on a mesoscale domain with 12km grid spacing followed by 1 hour of data assimilation (NEXRAD radial velocity and reflectivity observations) on a nested convection permitting domain at 4-km grid spacing. A 20 member convection-permitting ensemble was initialized from the 4-km analyses and run out to the 1-day lead time for all members and the 2-day lead time for the first ten members. A deterministic forecast at 1-km grid spacing was also initialized from the 4-km ensemble mean analysis and run out to the 1-day lead time. The physics configurations of the ensemble members are summarized in Table 1, below. For further details, please see Johnson and Wang (2016) and Johnson et al. (2017).

Citing data in formal publications

The points of contact for questions about this data are Xuguang Wang (xuguang.wang@ou.edu) and Aaron Johnson (ajohns14@ou.edu). Further details can be found in the papers listed below and these papers should be cited in formal presentations and publications that include research that involved use of these data.

Johnson, A., X. Wang and S. Degelia, 2016. OU MAP WRF ARW Deterministic and Ensemble 2-D Fields, Version 1.0. http://doi.org/10.5065/D6125R2T. Accessed 21 Nov 2016.

Johnson, A. and X. Wang, 2016: Design and implementation of a GSI-based convection-allowing ensemble data assimilation and forecast system for the PECAN field experiment. Part 1: Optimal configurations for nocturnal convection prediction using retrospective cases. *Wea. Forecasting*. Accepted with revision.

Johnson, A., X. Wang and S. Degelia, 2017: Design and implementation of a GSI-based convection-allowing ensemble based data assimilation and forecast system for the PECAN field experiment. Part 2: Overview and evaluation of real-time system. *Wea. Forecasting*. Submitted.

Contents of 4km ensemble forecast data for each forecast hour

```
netcdf fc2015070113_4km_f10 {
dimensions:
	NMEMS = 20 ;
	NX = 300 ;
	NY = 345 ;
variables:
	float LAT(NY, NX) ;
		LAT:Variable = "latitude" ;
		LAT:Units = "degrees" ;
	float LON(NY, NX) ;
		LON:Variable = "longitude" ;
		LON:Units = "degrees" ;
	float QPF(NY, NX, NMEMS) ;
		QPF:Variable = "precipitation" ;
		QPF:Units = "mm/hr" ;
	float CREF(NY, NX, NMEMS) ;
		CREF:Variable = "Composite Reflectivity" ;
		CREF:Units = "dBZ" ;
	float U10(NY, NX, NMEMS) ;
		U10:Variable = "u-component of 10 meter wind" ;
		U10:Units = "m/s" ;
	float V10(NY, NX, NMEMS) ;
		V10:Variable = "v-component of 10 meter wind" ;
		V10:Units = "m/s" ;
	float SLP(NY, NX, NMEMS) ;
		SLP:Variable = "Sea Level Pressure" ;
		SLP:Units = "mb" ;
	float T2(NY, NX, NMEMS) ;
		T2:Variable = "Temperature at 2m" ;
		T2:Units = "Celsius" ;
	float Q2(NY, NX, NMEMS) ;
		Q2:Variable = "Water vapor mixing ratio at 2m" ;
		Q2:Units = "g/kg" ;
	float SBCAPE(NY, NX, NMEMS) ;
		SBCAPE:Variable = "CAPE of parcel lifted from lowest model level" ;
		SBCAPE:Units = "J/kg" ;
	float SBCIN(NY, NX, NMEMS) ;
		SBCIN:Variable = "CIN of parcel lifted from lowest model level" ;
		SBCIN:Units = "J/kg" ;
	float MUCAPE(NY, NX, NMEMS) ;
		MUCAPE:Variable = "CAPE of most unstable lifted parcel" ;
		MUCAPE:Units = "J/kg" ;
```

```
        float MUCIN(NY, NX, NMEMS) ;
                MUCIN:Variable = "CIN of most unstable lifted parcel" ;
                MUCIN:Units = "J/kg" ;
        float MULPL(NY, NX, NMEMS) ;
                MULPL:Variable = "Height of most unstable lifted parcel" ;
                MULPL:Units = "meters above ground level" ;
}
```

Contents of 1km deterministic forecast data for each forecast hour

```
netcdf fc2015070113_1km_f10 {
dimensions:
        NX = 1000 ;
        NY = 1180 ;
        NZ = 49 ;
variables:
        float U10(NY, NX) ;  10m u component of wind (m/s)
        float V10(NY, NX) ;   10m v component of wind (m/s)
        float T2(NY, NX) ;    2m temperature (Celsius)
        float TD2(NY, NX) ;  2m dewpoint (Kelvin)
        float DBZ1(NY, NX) ; 1km AGL reflectivity (dbz)
        float DBZ(NY, NX) ; composite reflectivity (dbz)
        float MAXUH(NY, NX) ; hourly maximum updraft helicity (m2/s2)
        float MAX10M(NY, NX) ; hourly maximum 10m wind speed (m/s)
        float PRECIP(NY, NX) ; hourly accumulated precipitation (mm)
        float W1(NY, NX) ; 1km agl vertical velocity (m/s)
        float W5(NY, NX) ; 5km AGL vertical velocity (m/s)
        float INVHGT(NY, NX) ; estimated inversion height (m; use with caution)
        float DIV10M(NY, NX) ; divergence of 10m wind (/s)
        float XLAT(NY, NX) ; latitude (degrees)
        float XLON(NY, NX) ; longitude (degrees)
}
```

Table 1. Physics and IC configuration of the different ensemble members, including configurations during the data assimilation (DA) and forecast (Forec.) periods and including planetary boundary layer (PBL), microphysics (MP) and cumulus (CP) parameterizations. Asterisk indicates parameter perturbations as described in the text. (N/A indicates not applicable; e.g., forecasts were not generated for members 021-040)

Name	**DA PBL**	**Forec. PBL**	**DA MP**	**Forec. MP**	**12 km CP**	**IC/LBC**
hires	N/A	MYNN	N/A	Thompson	Grell-3	4km mean/ member 001 forec.
001	QNSE	MYNN	WSM6*	Thompson	Grell-3	GEFS.001
002	QNSE	QNSE	WSM6*	WDM6	Kain-Fritsch	GEFS.002
003	QNSE	YSU	WSM6*	Lin	Kain-Fritsch	GEFS.003
004	QNSE	ACM2	WSM6*	Thompson	Grell-F	GEFS.004
005	QNSE	MYJ	WSM6*	WDM6	Grell-3	GEFS.005
006	QNSE	MYNN	WSM6*	Morrison	Kain-Fritsch	GEFS.006
007	QNSE	QNSE	WSM6*	Thompson	Kain-Fritsch	GEFS.007
008	QNSE	YSU	WSM6*	WDM6	Grell-F	GEFS.008
009	QNSE	ACM2	WSM6*	Lin	Grell-3	GEFS.009
010	QNSE	MYJ	WSM6*	Thompson	Kain-Fritsch	GEFS.010
011	QNSE	MYNN	WSM6*	WDM6	Kain-Fritsch	GEFS.011
012	QNSE	QNSE	WSM6*	Morrison	Grell-F	GEFS.012
013	QNSE	YSU	WSM6*	Thompson	Grell-3	GEFS.013
014	QNSE	ACM2	WSM6*	WDM6	Kain-Fritsch	GEFS.014
015	QNSE	MYJ	WSM6*	Thompson	Kain-Fritsch	GEFS.015
016	QNSE	MYNN	WSM6*	Morrison	Grell-F	GEFS.016
017	QNSE	QNSE	WSM6*	Thompson	Grell-3	GEFS.017
018	QNSE	YSU	WSM6*	Thompson	Kain-Fritsch	GEFS.018
019	QNSE	ACM2	WSM6*	Thompson	Kain-Fritsch	GEFS.019

020	QNSE	MYJ	WSM6*	Thompson	Grell-F	GEFS.020
021	QNSE	N/A	WSM6*	N/A	Grell-3	SREF_em.ctl
022	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_em.n1
023	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_em.p1
024	QNSE	N/A	WSM6*	N/A	Grell-F	SREF_em.n2
025	QNSE	N/A	WSM6*	N/A	Grell-3	SREF_em.p2
026	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_em.n3
027	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_em.p3
028	QNSE	N/A	WSM6*	N/A	Grell-F	SREF_nmm.ctl
029	QNSE	N/A	WSM6*	N/A	Grell-3	SREF_nmm.n1
030	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmm.p1
031	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmm.n2
032	QNSE	N/A	WSM6*	N/A	Grell-F	SREF_nmm.p2
033	QNSE	N/A	WSM6*	N/A	Grell-3	SREF_nmm.n3
034	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmm.p3
035	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmb.n1
036	QNSE	N/A	WSM6*	N/A	Grell-F	SREF_nmb.p1
037	QNSE	N/A	WSM6*	N/A	Grell-3	SREF_nmb.n2
038	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmb.p2
039	QNSE	N/A	WSM6*	N/A	Kain-Fritsch	SREF_nmb.n3
040	QNSE	N/A	WSM6*	N/A	Grell-F	SREF_nmb.p3