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README FILE TO ACCOMPANY DATASETS FOR
"Evaluation and optimization of Northern China’s carbon dioxide emissions using atmospheric observations (2005-2009)."

DATA FAIR USE POLICY (Adapted from AmeriFlux Data Use Policy)
The data offered on this website are contributed by individual scientists, who share their data openly with the global community.
The data use policy is that all data should be properly acknowledged, and that data contributors should be informed of how data are being used, have the opportunity to make an intellectual contribution to the papers that use their data and, as a result, have the opportunity to be a co-author.

Data permalink: http://dx.doi.org/10.7910/DVN/OJESO0
Files included:
	000_README.txt
	001_CO2_modmeas_timeseries.csv
	001_CO2_modmeas_timeseries.RData
	002_WPS_Namelist.pdf
	002_WRF_Namelist.pdf
	002_WRF_Registry_EM_COMMON.pdf
	003_setStiltparam.r
	004_stiltv20150527AER_footncdf_YYYY_7dbk.tar.gz
	005_stiltv20150527AER_footplots_YYYY_7dbk.tar.gz

Revision History:
File Created 21 Nov 2017

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Notes:
1) Due to large file sizes, WRFv3.6.1 meteorological output (.nc format and .arl format) and STILT trajectory files (.RData format) are available upon request. Please contact adayalu@seas.harvard.edu
2) Please additionally cite the following when using the CO2 observational dataset:
	Wang, Y., Munger, J. W., Xu, S., McElroy, M. B., Hao, J., Nielsen, C. P., and Ma, H.: CO2 and its correlation with CO at a rural site near Beijing: implications for combustion efficiency in China, Atmos. Chem. Phys., 10, 8881-8897, https://doi.org/10.5194/acp-10-8881-2010, 2010.
3) Detailed analysis of vegetation model (VPRM):
	Dayalu, A., Munger, W., Wofsy, S. C., Wang, Y., Nehrkorn, T., Zhao, Y., McElroy, M. B., Nielsen, C., and Luus, K.: VPRM-CHINA: Using the Vegetation, Photosynthesis, and Respiration Model to partition contributions to CO2 measurements in Northern China during the 2005–2009 growing seasons, Biogeosciences Discuss., https://doi.org/10.5194/bg-2017-504, in review, 2017
4) Supplementary VPRM output, methods available at
	http://dx.doi.org/10.7910/DVN/RQLGLH

Description of included files
(1) 001_CO2_modmeas_timeseries.csv : Complete hourly timeseries of measured and modeled CO2 (ppm) for Miyun, China station. File contains the following variables:

	|--------------------------------------|
	** Location, Date, and Time Variables**
	|--------------------------------------|
	LAT_DEG_N: Measurement latitude, degrees North
	LON_DEG_E: Measurement longitude, degrees East
	INLET_MAGL: Measurement inlet height, meters above ground level
	Year_UTC: YYYY format, UTC-based
	Month_UTC: Numeric month of year, UTC-based

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        Day_UTC: Numeric day of month, UTC-based
        Hour_UTC: Numeric hour of day (0-23)
        Date_UTC: YYYY-MM-DD format, UTC-based
        fracday_origin_20031231_UTC: fractional day since 2003-12-31, UTC-based.
        Year, Month, Day, Hour, Date, fracday_origin_20031231 _local: Same as above,
                        in local (UTC+8h) time base.

        |------------------------------|
        ** CO2 Measurement Variables **
        |------------------------------|
        CO2_measured_ppm: Measured hourly CO2, average from original raw 5-sec
                        values (ppm)
        SDEV_CO2_measured_ppm: Standard deviation of average hourly CO2 from 5-sec
                        raw measurements (ppm)

        |------------------------------|
        ** CO2 Modeled Variables **
        |------------------------------|
        CO2_ZHAO_VPRM_BG_ppm: Modeled hourly Miyun CO2 timeseries using ZHAO anthropogenic
                                emissions, VPRM vegetation fluxes, CarbonTracker CT2015
                                background (ppm)
        CO2_EDGAR_VPRM_BG_ppm: Modeled hourly Miyun CO2 timeseries using EDGAR anthropogenic
                                emissions, VPRM vegetation fluxes, CarbonTracker CT2015
                                background (ppm)
        CO2_CDIAC_VPRM_BG_ppm: Modeled hourly Miyun CO2 timeseries using CDIAC anthropogenic
                                emissions, VPRM vegetation fluxes, CarbonTracker CT2015
                                background (ppm)
        VEG_VPRM_enh_ppm: Modeled vegetation contribution to CO2 signal (ppm)
        ANTH_ZHAO_enh_ppm: ZHAO-modeled anthropogenic contribution to CO2 signal (ppm)
        ANTH_EDGAR_enh_ppm: EDGAR-modeled anthropogenic contribution to CO2 signal (ppm)
        ANTH_CDIAC_enh_ppm: CDIAC-modeled anthropogenic contribution to CO2 signal (ppm)
        BG_CT2015_ppm: CarbonTracker CT2015 modeled background
        BG_VALID_FLAG: Flag indicating whether background value is valid (1) or invalid (0)
                                based on background selection criteria as described in
                                publication supplementary material. Requires a minimum 75%
                                of STILT particles to have reached 3000masl and/or
                                outermost domain edges to be considered representative of
                                true background not enhanced by the region within a 7-day
                                period.
        ANALYSIS_SUBSET_FLAG: Flag (1/0) indicating whether data points were used in analysis.
                                Requires that measured co2 be non-missing, that BG_VALID_FLAG
                                be 1, and that measurement hour be between 1100h and 1600h (local
                                time, inclusive).

(2) 001_CO2_modmeas_timeseries.RData : same contents as in (2); in RData format.
(3) 002_WPS_Namelist.pdf : Configuration file for WRFv3.6.1 Pre-processing System
(4) 002_WRF_Namelist.pdf : Configuration file for WRFv3.6.1
(5) 002_WRF_Registry_EM_COMMON.pdf : Required changes requiring WRF model re-compilation --
        required for compatibility with STILT, and for use with this study's
        version of the VPRM vegetation model (See http://stilt-model.org for additional
        information)
(6) 003_setStiltparam.r : Configuration file for STILT model. Equivalent to STILT's
        setStiltParam.r file. (See http://stilt-model.org for additional information)
(7) 004_stiltv20150527AER_footncdf_YYYY_7dbk.tar.gz : Tar gzipped file containing hourly
        footprints for each year. Within each annual tar.gz file:
        footYYYYxMMxDDxHHx40.48Nx116.78Ex00006.nc
        With file global attributes:
        dimensions:
        Lon = 248
        Lat = 143
        Time = 168  // unlimited (this is time back, in hours = 7 days max).
        variables:
        double Lon ( Lon )
         units :        degrees_east

        double Lat ( Lat )
         units :        degrees_north
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        double Time ( Time )
         units :        hours back

        double foot ( Time, Lat, Lon )
         units :        ppm_per_umol_per_m2s
         missing_value :        -9999
         long_name :    Footprint
         _FillValue :   -9999

(8) 005_stiltv20150527AER_footplots_YYYY_7dbk.tar.gz : Tar gzipped file containing hourly
        footprint IMAGES (png) for each year. Within each annual tar.gz file:
        footYYYYxMMxDDxHHx40.48Nx116.78Ex00006.png

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