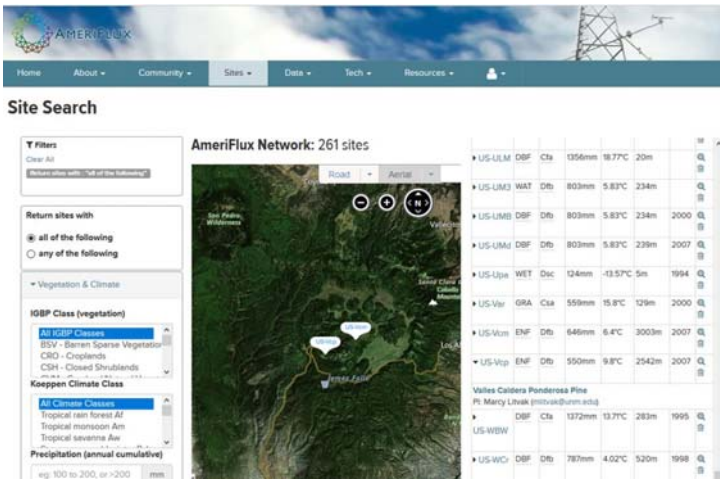
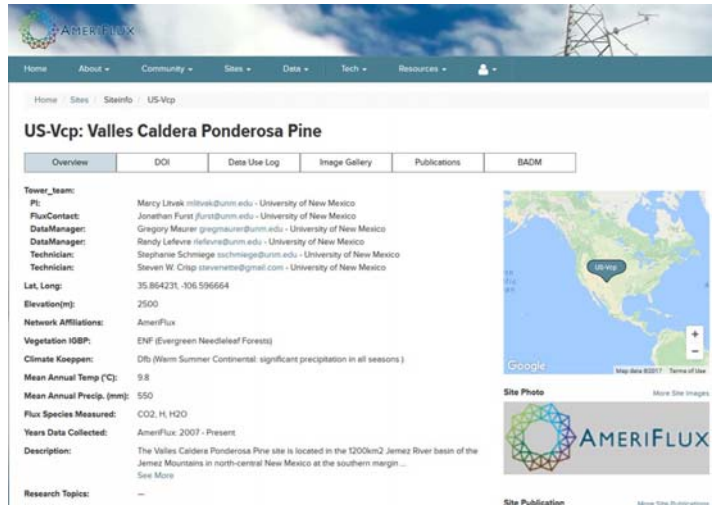
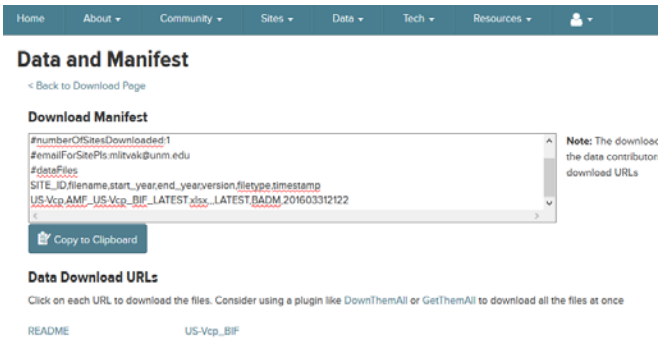




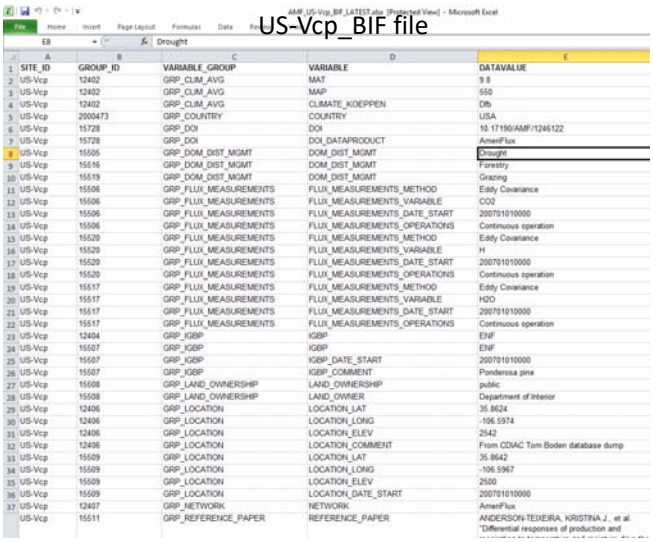
BADM data tab (metadata)



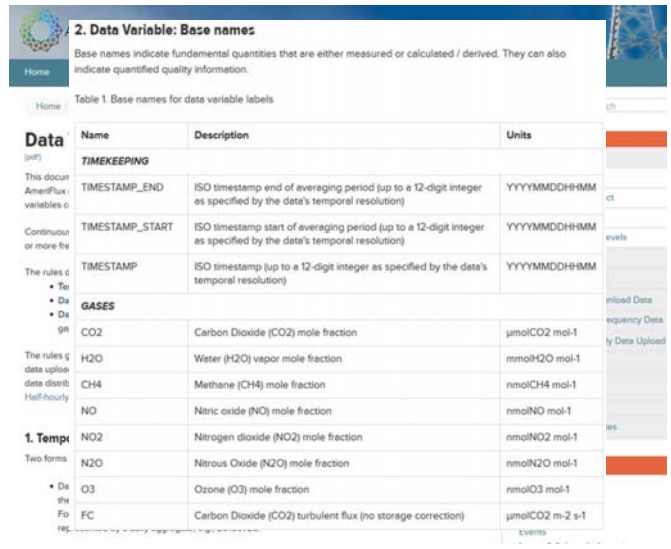
Readme file

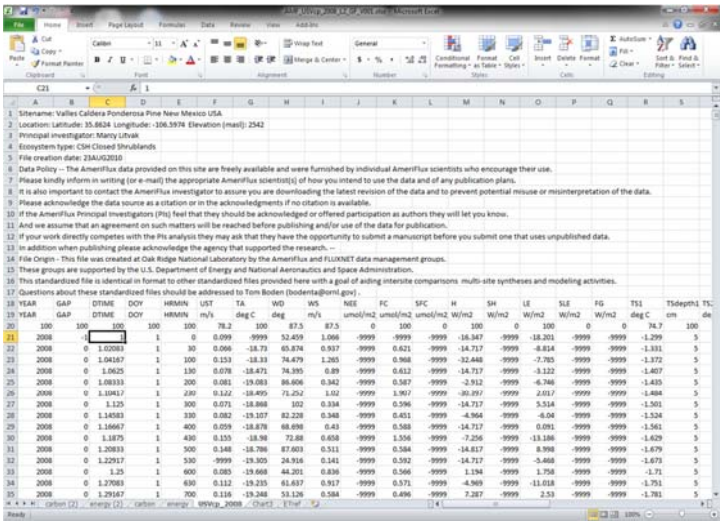
```
5) VARIABLE LIST

-- TIMEKEEPING
TIMESTAMP_START (YYYYMMDDHHMM): ISO timestamp start of averaging period - short format [YEAR, DTIME, DOY, HRMIN]
TIMESTAMP_END   (YYYYMMDDHHMM): ISO timestamp end of averaging period - short format [YEAR, DTIME, DOY, HRMIN]

-- GASES
CO2_1 (umolCO2 mol-1): Carbon Dioxide (CO2) mole fraction (CO2 layer 1 - Top) [CO2top]
CO2_2 (umolCO2 mol-1): Carbon Dioxide (CO2) mole fraction (CO2 layer 2) [CO2]
H2O   (mmolH2O mol-1): Water (H2O) vapor mole fraction [H2O]
FC    (umolCO2 m-2 s-1): Carbon Dioxide (CO2) flux [FC]
SC    (umolCO2 m-2 s-1): Carbon Dioxide (CO2) storage flux [SFC]

-- HEAT
G   (W m-2): Soil heat flux [FG]
H   (W m-2): Sensible heat flux [H]
LE  (W m-2): Latent heat flux [LE]
SH  (W m-2): Heat storage in the air [SH]
SLE (W m-2): Latent heat storage flux [SLE]

-- MET_WIND
WD    (Decimal degrees): Wind direction [WD]
WS    (m s-1): Wind speed [WS]
USTAR (m s-1): Friction velocity [UST]
ZL    (adimensional): Stability parameter [ZL]

-- MET_ATM
PA    (kPa): Atmospheric pressure [PRESS]
RH     (%): Relative humidity, range 0-100 [RH]
TA    (deg C): Air temperature [TA]
VPD_PI (hPa): Vapor Pressure Deficit (as measured/calculated by tower teams) [VPD]

-- MET_SOIL
SWC_1 (%): Soil water content (volumetric), range 0-100 (SWC layer 1 - upper) [SWC1]
SWC_2 (%): Soil water content (volumetric), range 0-100 (SWC layer 2 - lower) [SWC2]
TS_1  (deg C): Soil temperature (TS layer 1 - upper) [TS1]
TS_2  (deg C): Soil temperature (TS layer 2 - lower) [TS2]

-- MET_RAD
APAR    (umol m-2 s-1): Absorbed PAR [APAR]
FAPAR    (%): Fraction of absorbed PAR, range 0-100 [APARpct]
NETRAD   (W m-2): Net radiation [Rn]
PPFD_IN  (umolPhoton m-2 s-1): Photosynthetic photon flux density, incoming [PAR]
PPFD_OUT (umolPhoton m-2 s-1): Photosynthetic photon flux density, outgoing [PARout]
PPFD_DIF (umolPhoton m-2 s-1): Photosynthetic photon flux density, diffuse incoming [PARdif]
SW_IN    (W m-2): Shortwave radiation, incoming [Rg]
SW_OUT   (W m-2): Shortwave radiation, outgoing [RgOut]
SW_DIF   (W m-2): Shortwave radiation, diffuse incoming [Rgdif]
LW_IN    (W m-2): Longwave radiation, incoming [Rgl]
LW_OUT   (W m-2): Longwave radiation, outgoing [Rgl0ut]
```

US-Vcp_BIF file



SITE_ID	GROUP_ID	VARIABLE_GROUP	VARIABLE	DATAVALUE
US-Vcp	12402	GRP_CLIM_AVG	MAT	9.8
US-Vcp	12402	GRP_CLIM_AVG	MAP	550
US-Vcp	12402	GRP_CLIM_AVG	CLIMATE_KOEPPEN	Dfb
US-Vcp	2000473	GRP_COUNTRY	COUNTRY	USA
US-Vcp	15728	GRP_DOI	DOI	10.17190/AMF/1246122
US-Vcp	15728	GRP_DOI	DOI_DATAPRODUCT	AmeriFlux
US-Vcp	15505	GRP_DOM_DIST_MGMT	DOM_DIST_MGMT	Drought
US-Vcp	15516	GRP_DOM_DIST_MGMT	DOM_DIST_MGMT	Forestry
US-Vcp	15519	GRP_DOM_DIST_MGMT	DOM_DIST_MGMT	Grazing
US-Vcp	15506	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_METHOD	Eddy Covariance
US-Vcp	15506	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_VARIABLE	CO2
US-Vcp	15506	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_DATE_START	200701010000
US-Vcp	15506	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_OPERATIONS	Continuous operation
US-Vcp	15520	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_METHOD	Eddy Covariance
US-Vcp	15520	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_VARIABLE	H
US-Vcp	15520	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_DATE_START	200701010000
US-Vcp	15520	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_OPERATIONS	Continuous operation
US-Vcp	15517	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_METHOD	Eddy Covariance
US-Vcp	15517	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_VARIABLE	H2O
US-Vcp	15517	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_DATE_START	200701010000
US-Vcp	15517	GRP_FLUX_MEASUREMENTS	FLUX_MEASUREMENTS_OPERATIONS	Continuous operation
US-Vcp	12404	GRP_IGBP	IGBP	ENF
US-Vcp	15507	GRP_IGBP	IGBP	ENF
US-Vcp	15507	GRP_IGBP	IGBP_DATE_START	200701010000
US-Vcp	15507	GRP_IGBP	IGBP_COMMENT	Ponderosa pine
US-Vcp	15508	GRP_LAND_OWNERSHIP	LAND_OWNERSHIP	public
US-Vcp	15508	GRP_LAND_OWNERSHIP	LAND_OWNER	Department of Interior
US-Vcp	12406	GRP_LOCATION	LOCATION_LAT	35.8624
US-Vcp	12406	GRP_LOCATION	LOCATION_LONG	-106.5974
US-Vcp	12406	GRP_LOCATION	LOCATION_ELEV	2542
US-Vcp	12406	GRP_LOCATION	LOCATION_COMMENT	From CDIAC Tom Boden database dump
US-Vcp	15509	GRP_LOCATION	LOCATION_LAT	35.8642
US-Vcp	15509	GRP_LOCATION	LOCATION_LONG	-106.5967
US-Vcp	15509	GRP_LOCATION	LOCATION_ELEV	2500
US-Vcp	15509	GRP_LOCATION	LOCATION_DATE_START	200701010000
US-Vcp	12407	GRP_NETWORK	NETWORK	AmeriFlux
US-Vcp	15511	GRP_REFERENCE_PAPER	REFERENCE_PAPER	ANDERSON-TEIXEIRA, KRISTINA J., et al. "Differential responses of production and





Sitename: Valles Caldera Ponderosa Pine New Mexico USA
Location: Latitude: 35.8624 Longitude: -106.5974 Elevation (masl): 2542
Principal investigator: Marcy Litvak
Ecosystem type: CSM Closed Shrublands
File creation date: 23AUG2010
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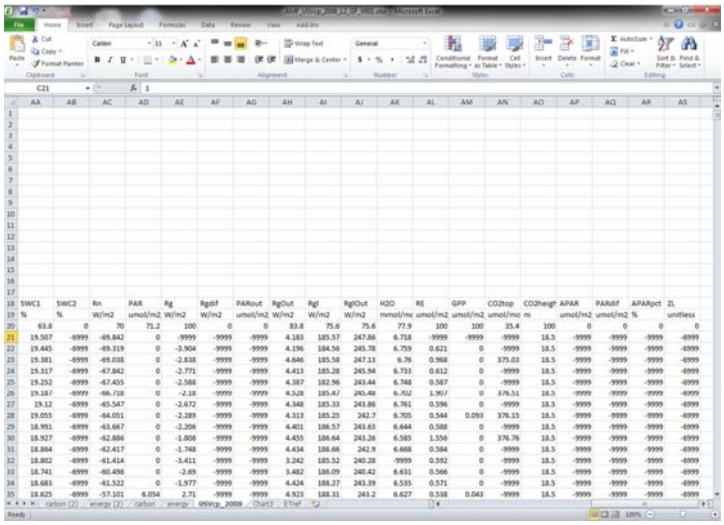
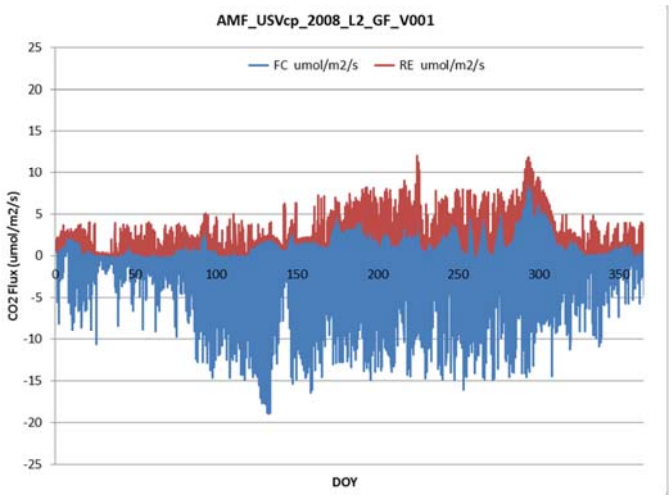
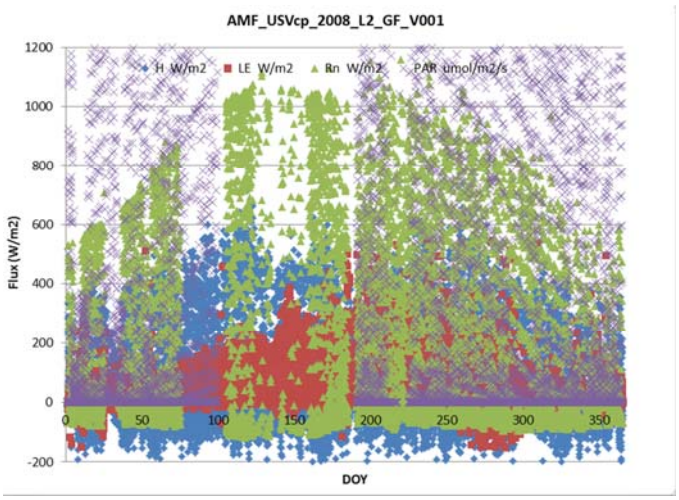
In addition when publishing please acknowledge the agency that supported the research. --
File Origin - This file was created at Oak Ridge National Laboratory by the AmeriFlux and FLUXNET data management groups.
These groups are supported by the U.S. Department of Energy and National Aeronautics and Space Administration.
This standardized file is identical in format to other standardized files provided here with a goal of aiding intersite comparisons multi-site syntheses and modeling activities.
Questions about these standardized files should be addressed to Tom Boden (bodenta@ornl.gov) .

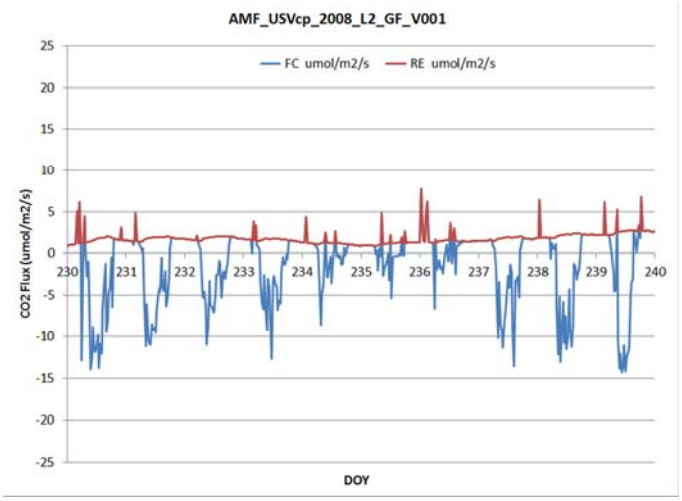
YEAR	GAP	DTIME	DOY	HRMIN	UST	TA	WD	WS	NEE	FC	SFC	H	SH	LE	SLE	FG	TS1	TSdepth1	TS
YEAR	GAP	DTIME	DOY	HRMIN	m/s	deg C	deg	m/s	umol/m2	umol/m2	umol/m2	W/m2	W/m2	W/m2	W/m2	W/m2	deg C	cm	de
100	100	100	100	100	100	78.2	100	87.5	87.5	0	100	0	100	0	100	0	0	74.7	100
2008	0	[illegible]	1	0	0.099	-9999	52.459	1.066	-9999	-9999	-9999	-16.347	-9999	-18.201	-9999	-9999	-1.299	5	
2008	0	1.02083	1	30	0.066	-18.73	65.874	0.937	-9999	0.621	-9999	-14.717	-9999	-8.814	-9999	-9999	-1.331	5	
2008	0	1.04167	1	100	0.153	-18.33	74.479	1.265	-9999	0.968	-9999	-32.448	-9999	-7.785	-9999	-9999	-1.372	5	
2008	0	1.0625	1	130	0.078	-18.471	74.395	0.89	-9999	0.612	-9999	-14.717	-9999	-3.122	-9999	-9999	-1.407	5	
2008	0	1.08333	1	200	0.081	-19.083	86.606	0.342	-9999	0.587	-9999	-2.912	-9999	-6.746	-9999	-9999	-1.435	5	
2008	0	1.10417	1	230	0.122	-18.495	71.252	1.02	-9999	1.907	-9999	-30.297	-9999	2.017	-9999	-9999	-1.484	5	
2008	0	1.125	1	300	0.071	-18.868	102	0.334	-9999	0.596	-9999	-14.717	-9999	5.514	-9999	-9999	-1.501	5	
2008	0	1.14583	1	330	0.082	-19.107	82.228	0.348	-9999	0.451	-9999	-4.964	-9999	-6.04	-9999	-9999	-1.524	5	
2008	0	1.16667	1	400	0.059	-18.878	68.696	0.43	-9999	0.588	-9999	-14.717	-9999	0.091	-9999	-9999	-1.561	5	
2008	0	1.1875	1	430	0.155	-18.98	72.88	0.658	-9999	1.556	-9999	-7.256	-9999	-13.186	-9999	-9999	-1.629	5	
2008	0	1.20833	1	500	0.148	-18.786	87.603	0.511	-9999	0.584	-9999	-14.817	-9999	8.998	-9999	-9999	-1.679	5	
2008	0	1.22917	1	530	-9999	-19.305	24.916	0.141	-9999	0.592	-9999	-14.717	-9999	-5.468	-9999	-9999	-1.673	5	
2008	0	1.25	1	600	0.083	-19.668	44.201	0.836	-9999	0.566	-9999	1.194	-9999	1.758	-9999	-9999	-1.71	5	
2008	0	1.27083	1	630	0.112	-19.235	61.637	0.917	-9999	0.571	-9999	-4.969	-9999	-11.018	-9999	-9999	-1.751	5	
2008	0	1.29167	1	700	0.116	-19.248	53.126	0.584	-9999	0.496	-9999	7.287	-9999	2.53	-9999	-9999	-1.781	5	

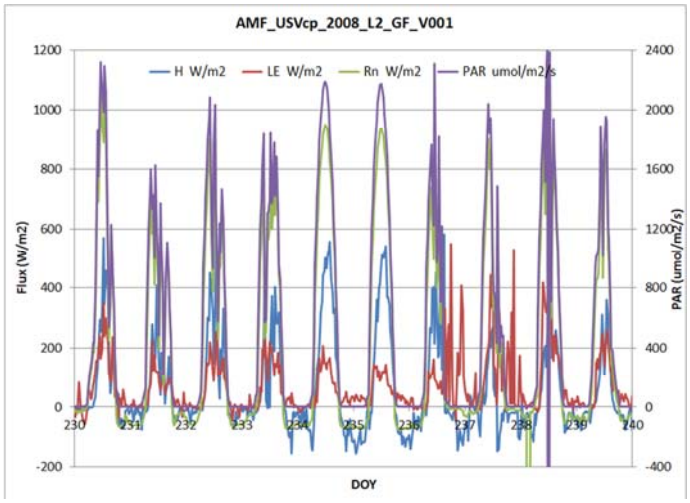


SWC1	SWC2	Rn	PAR	Rg	Rgdif	PARout	RgOut	Rgl	RglOut	H2O	RE	GPP	CO2top	CO2heigh	APAR	PARdif	APARpct	ZL
%	%	W/m2	umol/m2	W/m2	W/m2	umol/m2	W/m2	W/m2	W/m2	mmol/mo	umol/m2	umol/m2	umol/mo	m	umol/m2	umol/m2	%	unitless
63.8	0	70	71.2	100	0	0	83.8	75.6	75.6	77.9	100	100	35.4	100	0	0	0	0
19.507	-6999	-49.842	0	-9999	-9999	-9999	4.183	185.57	247.86	6.718	-9999	-9999	-9999	18.5	-9999	-9999	-9999	-6999
19.445	-6999	-69.319	0	-3.904	-9999	-9999	4.196	184.56	245.78	6.759	0.621	0	-9999	18.5	-9999	-9999	-9999	-6999
19.381	-6999	-69.038	0	-2.838	-9999	-9999	4.646	185.58	247.13	6.78	0.968	0	375.03	18.5	-9999	-9999	-9999	-6999
19.317	-6999	-67.842	0	-2.771	-9999	-9999	4.413	185.28	245.94	6.733	0.612	0	-9999	18.5	-9999	-9999	-9999	-6999
19.252	-6999	-67.455	0	-2.588	-9999	-9999	4.387	182.96	243.44	6.748	0.587	0	-9999	18.5	-9999	-9999	-9999	-6999
19.187	-6999	-66.718	0	-2.18	-9999	-9999	4.528	185.47	245.48	6.702	1.907	0	376.51	18.5	-9999	-9999	-9999	-6999
19.12	-6999	-65.547	0	-2.672	-9999	-9999	4.348	185.33	243.86	6.761	0.596	0	-9999	18.5	-9999	-9999	-9999	-6999
19.055	-6999	-64.051	0	-2.289	-9999	-9999	4.313	185.25	242.7	6.705	0.544	0.093	376.15	18.5	-9999	-9999	-9999	-6999
18.991	-6999	-63.667	0	-2.206	-9999	-9999	4.401	186.57	243.63	6.644	0.588	0	-9999	18.5	-9999	-9999	-9999	-6999
18.927	-6999	-62.886	0	-1.808	-9999	-9999	4.455	186.64	243.26	6.585	1.556	0	376.76	18.5	-9999	-9999	-9999	-6999
18.864	-6999	-62.417	0	-1.748	-9999	-9999	4.434	186.66	242.9	6.668	0.584	0	-9999	18.5	-9999	-9999	-9999	-6999
18.802	-6999	-61.414	0	-3.411	-9999	-9999	3.242	185.52	240.28	-9999	0.592	0	-9999	18.5	-9999	-9999	-9999	-6999
18.741	-6999	-60.498	0	-2.69	-9999	-9999	3.482	186.09	240.42	6.631	0.566	0	-9999	18.5	-9999	-9999	-9999	-6999
18.683	-6999	-61.522	0	-1.977	-9999	-9999	4.424	188.27	243.39	6.535	0.571	0	-9999	18.5	-9999	-9999	-9999	-6999
18.625	-6999	-57.101	6.054	2.71	-9999	-9999	4.921	188.31	243.2	6.627	0.538	0.043	-9999	18.5	-9999	-9999	-9999	-6999









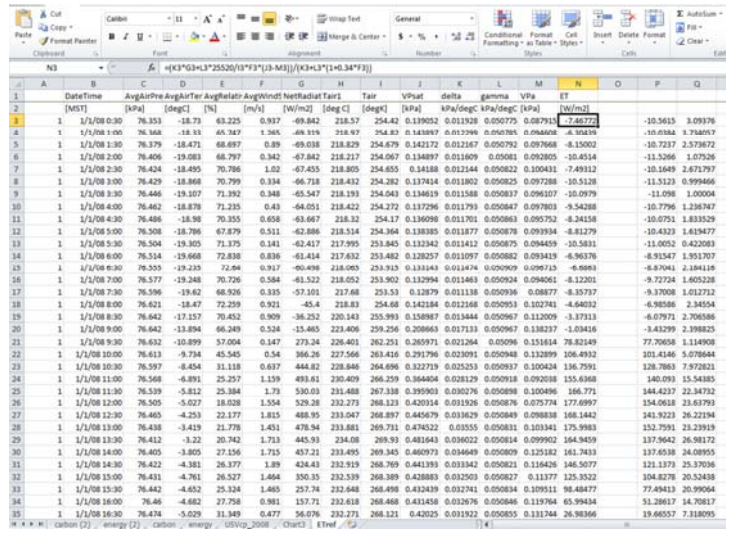
Reference ET – W/m^2

- $\lambda ET_{os} = \frac{\Delta R_n + \gamma \frac{25520}{Ta+273} u_2 (e_s - e_a)}{\Delta + \gamma(1+0.34u_2)}$ $[\frac{W}{m^2}]$ daily

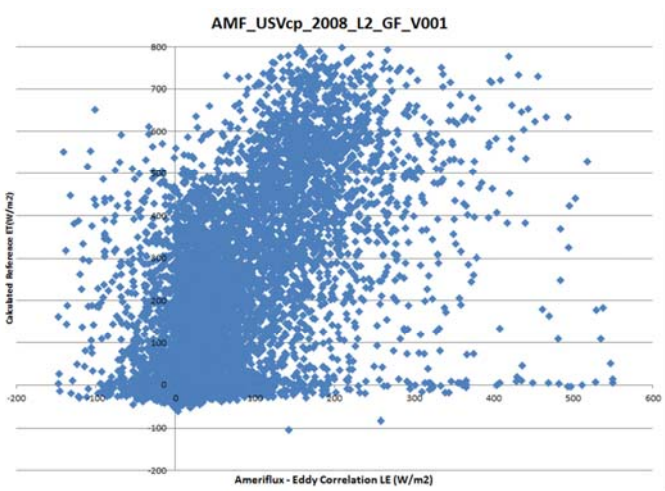
- *divide Σ hourly by 24 to get equivalent daily*

- $\lambda ET_{os} = \frac{\frac{\Delta}{\gamma} R_n + \frac{25520}{Ta+273} u_2 (e_s - e_a)}{\frac{\Delta}{\gamma} + (1+0.34u_2)}$ $[\frac{W}{m^2}]$ daily

- debugging: Δ & γ should be similar; LH & RH should be similar



N3 =(K3*G3+L3*25520/(3*F3*((J3-M3))/(K3+L3*(1+0.34*F3)))

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		DateTime	AvgAirPre	AvgAirTer	AvgRelatir	AvgWindS	NetRadiat	Tair1	Tair	VPsat	delta	gamma	VPa	ET			
2		[MST]	[kPa]	[degC]	[%]	[m/s]	[W/m2]	[deg C]	[degK]	[kPa]	kPa/degC	kPa/degC	[kPa]	[W/m2]			
3	1	1/1/08 0:30	76.353	-18.73	63.225	0.937	-69.842	218.57	254.42	0.139052	0.011928	0.050775	0.087915	-7.46772		-10.5615	3.09376
4	1	1/1/08 1:00	76.368	-18.33	65.747	1.265	-69.319	218.97	254.82	0.143897	0.012396	0.050785	0.094608	-6.30439		-10.6184	3.748057
5	1	1/1/08 1:30	76.379	-18.471	68.697	0.89	-69.038	218.829	254.679	0.142172	0.012167	0.050792	0.097668	-8.15002		-10.7237	2.573672
6	1	1/1/08 2:00	76.406	-19.083	68.797	0.342	-67.842	218.217	254.067	0.134897	0.011609	0.05081	0.092805	-10.4514		-11.5266	1.07526
7	1	1/1/08 2:30	76.424	-18.495	70.786	1.02	-67.455	218.805	254.655	0.14188	0.012144	0.050822	0.100431	-7.49312		-10.1649	2.671797
8	1	1/1/08 3:00	76.429	-18.868	70.799	0.334	-66.718	218.432	254.282	0.137414	0.011802	0.050825	0.097288	-10.5128		-11.5123	0.999466
9	1	1/1/08 3:30	76.446	-19.107	71.392	0.348	-65.547	218.193	254.043	0.134619	0.011588	0.050837	0.096107	-10.0979		-11.098	1.00004
10	1	1/1/08 4:00	76.462	-18.878	71.235	0.43	-64.051	218.422	254.272	0.137296	0.011793	0.050847	0.097803	-9.54288		-10.7796	1.236747
11	1	1/1/08 4:30	76.486	-18.98	70.355	0.658	-63.667	218.32	254.17	0.136098	0.011701	0.050863	0.095752	-8.24158		-10.0751	1.833529
12	1	1/1/08 5:00	76.508	-18.786	67.879	0.511	-62.886	218.514	254.364	0.138385	0.011877	0.050878	0.093934	-8.81279		-10.4323	1.619477
13	1	1/1/08 5:30	76.504	-19.305	71.375	0.141	-62.417	217.995	253.845	0.132342	0.011412	0.050875	0.094459	-10.5831		-11.0052	0.422083
14	1	1/1/08 6:00	76.514	-19.668	72.838	0.836	-61.414	217.632	253.482	0.128257	0.011097	0.050882	0.093419	-6.96376		-8.91547	1.951707
15	1	1/1/08 6:30	76.555	-19.235	72.64	0.917	-60.498	218.065	253.915	0.133143	0.011474	0.050909	0.096715	-6.8863		-8.87041	2.184115
16	1	1/1/08 7:00	76.577	-19.248	70.726	0.584	-61.522	218.052	253.902	0.132994	0.011463	0.050924	0.094061	-8.12201		-9.72724	1.605228
17	1	1/1/08 7:30	76.596	-19.62	68.926	0.335	-57.101	217.68	253.53	0.12879	0.011138	0.050936	0.08877	-8.35737		-9.37008	1.012712
18	1	1/1/08 8:00	76.621	-18.47	72.259	0.921	-45.4	218.83	254.68	0.142184	0.012168	0.050953	0.102741	-4.64032		-6.98586	2.34554
19	1	1/1/08 8:30	76.642	-17.157	70.452	0.909	-36.252	220.143	255.993	0.158987	0.013444	0.050967	0.112009	-3.37313		-6.07971	2.706586
20	1	1/1/08 9:00	76.642	-13.894	66.249	0.524	-15.465	223.406	259.256	0.208663	0.017133	0.050967	0.138237	-1.03416		-3.43299	2.398825
21	1	1/1/08 9:30	76.632	-10.899	57.004	0.147	273.24	226.401	262.251	0.265971	0.021264	0.05096	0.151614	78.82149		77.70658	1.114908
22	1	1/1/08 10:00	76.613	-9.734	45.545	0.54	366.26	227.566	263.416	0.291796	0.023091	0.050948	0.132899	106.4932		101.4146	5.078644
23	1	1/1/08 10:30	76.597	-8.454	31.118	0.637	444.82	228.846	264.696	0.322719	0.025253	0.050937	0.100424	136.7591		128.7863	7.972821
24	1	1/1/08 11:00	76.568	-6.891	25.257	1.159	493.61	230.409	266.259	0.364404	0.028129	0.050918	0.092038	155.6368		140.093	15.54385
25	1	1/1/08 11:30	76.539	-5.812	25.384	1.73	530.03	231.488	267.338	0.395903	0.030276	0.050898	0.100496	166.771		144.4237	22.34732
26	1	1/1/08 12:00	76.505	-5.027	18.028	1.554	529.28	232.273	268.123	0.420314	0.031926	0.050876	0.075774	177.6997		154.0618	23.63793
27	1	1/1/08 12:30	76.465	-4.253	22.177	1.815	488.95	233.047	268.897	0.445679	0.033629	0.050849	0.098838	168.1442		141.9223	26.22194
28	1	1/1/08 13:00	76.438	-3.419	21.778	1.451	478.94	233.881	269.731	0.474522	0.03555	0.050831	0.103341	175.9983		152.7591	23.23919
29	1	1/1/08 13:30	76.412	-3.22	20.742	1.713	445.93	234.08	269.93	0.481643	0.036022	0.050814	0.099902	164.9459		137.9642	26.98172
30	1	1/1/08 14:00	76.405	-3.805	27.156	1.715	457.21	233.495	269.345	0.460973	0.034649	0.050809	0.125182	161.7433		137.6538	24.08955
31	1	1/1/08 14:30	76.422	-4.381	26.377	1.89	424.43	232.919	268.769	0.441393	0.033342	0.050821	0.116426	146.5077		121.1373	25.37036
32	1	1/1/08 15:00	76.431	-4.761	26.527	1.464	350.35	232.539	268.389	0.428883	0.032503	0.050827	0.11377	125.3522		104.8278	20.52438
33	1	1/1/08 15:30	76.442	-4.652	25.324	1.465	257.74	232.648	268.498	0.432439	0.032741	0.050834	0.109511	98.48477		77.49413	20.99064
34	1	1/1/08 16:00	76.46	-4.682	27.758	0.981	157.71	232.618	268.468	0.431458	0.032676	0.050846	0.119764	65.99434		51.28617	14.70817
35	1	1/1/08 16:30	76.474	-5.029	31.349	0.477	56.076	232.271	268.121	0.42025	0.031922	0.050855	0.131744	26.98366		19.66557	7.318095

carbon (2) , energy (2) , carbon , energy , USVcp_2008 , Chart3 , ETref