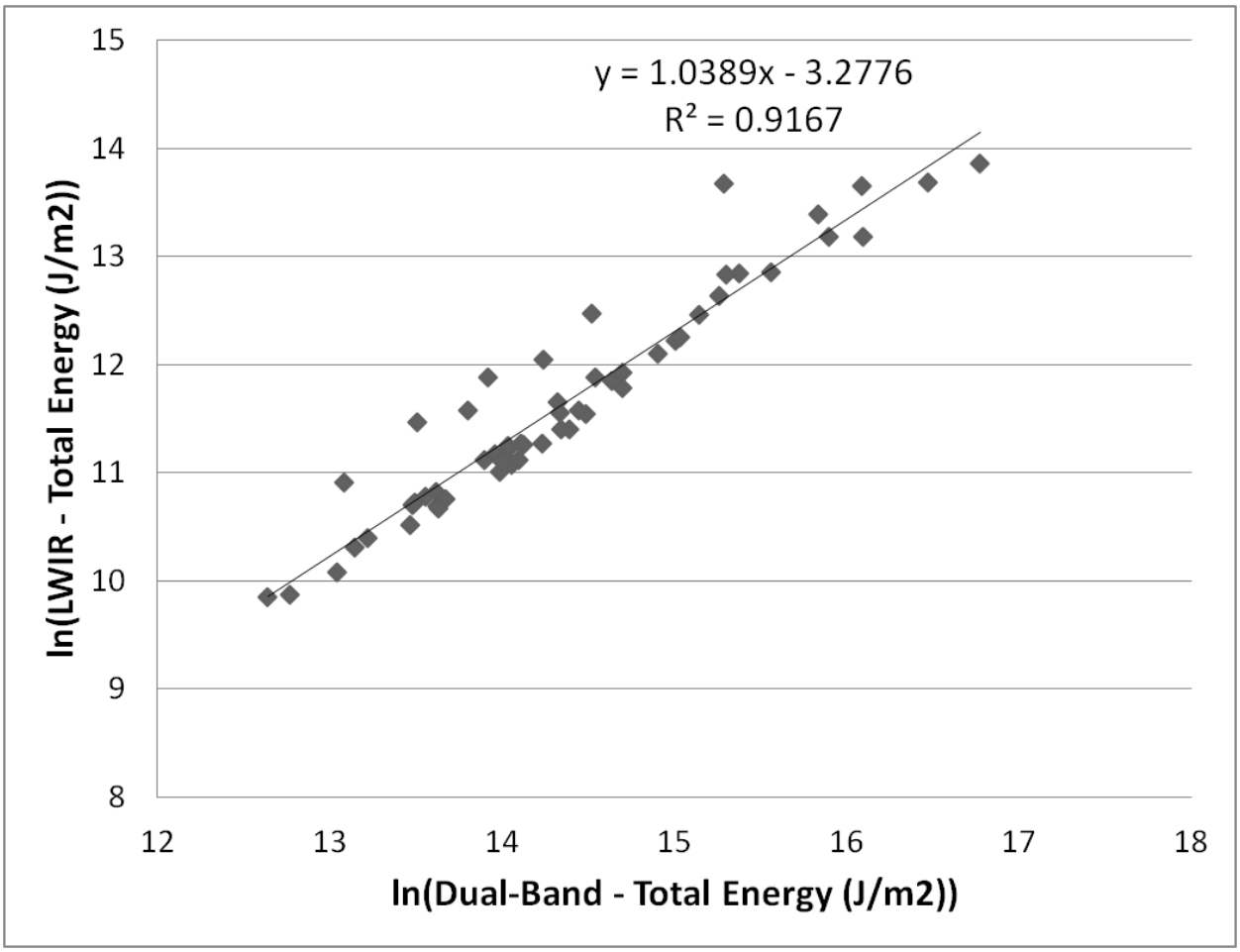
Appendix 4: Radiant Emission Spectra Data Study Summary—JFSP Project # 08-1-6-01

List of ground-calibration datasets, summarized to total ground-leaving energy from the fires. Included are total energy calculated from dual-band radiometry (Kremens et al. 2010) and from the restricted bandpass LWIR detectors as described by Kremens and Dickinson (in review, Appendix 5). The plot indicates that the physics-based simulation approach as discussed in the in Kremens and Dickinson (in review, Appendix 5) has validity, relating the well-understood dual-band method of estimating energy to energy inferred from a detector with a single, limited bandpass. The next step is to validate the calibration approach with ground-based data.

Kremens, R.L.; Smith, A.M.; Dickinson, M.B. 2010. Fire Metrology: Current and future directions in physics-based measurements., Fire Ecology, 6, pp. 13-35.

Kremens, R.L.; Dickinson, M.B. (in review) Flame-font scale numerical simulation of wildland fire radiant emission spectra as an aid to observation of wildfires.

File	Total Energy (J/m^2)		LN(Total Energy)	
	Dual-band radiometer	LWIR detector	Dual-band radiometer	LWIR detector
BearWaller_Plot1_IR_30April2007.xlsm	9750005.8	848028.6	16.1	13.7
BearWaller_Plot2_IR_30April2007.xlsm	4231336.2	305080.0	15.3	12.6
BearWaller_Plot3_IR_30April2007.xlsm	4779853.2	375082.1	15.4	12.8
BearWaller_ExtraPlot4_IR_30April2007.xlsm	4374764.4	860678.6	15.3	13.7
BearWaller_BatRoost_IR_30April2007.xlsm	14253997.1	875964.3	16.5	13.7
PowderMill_Plot1_IR_10April2007.xlsm	1666992.3	113912.9	14.3	11.6
PowderMill_Plot3_IR_10April2007.xlsm	2975629.5	179597.9	14.9	12.1
PowderMill_Plot8_IR_10April2007.xlsm	9801704.7	525435.7	16.1	13.2
PowderMill_Plot9_IR_10April2007.xlsm	3774429.1	256198.6	15.1	12.5
TarHollow_Plot1_IR_20April2007.xlsm	5732727.3	378535.7	15.6	12.8
TarHollow_Plot4_IR_20April2007.xlsm	19279550.6	1044375.0	16.8	13.9
TarHollow_Plot6_IR_20April2007.xlsm	7539825.7	653346.4	15.8	13.4
TarHollow_PlotEXTRA1_IR_20April2007.xlsm	8013919.7	528264.3	15.9	13.2
608A_Plot3_IR_Calibrated_1March2008.xlsm	1159348.3	71093.6	14.0	11.2
608A_Plot4_IR_Calibrated_1March2008.xlsm	2072675.2	144597.5	14.5	11.9
307B_Plot2_IR_Calibrated_2March2008.xlsm	820351.0	49687.5	13.6	10.8
307B_Plot4_IR_Calibated_2March2008.xlsm	715462.1	44216.1	13.5	10.7
307B_Plot5_IR_Calibrated_2March2008.xlsm	553186.6	32715.7	13.2	10.4
HomeField_Plot1_IR_Calibrated_3March2008.xlsm	1347139.3	77894.3	14.1	11.3
HomeField_Plot2_IR_Calibrated_3March2008.xlsm	1089616.8	66630.4	13.9	11.1
NorthBoundary_Plot1_IR_Calibrated_5March2008.xlsm	708340.4	36860.0	13.5	10.5
NorthBoundary_Plot2_IR_Calibrated_5March2008.xlsm	510435.7	29741.4	13.1	10.3
NorthBoundary_Plot3_IR_Calibrated_5March2008.xlsm	309063.0	18948.6	12.6	9.8
JohnBaptist_Plot1_IR_6March2008.xlsm	726935.5	45050.0	13.5	10.7
JohnBaptist_Plot2_IR_6March2008.xlsm	824697.3	43781.4	13.6	10.7
WolfPen_Plot20_IR_7April2008.xlsm	1776588.2	89275.0	14.4	11.4
WolfPen_Plot24_IR_7April2008.xlsm	1363290.7	77212.1	14.1	11.3
WolfPen_Plot25_IR_7April2008.xlsm	1683360.2	103174.3	14.3	11.5
WolfPen_Plot27_IR_7April2008.xlsm	350707.5	19252.1	12.8	9.9
BuckCreek_Plot2_IR_Calibrated_17April2009.xlsm	1245800.8	73808.6	14.0	11.2
EglinAFB_907D_Plot1_IR_Calibrated_9Jan2010.xlsm	462856.0	23585.0	13.0	10.1
EglinAFB_601_Plot1_IR_Calibrated_10Jan2010.xlsm	1700008.7	88552.1	14.3	11.4
EglinAFB_601_Plot2_IR_Calibrated_10Jan2010.xlsm	1272454.7	63953.6	14.1	11.1
EglinAFB_702D_Plot1_IR_Calibrated_11Jan2010.xlsm	1322165.9	66635.0	14.1	11.1
EglinAFB_702D_Plot2_IR_Calibrated_11Jan2010.xlsm	770082.7	47793.9	13.6	10.8
EglinAFB_702D_Plot3_IR_Calibrated_11Jan2010.xlsm	1186833.0	60295.0	14.0	11.0
EglinAFB_702D_Plot4_IR_Calibrated_11Jan2010.xlsm	869362.7	46510.0	13.7	10.7
EglinAFB_100B_Plot1_IR_Calibrated_12Jan2010.xlsm	1520516.4	77977.1	14.2	11.3
EglinAFB_100B_Plot2_IR_Calibrated_12Jan2010.xlsm	1952033.4	103037.9	14.5	11.5
EglinAFB_100B_Plot3_IR_Calibrated_12Jan2010.xlsm	1245268.1	76635.0	14.0	11.2
EglinAFB_100B_Plot4_IR_Calibrated_12Jan2010.xlsm	834889.4	42905.7	13.6	10.7
DATA_MACA_FloatingMill_Plot1_IR_Calibrated.xlsm	1528637.5	169460.4	14.2	12.0
DATA_MACA_FloatingMill_Plot2_IR_Calibrated.xlsm	1106815.0	144224.2	13.9	11.9
DATA_MACA_FloatingMill_Plot3_IR_Calibrated.xlsm	2422727.9	130471.1	14.7	11.8
DATA_MACA_FloatingMill_Plot4_IR_calibrated.xlsm	1206473.0	66240.0	14.0	11.1
MACA_JoppaChurch_Plot1_IR_Calibrated.xlsm	734259.7	94520.0	13.5	11.5
MACA_JoppaChurch_Plot2_IR_Calibrated.xlsm	1885794.5	105543.6	14.4	11.6
MACA_JoppaChurch_Plot3_IR_Calibrated.xlsm	987210.2	105892.9	13.8	11.6
MACA_JoppaChurch_Plot4_IR_Calibrated.xlsm	2415214.6	150776.4	14.7	11.9
TarHollow_Ailanthus_UnitA_Plot1_IR_Calibrated.xlsm	3285431.0	202397.1	15.0	12.2
TarHollow_Ailanthus_UnitA_Plot2_IR_Calibrated.xlsm	480781.9	54263.6	13.1	10.9
TarHollow_Ailanthus_UnitB_Plot1_IR_Calibrated.xlsm	4425545.5	371187.9	15.3	12.8
TarHollow_Ailanthus_UnitB_Plot2_IR_Calibrated.xlsm	2025604.7	258567.9	14.5	12.5
Acorn_Hill_Plot1.xlsm	2279094.4	138841.8	14.6	11.8
Acorn_Hill_Plot2.xlsm	3397824.5	208292.5	15.0	12.2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R² = 0.9167
15
14
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15
16
17
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ln(LWIR - Total Energy (J/m2))
ln(Dual-Band - Total Energy (J/m2))