



# ERRATUM: “HOW TO CONSTRAIN YOUR M DWARF: MEASURING EFFECTIVE TEMPERATURE, BOLOMETRIC LUMINOSITY, MASS, AND RADIUS” (ApJ, 804, 64)

ANDREW W. MANN<sup>1,2,8,9</sup>, GREGORY A. FEIDEN<sup>3</sup>, ERIC GAIDOS<sup>4,5,10</sup>, TABETHA BOYAJIAN<sup>6</sup>, AND KASPAR VON BRAUN<sup>7</sup>

<sup>1</sup>University of Texas at Austin, USA

<sup>2</sup>Institute for Astrophysical Research, Boston University, USA

<sup>3</sup>Department of Physics and Astronomy, Uppsala University, Box 516, SE-751 20, Uppsala, Sweden

<sup>4</sup>Department of Geology and Geophysics, University of Hawaii at Manoa, Honolulu, HI 96822, USA

<sup>5</sup>Max Planck Institut für Astronomie, Heidelberg, Germany

<sup>6</sup>Department of Astronomy, Yale University, New Haven, CT 06511, USA

<sup>7</sup>Lowell Observatory, 1400 W. Mars Hill Rd., Flagstaff, AZ, USA

Received 2016 January 15; accepted 2016 January 15; published 2016 March 1

Due to a press error, in the original article, Tables 1, 2, and 3 were published with incorrect values. IOP sincerely regrets the error and has reproduced the tables in full below.

**Table 1**  
Mass and Radius Relations

Y	X	Eqn #	a	b	c	d	e	f	$\sigma^a$ %	$\chi^2_\nu$
$R_*$	$M_{K_S}$	(4)	1.9515	-0.3520	0.01680	...	...	...	2.89	0.93
$R_*$	$M_{K_S}, [\text{Fe}/\text{H}]$	(5)	1.9305	-0.3466	0.01647	...	...	0.04458	2.70	0.88
$R_*$	$T_{\text{eff}}/3500$	(4)	10.5440	-33.7546	35.1909	-11.5928	...	...	13.4	2.35
$R_*$	$T_{\text{eff}}/3500, [\text{Fe}/\text{H}]$	(5)	16.7700	-54.3210	57.6627	-19.6994	...	0.4565	9.3	1.10
$M_*^c$	$M_{K_S}$	(10)	0.5858	0.3872	-0.1217	0.0106	$-2.7262 \times 10^{-4}$	...	1.8	0.37

**Notes.** For the first, third, and fifth equation  $Y = a + bX + c^2\dots$ , for the equations including  $[\text{Fe}/\text{H}]$  the right-hand side is multiplied by  $(1 + f[\text{Fe}/\text{H}])$ .

<sup>a</sup> For the first three relations  $\sigma$  is given as the percent scatter in  $R_*$ , i.e., the standard deviation of  $\frac{R_{*,\text{observed}} - R_{*,\text{predicted}}}{R_{*,\text{observed}}}$ . The last relation is quoted as the percent scatter in  $M_*$ .

<sup>c</sup> Semi-empirical relation derived using empirical  $K_S$ -band magnitudes and masses estimated from our model analysis. Coefficients are calculated using maximum likelihood and a MCMC method. See Section 8 for details.

**Table 2**  
 $T_{\text{eff}}$  Relation Coefficients

Y	X	a	b	c	d	e	f	g	$\sigma^a$ K	$\chi^2_\nu$
$T_{\text{eff}}/3500$	$BP - RP$	3.245	-2.4309	1.043	-0.2127	0.01649	...	...	52	0.88
$T_{\text{eff}}/3500$	$V - J$	2.840	-1.3453	0.3906	-0.0546	0.002913	...	...	55	0.93
$T_{\text{eff}}/3500$	$V - Ic$	2.455	-1.5701	0.6891	-0.1500	0.01254	...	...	53	0.94
$T_{\text{eff}}/3500$	$r - z$	1.547	-0.7053	0.3656	-0.1008	0.01046	...	...	58	1.06
$T_{\text{eff}}/3500$	$r - J$	2.445	-1.2578	0.4340	-0.0720	0.004502	...	...	58	1.04
$T_{\text{eff}}/3500$	$BP - RP, [\text{Fe}/\text{H}]$	2.835	-1.893	0.7860	-0.1594	0.01243	0.04417	...	45	0.60
$T_{\text{eff}}/3500$	$V - J, [\text{Fe}/\text{H}]$	2.515	-1.054	0.2965	-0.04150	0.002245	0.05262	...	42	0.53
$T_{\text{eff}}/3500$	$V - Ic, [\text{Fe}/\text{H}]$	1.901	-0.6564	0.1471	-0.01274	...	0.04697	...	48	0.67
$T_{\text{eff}}/3500$	$r - z, [\text{Fe}/\text{H}]$	1.572	-0.7220	0.3560	-0.09221	0.009071	0.05220	...	50	0.71
$T_{\text{eff}}/3500$	$r - J, [\text{Fe}/\text{H}]$	2.532	-1.319	0.4449	-0.07151	0.004333	0.05629	...	47	0.63
$T_{\text{eff}}/3500$	$BP - RP, J - H$	3.172	-2.475	1.082	-0.2231	0.01738	0.08776	0.04355	49	0.78
$T_{\text{eff}}/3500$	$V - J, J - H$	2.769	-1.421	0.4284	-0.06133	0.003310	0.1333	0.05416	48	0.71
$T_{\text{eff}}/3500$	$V - Ic, J - H$	1.568	-0.4381	0.07749	-0.005610	...	0.2441	-0.09257	52	0.85
$T_{\text{eff}}/3500$	$r - z, J - H$	1.384	-0.6132	0.3110	-0.08574	0.008895	0.1865	-0.02039	55	0.90
$T_{\text{eff}}/3500$	$r - J, J - H$	2.151	-1.092	0.3767	-0.06292	0.003950	0.1697	0.03106	52	0.79

**Note.** The first five formulae follow Equation (4), the middle five follow Equation (6) ( $f$  is the coefficient of the  $[\text{Fe}/\text{H}]$  term), and the last five follow Equation (7) ( $f$  and  $g$  are the coefficients for the  $J - H$  and  $(J - H)^2$  terms, respectively). Equations using  $J - H$  as an additional variable are meant for when the metallicity is not known.

<sup>a</sup> We report the scatter in the predicted — observed (from spectrum)  $T_{\text{eff}}$ . Conservatively, these errors should be added (in quadrature) with our typical spectroscopic uncertainty (60 K).

<sup>8</sup> Harlan J. Smith Fellow.

<sup>9</sup> Visiting Researcher.

<sup>10</sup> Visiting Scientist.

**Table 3**  
Bolometric Correction Formulae

$BC_Y$	X	a	b	c	d	e	$\sigma$	$\chi^2_\nu$
<i>V</i>	<i>V - J</i>	0.5817	-0.4168	-0.08165	$4.084 \times 10^{-3}$	...	0.016	0.88
<i>Rc</i>	<i>V - J</i>	2.127	-1.059	0.1029	$-7.881 \times 10^{-3}$	...	0.031	2.97
<i>Ic</i>	<i>V - J</i>	0.4440	0.2331	-0.05313	...	...	0.037	2.47
<i>r</i>	<i>r - J</i>	0.8958	-0.5081	-0.07387	$3.999 \times 10^{-3}$	...	0.016	0.56
<i>i</i>	<i>r - J</i>	0.4431	-0.06470	-0.04038	$2.798 \times 10^{-5}$	...	0.031	2.86
<i>z</i>	<i>r - J</i>	0.05373	0.2980	-0.05001	...	...	0.035	3.53
<i>Gaia</i>	<i>BP - RP</i>	0.7384	-0.7398	0.01340	...	...	0.045	5.93
<i>J</i>	<i>V - J</i>	0.8694	0.3667	-0.02920	...	...	0.016	0.90
<i>J</i>	<i>r - J</i>	0.8790	0.5068	-0.07791	$4.338 \times 10^{-3}$	...	0.016	0.92
<i>H</i>	<i>V - J</i>	1.834	0.2054	-0.01271	...	...	0.030	1.96
<i>H</i>	<i>r - J</i>	1.939	0.1969	-0.01337	...	...	0.029	1.87
<i>K</i>	<i>V - J</i>	1.421	0.6084	-0.09655	$6.263 \times 10^{-3}$	...	0.036	2.44
<i>K</i>	<i>r - J</i>	1.719	0.5236	-0.09085	$6.735 \times 10^{-3}$	...	0.036	2.36
<i>V</i>	<i>V - J</i> , [Fe/H]	0.6570	-0.4710	-0.06943	$3.206 \times 10^{-3}$	-0.04885	0.012	0.50
<i>Rc</i>	<i>V - J</i> , [Fe/H]	2.183	-1.102	0.1126	$-8.579 \times 10^{-3}$	-0.09587	0.025	1.92
<i>Ic</i>	<i>V - J</i> , [Fe/H]	0.5043	0.1994	-0.04883	...	-0.06312	0.032	1.82
<i>r</i>	<i>r - J</i> , [Fe/H]	0.9341	-0.5432	-0.06423	$3.170 \times 10^{-3}$	-0.05569	0.012	0.28
<i>i</i>	<i>r - J</i> , [Fe/H]	0.5235	-0.1326	-0.02203	$-1.541 \times 10^{-3}$	-0.1396	0.028	2.60
<i>z</i>	<i>r - J</i> , [Fe/H]	0.1009	0.2658	-0.04509	...	-0.07352	0.028	2.44
<i>Gaia</i>	<i>BP - RP</i> , [Fe/H]	0.7567	-0.7541	0.01574	...	-0.1212	0.037	4.39
<i>J</i>	<i>V - J</i> , [Fe/H]	0.8879	0.3563	-0.02791	...	-0.04857	0.012	0.64
<i>J</i>	<i>r - J</i> , [Fe/H]	0.9672	0.4291	-0.05677	$2.528 \times 10^{-3}$	-0.05249	0.012	0.56
<i>H</i>	<i>V - J</i> , [Fe/H]	1.796	0.2260	-0.01525	...	0.09544	0.021	1.02
<i>H</i>	<i>r - J</i> , [Fe/H]	1.915	0.2135	-0.01582	...	0.09088	0.021	1.01
<i>K</i>	<i>V - J</i> , [Fe/H]	1.197	0.7714	-0.1339	$8.998 \times 10^{-3}$	0.09572	0.030	1.68
<i>K</i>	<i>r - J</i> , [Fe/H]	1.572	0.6529	-0.1260	$9.746 \times 10^{-3}$	0.08987	0.030	1.68

**Note.** All relations are of the form  $BC_Y = a + bX + cX^2 + dX^3 + e([\text{Fe}/\text{H}])$ , where  $Y$  is a the filter listed above, and  $X$  is the specified color.