Table 1. The data base of 85 SNe included in this work.

SN	Type	μ (mag)	z	$E(B-V)_{\rm MW}$ (mag)	$E(B-V)_{\rm host}$ (mag)	References
1993J	IIb	27.8	− 0.000113	0.071	0.1	(1)
1994I	Ic	29.6	0.0015	0.03	0.3	(2)
1996cb	IIb	29.95	0.0024	0.12	negligible	(3)
1998bw	GRB-SN	32.76	0.0087	0.052	negligible	(4),(5)
1999dn	Ib	32.93	0.0093	0.052	0.1	(6)
1999ex	Ib	33.44	0.0114	0.02	0.28	(7)
2002ap	Ic-BL	29.5	0.0022	0.071	0.008	(8),(9),(10)
2003bg	IIb	31.68	0.0046	0.02	negligible	(11)
2003dh	GRB-SN	39.21	0.168	0.025	negligible	(12)
2003jd	Ic-BL	34.43	0.019	0.06	0.09	(13)
2004aw	Ic	34.31	0.016	0.021	0.35	(14)
2004fe	Ic	34.28	0.018	0.0210	–	(15)
2004gq	Ib	32.09	0.0065	0.0627	0.095	(15)
2005az	Ic	33.14	0.0085	0.0097	–	(15)
2005bf	Ib	34.62	0.019	0.045	negligible	(16)
2005hg	Ib	34.68	0.021	0.0901	–	(15)
2005hl	Ib	34.92	0.023	0.073	–	(17)
2005hm	Ib	35.85	0.035	0.048	–	(17)
2005kl	Ic	31.64	0.0035	0.0219	–	(15)
2005kr	Ic-BL	38.91	0.134	0.087	–	(17)
2005ks	Ic-BL	38.21	0.099	0.05	–	(17)
2005kz	Ic	35.31	0.027	0.046	–	(15)
2005mf	Ic	35.27	0.027	0.0153	–	(15)
2006T	IIb	32.68	0.0080	0.0647	–	(15)
2006aj	GRB-SN	35.61	0.033	0.097	negligible	(18),(19),(20)
2006el	IIb	34.25	0.017	0.0973	–	(15)
2006ep	Ib	33.93	0.015	0.036	–	(15)
2006fe	Ic	37.41	0.07	0.098	–	(17)
2006fo	Ib	34.58	0.021	0.025	–	(15)
14475[a]	Ic-BL	39.17	0.149	0.072	–	(17)
2006jo	Ib	37.63	0.077	0.032	–	(17)
2006lc	Ib	34.13	0.016	0.057	–	(17)
2006nx	Ic-BL	38.97	0.137	0.108	–	(17)
2007C	Ib	32.15	0.0059	0.0363	0.73	(15)
2007D	Ic-BL	34.84	0.023	0.2881	–	(15)
2007Y	Ib	31.29	0.0046	0.022	0.09	(24)
2007ag	Ib	34.78	0.020	0.025	–	(15)
2007cl	Ic	34.84	0.022	0.02	–	(15)
2007gr	Ic	29.84	0.0017	0.055	0.03	(21)
2007kj	Ib	34.3	0.018	0.0691	–	(15)
2007ms	Ic	36.09	0.039	0.184	–	(17)
2007nc	Ib	37.91	0.087	0.025	–	(17)
2007qv	Ic	38.11	0.095	0.048	–	(17)
2007qx	Ic	37.71	0.08	0.023	–	(17)
2007ru	Ic-BL	34.04	0.016	0.27	negligible	(22)
2007sj	Ic	36.09	0.039	0.032	–	(17)
2007uy	Ib	32.48	0.0065	0.022	0.63	(23)
2008D	Ib	32.48	0.0065	0.02	0.63	(27),(15),(28)
2008ax	IIb	29.82	0.0019	0.022	0.278	(25),(26)
2008bo	IIb	32.06	0.005	0.0513	0.0325	(15)
2008hw	GRB-SN	42.35	0.53	0.42	negligible	(15)
2009bb	Ic	33	0.00988	0.098	0.482	(29)
2009er	Ib	35.9	0.035	0.0389	–	(15)
2009iz	Ib	33.8	0.014	0.0729	–	(15)
2009jf	Ib	32.64	0.0079	0.112	0.05	(30)
2010as	IIb	32.17	0.0073	0.15	0.42	(31)
2010bh	GRB-SN	36.94	0.059	0.12	0.14	(32)
2010ma	GRB-SN	42.40	0.552	0.019	0.04	(32)
2011bm	Ic	34.95	0.022	0.032	0.032	(33)
2011dh	IIb	29.48	0.0020	0.035	0.05	(34)
2011ei	IIb	33.09	0.0093	0.059	0.18	(35)
2011fu	IIb	34.36	0.019	0.068	0.015	(36)
2011hs	IIb	31.91	0.0057	0.011	0.16	(37)
2011kl	GRB-SN	43.09	0.677	0.019	0.038	(38)

Table 1 – *continued.*

SN	Type	μ (mag)	z	$E(B-V)_{\rm MW}$ (mag)	$E(B-V)_{\rm host}$ (mag)	references
2012ap	Ic-BL	33.45	0.012	0.045	0.4	(39)
2012bz	GRB-SN	40.31	0.28	0.037	negligible	(40)
2013cq	GRB-SN	41.19	0.34	0.02	0.05	(41)
2013cu	IIb	35.23	0.026	0.011	negligible	(42)
2013df	IIb	31.65	0.0024	0.017	0.08	(43)
2013dx	GRB-SN	39.04	0.145	0.04	0.10	(44)
2013ge	Ibc	31.87	0.0044	0.02	0.047	(45)
PTF09dh/2009dr[b]	Ic-BL	37.60	0.076	0.022	–	–
PTF10gvb	Ic-BL	38.26	0.098	0.022	–	–
PTF10inj	Ib	37.31	0.066	0.01	–	–
PTF10qif	Ib	37.26	0.064	0.0587	–	–
PTF10vgv	Ic	34.01	0.015	0.145	–	(49)
PTF11bli	Ibc	35.81	0.034	0.013	–	–
PTF11jgj	Ic	36.15	0.04	0.027	–	–
PTF11klg	Ic	35.26	0.027	0.03	–	–
PTF11qiq	Ib	35.66	0.032	0.066	–	–
PTF11rka	Ic	37.61	0.074	0.03	–	–
PTF12gzk	Ic	33.8	0.014	0.14	negligible	(48)
PTF12os	IIb	31.89	0.0045	0.045	–	(50)
iPTF13bvn	Ib	31.89	0.0045	0.0278	0.0437	(46),(47)
iPTF14dby	Ic-BL	37.54	0.074	0.048	–	(51)

Notes. References: (1) Richmond et al. (1994), (2) Richmond et al. (1996), (3) Qiu et al. (1999), (4) Clocchiatti et al. (2011), (5) Patat et al. (2001), (6) Benetti et al. (2011), (7) Stritzinger et al. (2002), (8) Foley et al. (2003), (9) Gal-Yam, Ofek & Shemmer (2002), (10) Tomita et al. (2006), (11) Hamuy et al. (2009), (12) Deng et al. (2005), (13) Valenti et al. (2008), (14) Taubenberger et al. (2006), (15) Bianco et al. (2014), (16) Anupama et al. (2005), (17) Taddia et al. (2015), (18) Pian et al. (2006),(19) Mirabal et al. (2006), (20) Kocevski et al. (2007), (21) Hunter et al. (2009), (22) Sahu et al. (2009), (23) Roy et al. (2013), (24) Stritzinger et al. (2009), (25) Pastorello et al. (2008), (26) Taubenberger et al. (2011), (27) Mazzali et al. (2008), (28) Modjaz et al. (2009), (29) Pignata et al. (2011), (30) Valenti et al. (2011), (31) Folatelli et al. (2014), (32) Bufano et al. (2012), (33) Valenti et al. (2012), (34) Marion et al. (2014), (35) Milisavljevic et al. (2013), (36) Kumar et al. (2013), (37) Bufano et al. (2014), (38) Greiner et al. (2015), (39) Milisavljevic et al. (2015), (40) Melandri et al. (2012), (41) Melandri et al. (2014), (42) Gal-Yam et al. (2014), (43) Morales-Garoffolo et al. (2014), (44) D'Elia et al. (2015), (45) Drout et al. (2015), (46) Fremling et al. (2014), (47) Srivastav, Anupama & Sahu (2014), (48) Ben-Ami et al. (2012), (49) Corsi et al. (2012), (50) Fremling et al. (in preparation), (51) Corsi et al. (in preparation).

[a]SN 14475 was discovered in 2006 as part of the SDSS-II SN survey.

[b]PTF09dh/SN 2009dr was originally classified at a Type Ia SN but later reclassified as a Ic-BL.

between the Ib and Ic subclasses.) SNe with full optical and near-infrared (NIR) coverage allowed the construction of an effective bolometric LC as opposed to a pseudo-bolometric optical variant.

3 CONSTRUCTING THE BOLOMETRIC LC

3.1 Missing data

In order to derive the bolometric luminosity of a SN at a particular date, an SED constructed from the photometry is required. Thus, it was essential that there was photometry in the relevant bands at that time, which was not always the case. In order to attain temporal uniformity, the worst-sampled band was chosen to be a reference point and the remaining bands were fit with a linear spline. The magnitudes were interpolated on the dates of the reference band. Early-time data points are especially important as they help determine the rise time of the SN and constrain t_0, the time of explosion. However, these epochs also tended to be sparsely sampled, often with observations in just a couple of bands.

To obtain estimates of the early-time bolometric data points, two methods were used to extrapolate missing photometry provided that at least two bands were available and one of them was a V-band equivalent (e.g. an effective wavelength around 4000–5000 Å). If the temporal gap between the first date in two adjacent bands was no greater than a few days, then either a constant colour was assumed or the mean colour evolution of similar SN types was adopted. If it was not possible to use this method, but there were sufficient pre-peak data, then extrapolations were done via a low-order polynomial fit to the data. As per the previous method, this technique was limited to time periods of the order of a few days. Care was taken to avoid extrapolating early-time data points based upon the behaviour of the LCs near peak, as this would have underestimated the rate of change. Given the uncertain nature of the shape of the LC outside the observed dates, large errors of $\sim$1 mag on the extrapolations were assumed.

3.2 GRB-SNe and afterglow subtraction

The desire to include as many GRB-SNe as possible in the data base is compromised by the difficulty in deconvolving the SN light from that of the GRB afterglow and host galaxy. For some SNe (e.g. SN 1998bw), the afterglow is negligible, so optical emission is dominated by SN photons; however, this is not usually the case. To calculate the afterglow component of the LC, the spectrum is considered to follow a simple relation given by $F_\nu(t,\,\nu) \propto t^{-\alpha}\nu^{-\beta}$. We defer to the literature for the numerical values of the temporal and spectral indices and subtract the afterglow flux from the SEDs as required. Additionally, it is common in the literature to fit the afterglow-SN-host LC with a template SN based on SN 1998bw (Cano 2013), but this method is not adopted here to avoid biasing any temporal characteristics that may be extracted from the LC.

There are approximately 20 GRB-SNe given in the literature. Most are photometrically associated with the GRB (e.g. they show a late-time bump in the LC), but unfortunately the majority of these