Calibration of the Nearby'99 dataset

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Calibration of the Nearby'99 dataset

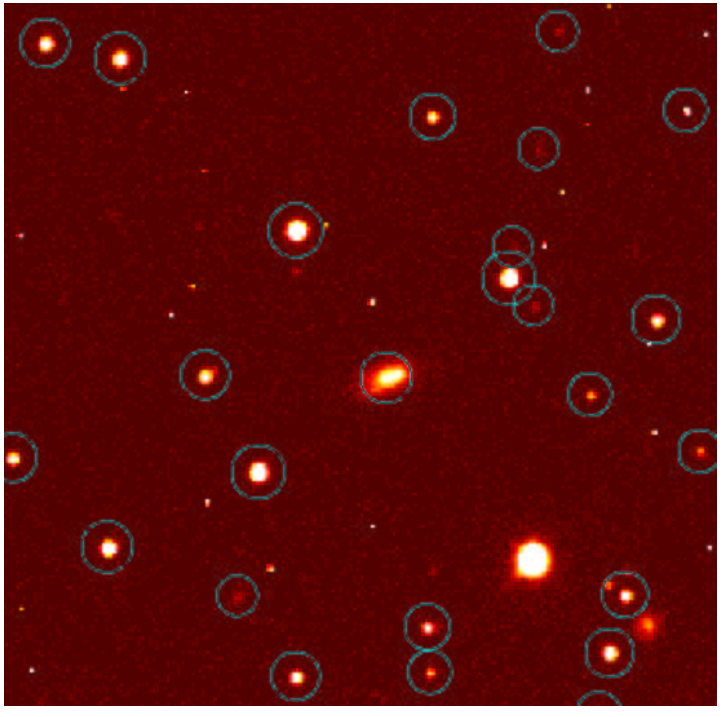
- Currently, absolute calibration is the dominant source of uncertainties
  - a better calibration is necessary
  - using all the standard star observations made during the followup
- Calibration of 6 different telescopes / setups
  - $\sim$ 80 calibrated nights
  - $\sim$ 25% of them $\begin{cases} \text{not photometric} \\ \text{too few standards} \end{cases}$

Principle

- For each SN:

$$\begin{cases} 5 - 50 \text{ field stars} \\ \text{Observed on } 1 - 3 \text{ telesc.} \end{cases}$$

- Goal:
  - Get Absolute magnitudes for field stars
  - Use them as secondary standards to calibrate each image



- Compare and merge observations taken on many different telescopes !

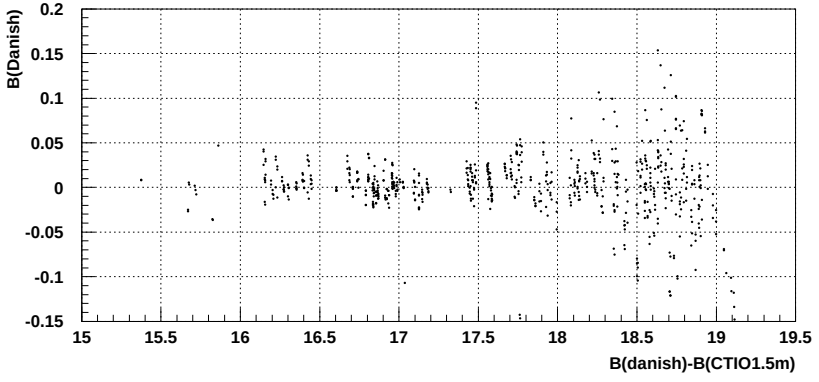
Summary of calibrated nights available

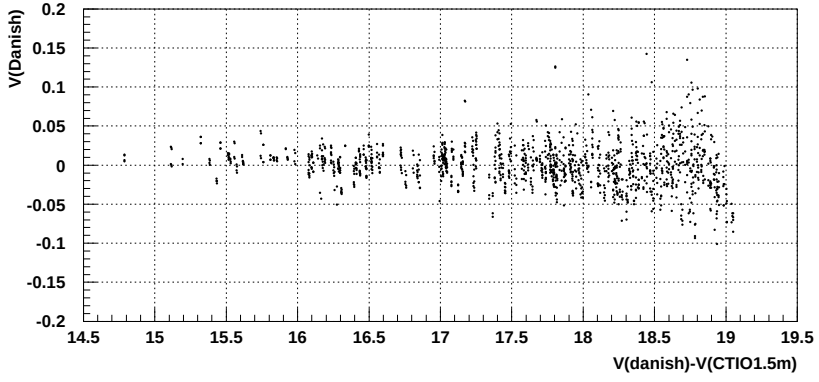
	CTIO (Site2K6)	CTIO (Tek1K2)	CTIO 0.9-m	Danish	JKT
1999aa	U1 B1 V1 R1 I1	B1 V1 R1 I1		U1 B1 V1 R1 I1	
1999ao	U3 B3 V3 R3 I3	B3 V3 R1 I1		U1 B2 V2 R2 I2	
1999ar	U1 B6 V6 R5 I5	B1 V1	B5 V5 R2 I3	U1 B2 V2 R2 I2	
1999as		B1 V1 R1 I1	U1 B1 V1 R1	B1 V1 R1	
1999at		B1 V2 R1 I1		U1 B1 V1 R1 I1	
1999au	U1 B6 V6 R6 I6	B5 V5 R4 I5		U2 B3 V3 R3 I3	
1999av	U3 B6 V6 R6 I6	B1 V1	B4 V4 R3 I4	U1 B3 V2 R2 I2	U1 B1 V1 R1 I1
1999aw	U2 B5 V5 R5 I5	B4 V4 R3 I3		U2 B2 V2 R2 I2	
1999ax	U1 B1 V1 R1 I1			U2 B2 V2 R2 I2	U3 B3 V2 R2 I3
1999be	U1 B1 V1			U1 B1 V1 R1 I1	
1999bf	B3 V4 R3				
1999bh					B1 V1 R1 I1
1999bi	U2 B2 V2 R2 I2	B3 V3		U1 B2 V2 R2 I2	
1999bk	U1 B2 V2 R1 I1			U1 B3 V2 R2 I2	
1999bm	U1 B2 V2 R1	B2 V2 R1		U1 B2 V2 R2 I2	
1999bn				U2 B4 V4 R3 I2	
1999bp	U2 B2 V2 R2 I1	B1 V1 R1 I1		U2 B2 V2 R2 I2	U1 B1 V1 R1 I1
1999bq	B2 V2 R2 I1	B1 V1	U1 B1 V1 R1 I1	U1 B1 V1 R1 I1	
1999by					

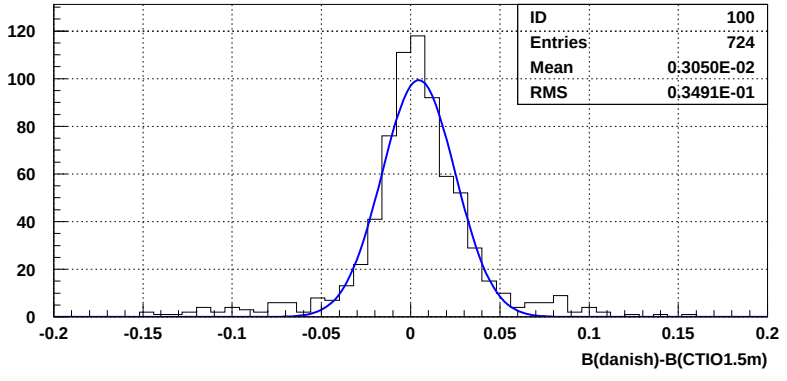
- Using these secondary standards, we can determine a global calibration for the other telescopes.
- 1999bh calibrated only with one JKT night (+Lick)
- 1999by calibrated only with the Lick (global calibration)

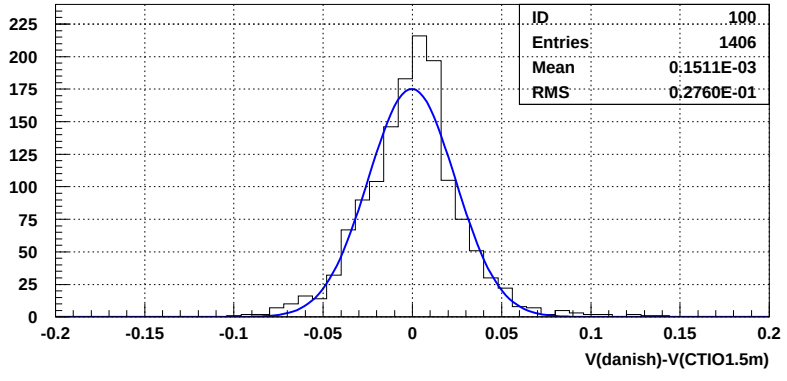
Cross-telescope comparisons

1999ao



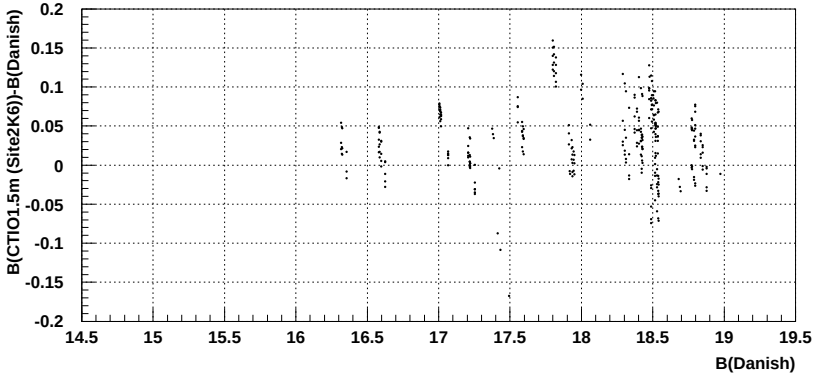


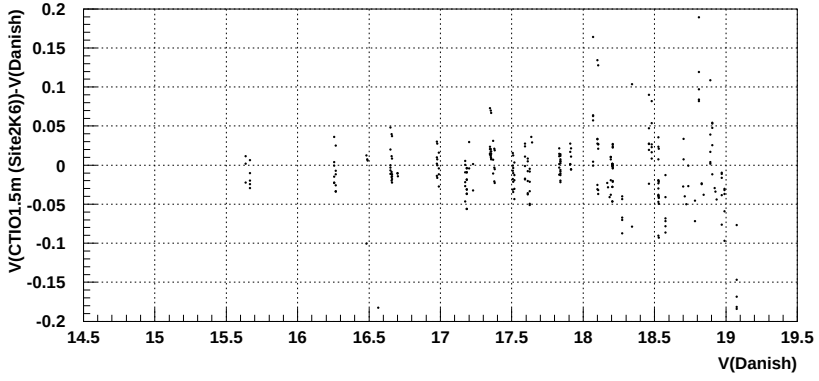


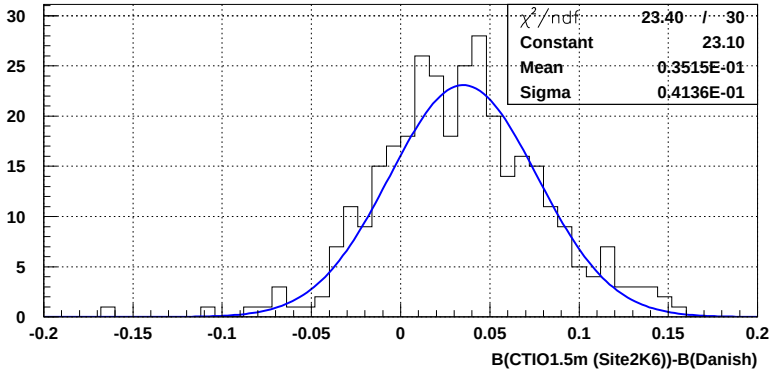


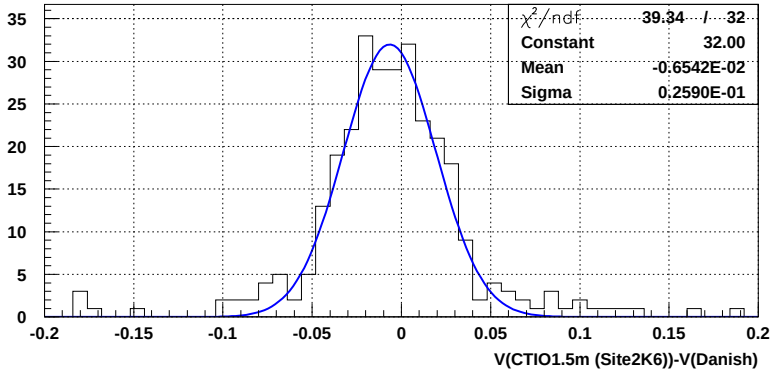
Cross-telescope comparisons

1999aw



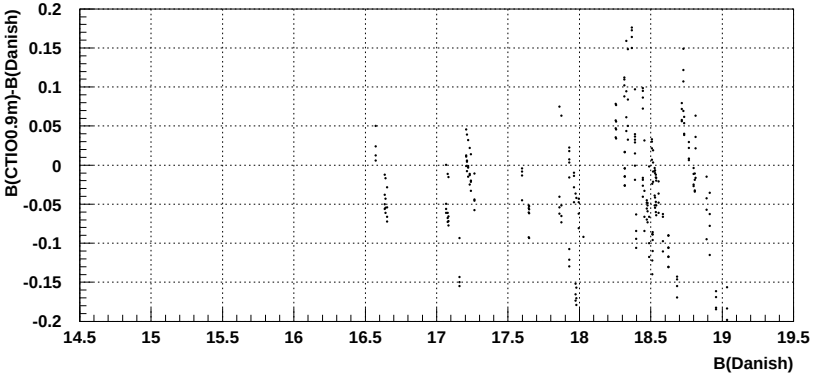


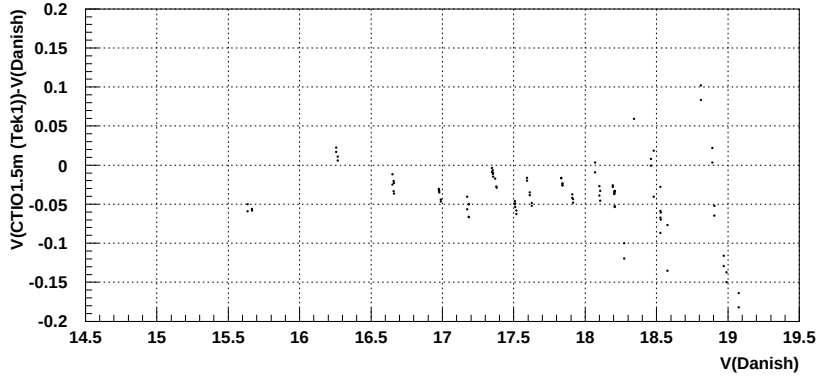


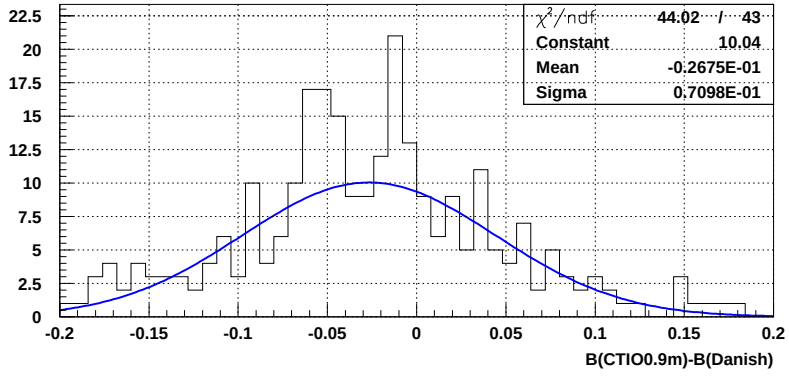


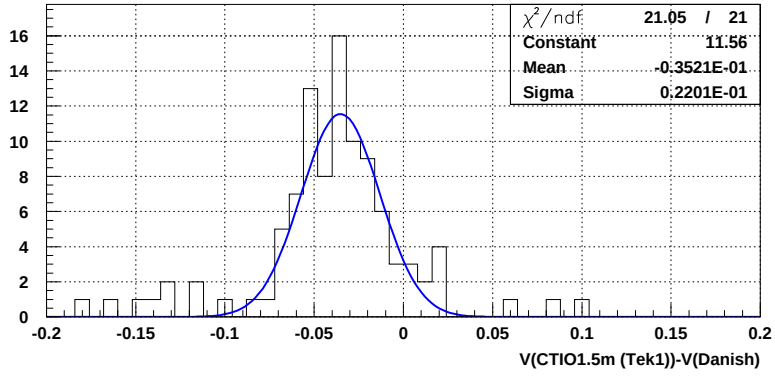
Cross-telescope comparisons

1999aw







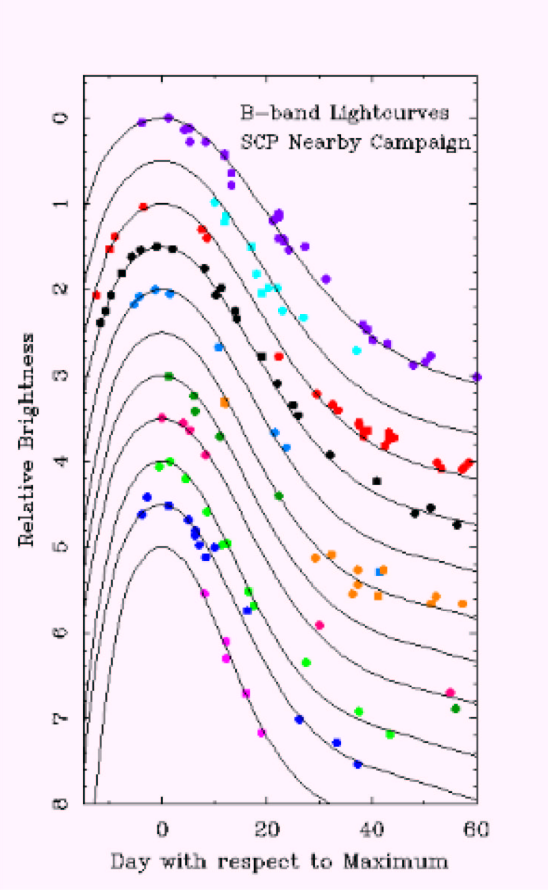


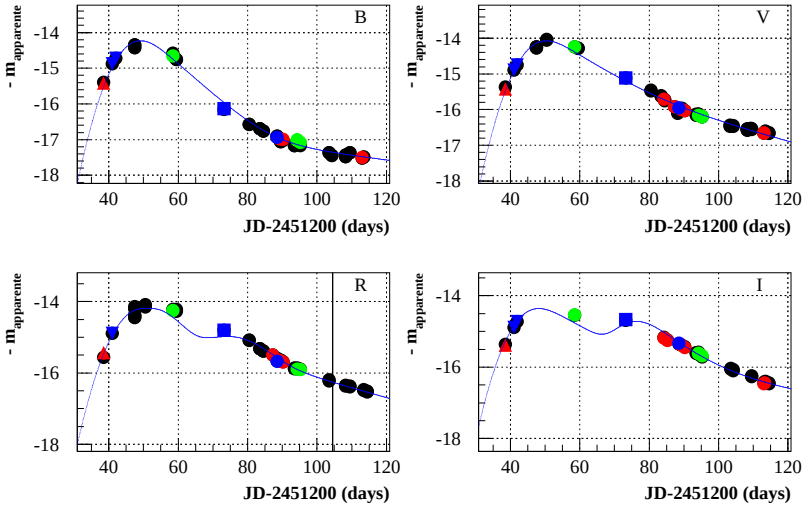
Conclusions

- Absolute calibration errors are the dominant source of uncertainties affecting the Nearby'99 lightcurves
  $\Rightarrow$ Ongoing work to reduce them
- BUT
  - low statistics / few standards
    $\Rightarrow$ airmass term not always well constrained
  - disagreements between several telescopes, in one or several bands
  - large dispersion / systematics biases (>10%) in U

Lightcurves

- Preliminary Lightcurves from (Regnault, 2000)

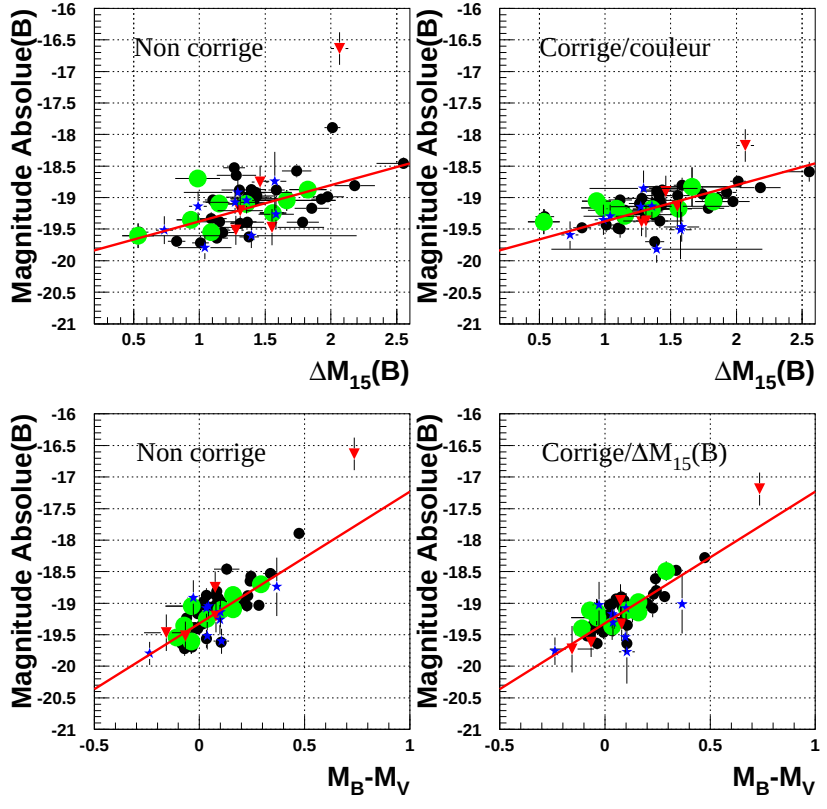




WIYN 3.5m · MARLY 1.0m · CTIO 0.9m
CTIO 1.5m · YALO 1.0m
KPNO 2.1m · CFHT 3m60
JKT 1.0m · ESO 3m60
Lick 1.0m · Danish 1.54m

BVRI lightcurve for 1999ac

Standardization



$$\tilde{M}_{max}(B) = -19.32\ (0.11) - 0.57\ (0.08) \times (\Delta m_{15} - 1.1) - 2.09\ (0.18) \times (B-V)_{max}$$

Hubble diagram

- Hubble diagram from (Regnault, 2000)