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EFOSC2/NTT INTEGRATED SPECTROSCOPY OF TEN MAGELLANIC CLOUDS' STELLAR CLUSTERS

A. V. Ahumada,[1,2,3] A. Benítez Llambay,[1] J. F. C. Santos, Jr.,[4] J. J. Clariá,[1,2] E. Bica,[5] and A. E. Piatti[2,6]

We present integrated spectra in the optical range for 10 concentrated Magellanic Clouds' (MCs) stellar clusters (SCs), six of them belonging to the Large Magellanic Cloud (LMC), and the other four to the Small Magellanic Cloud (SMC). We estimate simultaneously age and foreground reddening by comparing the continuum distribution and line strengths of the cluster spectra with those of template spectra. The present cluster sample complements previous ones, in an effort to create a spectral library for the MCs with several clusters per age bin.

The study of extragalactic stellar systems provides relevant information on the star formation and chemical histories of the host galaxies. The SCs of the MCs, on account of their proximity, richness, and variety, may furnish us with the ideal ground to conduct a detailed examination of the processes mentioned before. One of the goals of the present study is to collect and analyze a sample of MCs' SCs spectra with the aim to study the integrated light properties of such metal deficient SCs, deriving their fundamental parameters (age and reddening); and making them available as template spectra complementing previous sub-solar metallicity libraries.

The observations were carried out with the NTT (New Technology Telescope) at La Silla Observatory (ESO, Chile). We employed EFOSC2 spectrograph (ESO Faint Object Spectrograph and Camera) in the simple mode. The observations were performed scanning the slit (2.0″) across the objects. A grism of 300 grooves/mm (Gr#11) was used. The spectral coverage was the visible range: ∼(3800–7500) Å.

The main denomination of the 10 observed MCs' SCs, as well reddening and age derived are shown in Table 1. In general, the parameters we present here are in good agreement with the ones derived previously by other authors. However, the parameters of the SMC's SCs NGC 330 and NGC 306, show a difference with the existent data, so they'll be analyzed again. Figure 1 shows, as an example, the template match method to derive NGC 1839 parameters.

TABLE 1

THE MCS' CLUSTER SAMPLE

Cluster		$E(B-V)$	Template	Age range
L 114	SMC	0.14	(Yf+Ye)/2	(50-150) Myr
NGC 121	SMC	0.02	G5	12 Gyr
NGC 306	SMC	0.25	Yb3	(5–10) Myr
NGC 330	SMC	0.25	Yd	40 Myr
NGC 1754	LMC	0.01	G5	12 Gyr
NGC 1836	LMC	0.07	Yg	(200–350) Myr
NGC 1839	LMC	0.04	(Yg+Yf)/2	(100–350) Myr
NGC 2136	LMC	0.07	(Yf+Ye)/2	(45–150) Myr
NGC 2137	LMC	0.07	(Yf+Ye)/2	(45–150) Myr
SL 237	LMC	0.02	(Yd+Ye)/2	(40–75) Myr

Note: Y* templates are from Piatti et al. (2002), while G5 template is from Bica (1988). The "Age range" corresponds to the template ages.

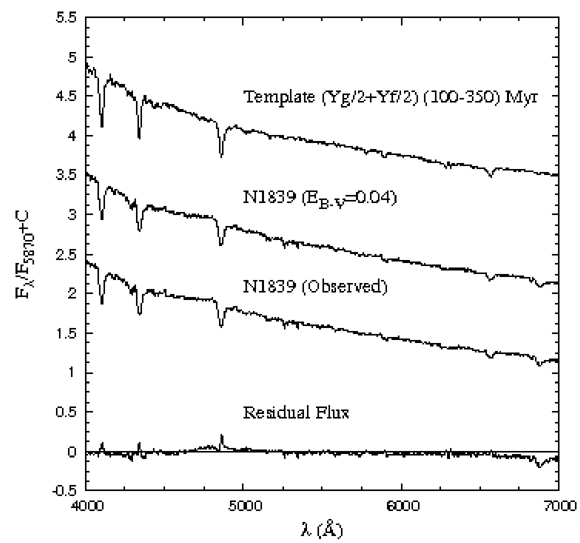

Fig. 1. From top to bottom: the chosen template spectrum, the spectrum of NGC 1839 corrected for $E(B-V)=0.04$, the observed spectrum of NGC 1839, and the flux residuals according to $(F_{\rm cluster}-F_{\rm template})/F_{\rm cluster}$.

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[1]Observatorio Astronómico de la Universidad Nacional de Córdoba, Laprida 854, CP 5000, Córdoba, Argentina.

[2]CONICET, Argentina.

[3]ESO, Chile (aahumada@eso.org).

[4]UFMG/ICEx, Brazil.

[5]IF, UFRGS, Brazil.

[6]IAFE, Argentina.