RevMexAA (Serie de Conferencias), **44**, 115–115 (2014)

XIV Latin American Regional IAU Meeting (Florianópolis/SC, Brazil, 25-30 November 2013)
Editors: A. Mateus, J. Gregorio-Hetem & R. Cid Fernandes

GLOBULAR CLUSTERS AS TRACERS OF THE HIERARCHICAL FORMATION OF THE MILKY WAY

J. A. Carballo-Bello[1,2,3], D. Martínez-Delgado[4], A. Sollima[5], and R. R. Muñoz[1]

Globular clusters have played an important role in the study of the processes that led to the formation of our Galaxy. Moreover, the dual Galactic globular cluster system is considered a manifestation of its hierarchical formation in the context of the Λ-CDM scenario. Wide-field imaging - as the one obtained in our work - and follow-up spectroscopy are crucial tools to unveil the remnants of their progenitor dwarf galaxies, in some cases unknown stellar systems already assimilated by the Milky Way.

Globular cluster (GC) systems contain valuable information about the formation process of the host galaxy. The existence of two subcomponents in the Galactic GC population was interpreted as evidence which supports the hierarchical galaxy formation in the Λ-CDM scenario (Searle & Zinn 1978; Tonini 2013). The outer halo clusters ($R_{\rm G} \geq 15$ kpc) were probably formed in small fragments subsequently accreted by the Galaxy, whereas the inner clusters were formed *in situ*. In this context, we expect part of the Galactic GC system to be associated with some of the tidal streams that populate the outer halo, similar to what has been observed in the M 31 outer GC system, which coincides with the stellar substructures around that galaxy (Mackey et al. 2010). If these GCs were formed in already accreted systems, these clusters might be still surrounded by the tidal remnants generated by the disruption of their progenitor galaxies.

We have obtained deep wide-field photometry for 23 GCs lying in the distance range $10 \leq R_{\rm G} \leq 40$ kpc, which might include the suggested transition region between accreted and *in-situ* formed Galactic stellar halo (Carollo et al. 2007). The observations were made with the WFC at the Isaac Newton Telescope (La Palma, Spain) and the WFI at the ESO2.2 m telescope (La Silla, Chile). For each cluster we obtained a color-magnitude diagram (CMD) for the cluster content and a second diagram corresponding to those stars beyond $1.5\,r_{\rm t}$. In the latter case, we have detected the presence around a half of the sample of underlying tidal remnants possibly associated with their progenitor galaxies. Globulars such as Whiting 1 and NGC 7492 seem to be inmersed in the tidal stream generated by the disruption of the Sagittarius dwarf spheroidal and a new underlying system has been unveiled in the background of NGC 1851, with the help of follow-up spectroscopy (Sollima et al. 2012). Further observations of the area around these clusters and an analysis of the kinematics of the subjacent populations will shed light on the nature of these systems.

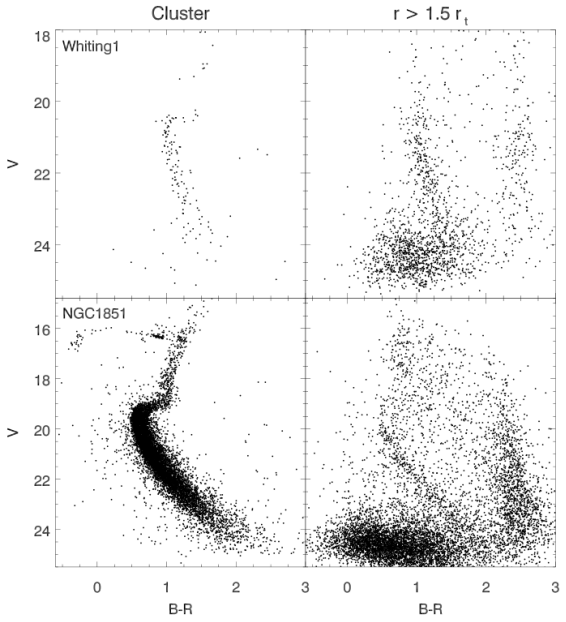

Fig. 1. Examples of CMDs obtained for Whiting 1 and NGC 1851 (left) and the area surrounding them (right).

[1]Departamento de Astronomía, Universidad de Chile, Camino El Observatorio 1515, Las Condes, Santiago, Chile.
[2]Instituto de Astrofísica de Canarias (IAC), Vía Láctea s/n, La Laguna E-38205, S/C de Tenerife, Spain.
[3]Departamento de Astrofísica, Universidad de La Laguna, La Laguna E-38205, S/C de Tenerife, Spain.
[4]Max Planck Institut für Astronomie, D69117 Heidelberg, Germany.
[5]INAF - Observatorio Astronomico di Padova, I35122 Padova, Italy.

REFERENCES

Searle, L. & Zinn, R. 1978, ApJ, 225, 357
Tonini, C. 2013, ApJ, 762, 39
Mackey, A. D. et al. 2010, ApJL, 717, L11
Carollo, D. et al., 2007, Nat, 450, 1020
Sollima, A. et al. 2012, MNRAS, 426, 1137