RECENT STAR FORMATION HISTORY IN THE REGION OF 30 DORADUS

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ABSTRACT. The main purpose of our work is to study the range of ages of the stars in an area about 40' in diameter around R 136. Apart from individual stellar spectra, other age criteria may be found in photometric studies, the morphology and the density of the associated gas. In such complex regions as the 30 Dor region, estimating the depth along the line of sight is a problem.

1. Study of stellar associations

A first description of LH 89, 90, 99, 104 is given elsewhere (Schild *et al.* 1990). The stars of an association are not necessarily strictly coeval; indeed, the question of where the boundaries of a stellar association exist has been found to be critical, e.g. in the case of LH 99 where a mixture of O3-4 and evolved stars has been found.

2. Relation with nebulosity

A recent study of a 6'arc diameter area in 30 Dor (Lortet and Testor, 1990) confirmed that the youngest stars tend to be associated with dense, compact HII regions (e.g. the O3-4 star Walborn 1 in an ionization-bounded HII region), while older clusters, e.g. the cluster Hodge 301 near R 132, are surrounded by large shells. Among the four associations quoted in Sect. 1, the oldest (no star hotter than O9) is LH 89, devoid of nebulosity.

3. Kinematics and the environment of SN 1987A

The accurate measurements of radial velocity of red supergiants by CORAVEL allowed Prévot *et al.* (1989) to discriminate several groups of stars in the LMC. SN 1987A is sitting at the encounter of three of these kinematical complexes, namely 30 Dor 2 around it and to the south, 30 Dor 1 to the north and the superassociation Shapley II. The complex 30 Dor 1, which contains LH 89, is characterised by stellar radial velocities decidedly larger (~ 295 km s^{-1}). The complex 30 Dor 2 differs from Shapley II mainly in the relative velocity of stars and HI (Lortet and Martin, 1990); its

R. Haynes and D. Milne (eds.), The Magellanic Clouds, 155–156.

northern and western boundaries are poorly known. Three new members have been recently discovered by Lindgren (1988). Table 1 lists these stars, as well as BV photometry (Schild *et al.* 1990).

Table 1. Recent data on stars near SN 1987A

Star	Sp	Type	V	B-V	Ref	V_{hel}	eps	Ref
RM1-646	M	I				266.0±1.65		1
RM1-654	M	I				269.1±1.31		1
RM1-658			13.87	+1.32	2			
RM1-660	M	I	13.32	+1.59	2	267.1±0.9		1

Notes. 1. Lindgren, 1988. 2. Schild *et al.* 1990. RM1 Rebeirot *et al.* 1983

Notice that RM1-658 has been swept by the light echo of the SN 1987A, while RM1-660 (very near to Sk-69 203) will also be in less than two years. Data on these stars, jointly with recent studies of neighbouring hot stars (Molaro *et al.* 1989, Fitzpatrick and Walborn 1990) and ionized gas (Meaburn 1990) may help to locate SN 1987A along the line of sight.

4. An aged population everywhere?

Finally, we discovered clumps of He-burning giants (Seidel *et al.* 1987) at V = 18.5 to 20.5, and B-V = 0.6 to 0.9 in all our CCD frames of sufficient exposure times. Their spatial distribution is relatively uniform, namely independent of dust patches, which suggests they are partly foreground to the whole dust-rich 30 Dor complex.

5. References

Fitzpatrick, E.LO., Walborn, N.R. (1990), *Astron. J.* **99**, 1483.
Lindgren, H. (1988), CORAVEL measurements, processed by M. Mayor (unpubl.).
Lortet, M.-C., Martin, N. (1990), in preparation.
Lortet, M.-C., Testor, G. (1990), *Astron. Astrophys. Suppl.* accepted.
Meaburn, J. (1990), *M.N.R.A.S.* **244**, 551.
Molaro, P., Vladilo, G., Avila, G., D'Odorico, S. (1989), *Ap. J. Lett.* **339**, L63.
Prévot, L., Rousseau, J., Martin, N.,(1989), *Astron. Astrophys.* **225**, 303.
Rebeirot, E., Martin, N., Mianes, P., Prévot, L., Robin, A., Rousseau, J., Peyrin, Y. (1983), *Astron. Astrophys. Suppl.* **51**, 277.
Schild, H., Lortet, M.-C., Testor, G. (1990), *IAU Symp. 143*, in press.
Seidel, E., Demarque, P., Weinberg, D. (1987), *Ap. J. Suppl.* **63**, 917.