

Triggered star formation in the isolated cluster CB 34?

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Abstract. Bok globules, optically opaque small dark clouds, are classical examples of isolated star formation. However, the collapse mechanism for these cold, dense clouds of gas and dust is not well understood. Observations of Bok globules include some which appear to be starless while others harbor single stars, binaries and even small groups of forming stars. One example of a Bok globule forming a group of stars is CB 34, observed with both the IRAC and MIPS instruments as part of the Spitzer Young Cluster Survey. Based on initial analysis of 1-8 μm photometry from IRAC and the Two Micron All Sky Survey (2MASS), we identified 9 Class 0/I and 14 Class II young stellar objects within the small, $4.5' \times 4.5'$ region encompassing CB 34. This unusually high number of protostars compared with Class II sources is intriguing because it implies a high rate of star formation. Therefore we have begun a larger study of this region in order to determine why and how CB 34 started forming stars at such a high rate. Is CB 34 embedded within a larger HII region which may have triggered its collapse or does it appear to have collapsed in isolation from outside influences?

Keywords. stars: formation, stars: pre-main-sequence, ISM: clouds, ISM: globules, ISM: individual (CB 34), stars: formation

The immediate vicinity around CB 34 is fairly empty, with only dark cloud CB 35 nearby. To search for possible triggers, a 3° radius around CB 34 was examined. Within this region is NGC 2129, a young, 10 Myr open cluster at a distance of 2.2 kpc and with a $V_r=17.5 \text{ km s}^{-1}$ (Carraro, Chaboyer & Perencevich 2006). Kawamura *et al.* (1998) find $V_{LSR}=0.6 \text{ km s}^{-1}$ for CB 34, which rules out winds from O and B stars in NGC 2129 as triggers. Star forming region GGD 4 is nearby, at a distance of 1 kpc and with $V_r=2.1 \text{ km s}^{-1}$ (Kawamura *et al.* 1998). It is possible it is associated with CB 34, however there are not any stars in GGD 4 massive enough to trigger star formation in CB 34. Finally, the western edge of the Gemini OB 1 association is nearby. At 1.5 kpc and with $V_r=3.8 \text{ km s}^{-1}$ (Carpenter, Snell & Schloerb 1995), if there is a trigger, this one is most likely.

References

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