

An interesting candidate for isolated massive star formation in the Small Magellanic Cloud

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The SMC region with which this paper is concerned has the particularity of containing the highest concentration of IRAS/Spitzer sources, H I emission, and molecular clouds in this neighboring galaxy. However very few studies have been devoted to it, despite these signs of star formation. We present the first detailed study of the compact H II region N33 in the SMC by placing it in a wider context of massive star formation. Moreover, we show that N33 is a particularly interesting candidate for isolated massive star formation. This analysis is based mainly on optical ESO NTT observations, both imaging and spectroscopy, coupled with other archive data, notably Spitzer images (IRAC 3.6, 4.5, 5.8, and 8.0 mic) and 2MASS observations. We derive a number of physical characteristics of the compact H II region N33 for the first time. This gas and dust formation of $7''.4$ (2.2 pc) in diameter is powered by a massive star of spectral type O6.5-O7 V. The compact H II region belongs to a rare class of H II regions in the Magellanic Clouds, called high-excitation blobs (HEBs). We show that this H II region is not related to any star cluster. Specifically, we do not find any traces of clustering around N33 at scales larger than $10''$ (~ 3 pc). On smaller scales there is a marginal stellar concentration, the low density of which, below the 3 sigma level, does not classify it as a real cluster. We also verify that N33 is not a member of any large stellar association. Under these circumstances, N33 is therefore attractive also because it represents a remarkable case of isolated massive star formation in the SMC. Various aspects of the relevance of N33 to the topic of massive star formation in isolation are discussed.

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Comments:

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