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The high latitude low mass star forming region Cometary Globule 12: two compact cores and a C18O hot spot

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Abstract. Cometary globule CG 12 lies at the distance of 630 pc more than 200 pc above the Galactic plane. The cloud's structure could be due to the passage of a supernova blast wave. Curiously, the cometary tail points at the galactic plane which would put the putative supernova even farther above the Galactic plane than the globule. The globule contains a low/intermediate mass stellar cluster with at least 9 members (Williams *et al.* 1977). The head of CG 12 has been observed using NIR imaging (NTT SOFI), mm continuum (SEST SIMBA) and sub mm (APEX) and mm (SEST) spectroscopy (Haikala & Olberg 2006, Haikala *et al.* 2006). The molecular material is distributed in a North-South 10' long elongated lane with two compact maxima separated by 3'. Strong $C^{18}O$ (3-2), (2-1) and (1-0) emission is detected in both maxima and both have an associated compact 1.2 mm continuum source. The Northern core, CG 12 N, is cold and is possibly still pre-stellar. A dense and compact core is observed in DCO^+ and CS emission in the direction of the Southern core, CG 12 S. A remarkable $C^{18}O$ hot spot was detected in CG 12 S. This is the first detection of such a compact, warm object in a low mass star forming region. The hot spot can be modelled with a 60" to 80" diameter (∼0.2 pc) hot (80 K $\lesssim T_{ex} \lesssim$ 100 K) 1.6 solar mass clump (Haikala *et al.* 2006). The hot spot lies at the edge of a dense cloud core and on the axis of a highly collimated bipolar molecular outflow (White 1993). The driving source of the outflow is most probably embedded in the dense core. NIR imaging reveals a bright cone like feature with a faint counter cone in the centre of CG 12 S. The size of the CG 12 compact head, 1.1 pc by 1.8 pc, and the $C^{18}O$ mass larger than 100 solar masses are comparable to those of other nearby low/intermediate mass star formation regions.

References

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