Cloud Structure and Feedback effects in the Carina Nebula Complex

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Abstract

The Carina Nebula complex (CNC) is one of the richest and largest high-mass star-forming regions in our Galaxy. At a distance of 2.3 kpc, it contains at least 65 O-type stars and 4 Wolf-Rayet stars. The CNC extends over at least ~80 pc -> 2º on the sky.

We obtained and computed:

- *Herschel photometric observations with PACS & SPIRE in parallel mode.*
- ***Temperature** and **column density** maps from the SED black-body fitting pixel by pixel.*
- *Far-Ultraviolet Radiation Field in the CNC, G_0, computed as:*
  $G_0 = 4\pi\, I_{FIR}/(1.6 \times 10^{-3}$ erg cm^{-2} s^{-1}),
  where I_{FIR} is the total 60–200 μm FIR intensity

Column Density Map

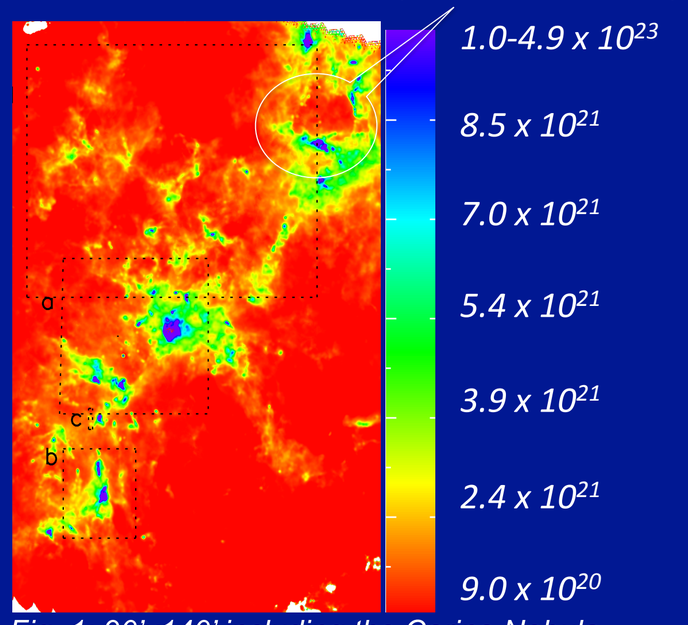


Fig. 1: 90'x140' including the Carina Nebula, The Southern Pillars and Gum 31.

Central region around η Car

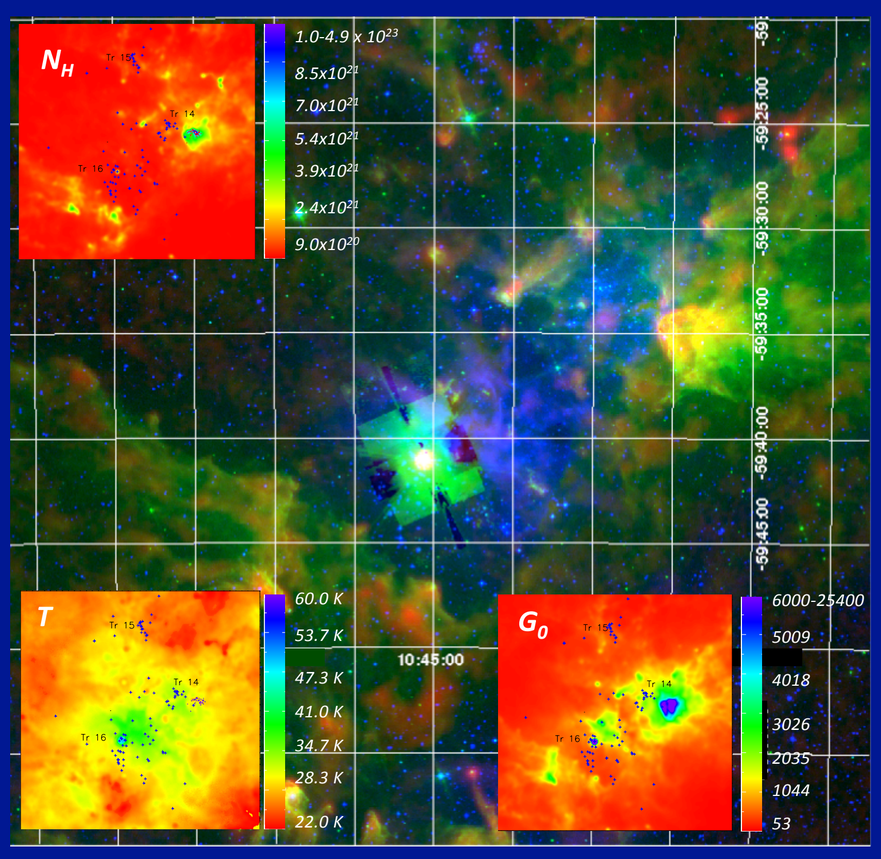


Fig. 2: Composite optical DSS + Spitzer 8.0 μm + LABOCA of the central part (23pc x 26pc) around η Car, including Tr14, Tr15 & Tr16. FUV flux G_0, column density and temperature of the same region are shown in the overlaid panels.

Temperature Map

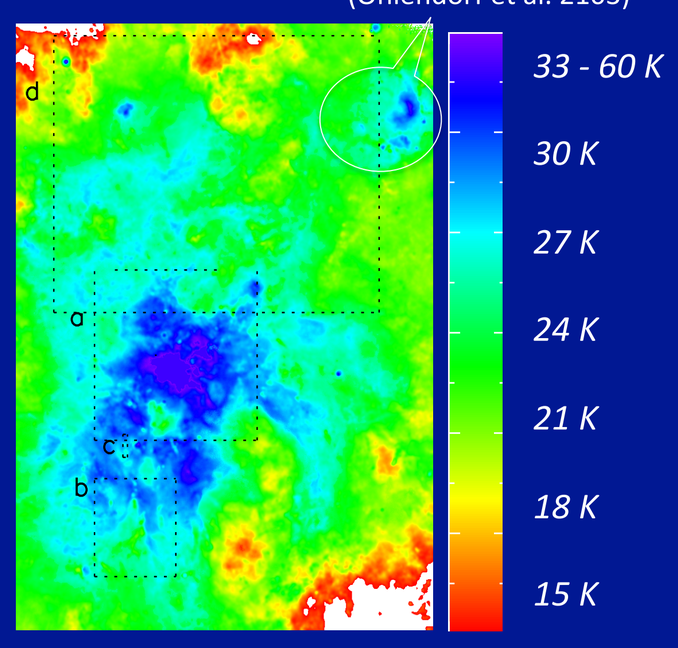


Fig. 3: 90'x140' including the Carina Nebula, the Southern Pillars and Gum 31.

Pillars in the Southern Region:

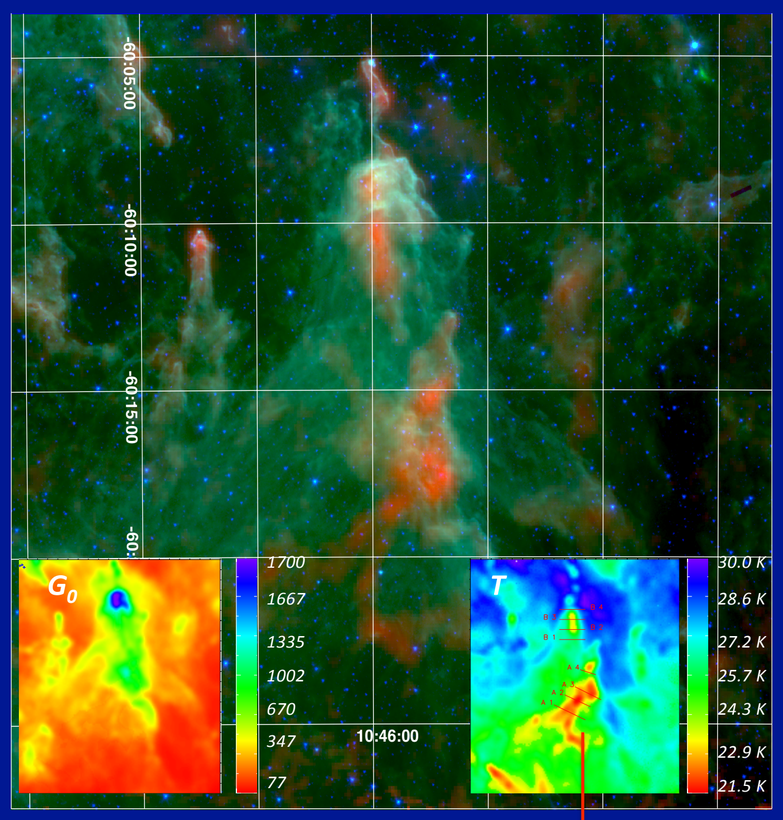
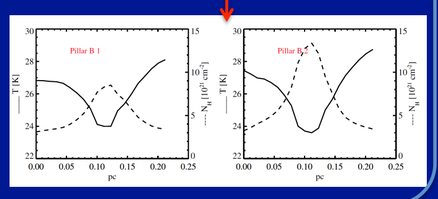


Fig.4: Composite LABOCA+Spitzer 3.6+8.0 μm image of the Southern Pillars. FUV flux G_0 and temperature of the same region are shown in the lower panels.

Temperature & Column Density profiles of sections B1 & B2 along Pillar B



Treasure Chest Cluster:

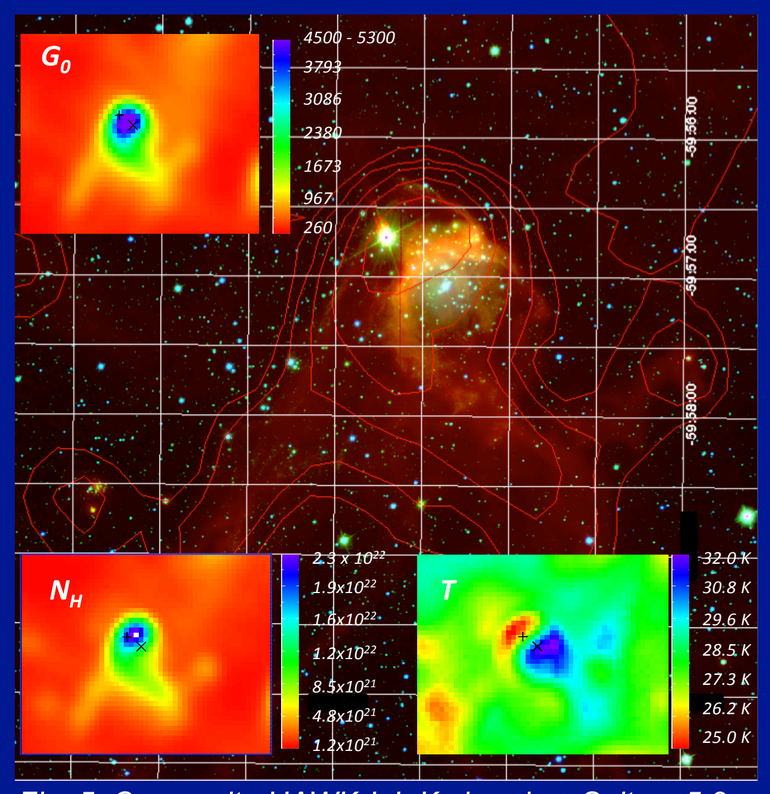


Fig. 5: Composite HAWK-I J+Ks bands + Spitzer 5.8 μm + LABOCA (contours) of the 1 Myr-old Treasure Chest Cluster. FUV flux G_0, column density and temperature of the same region are shown in the overlaid panels.

The Carina Nebula Complex: A link between Local and Extragalactic star-formation

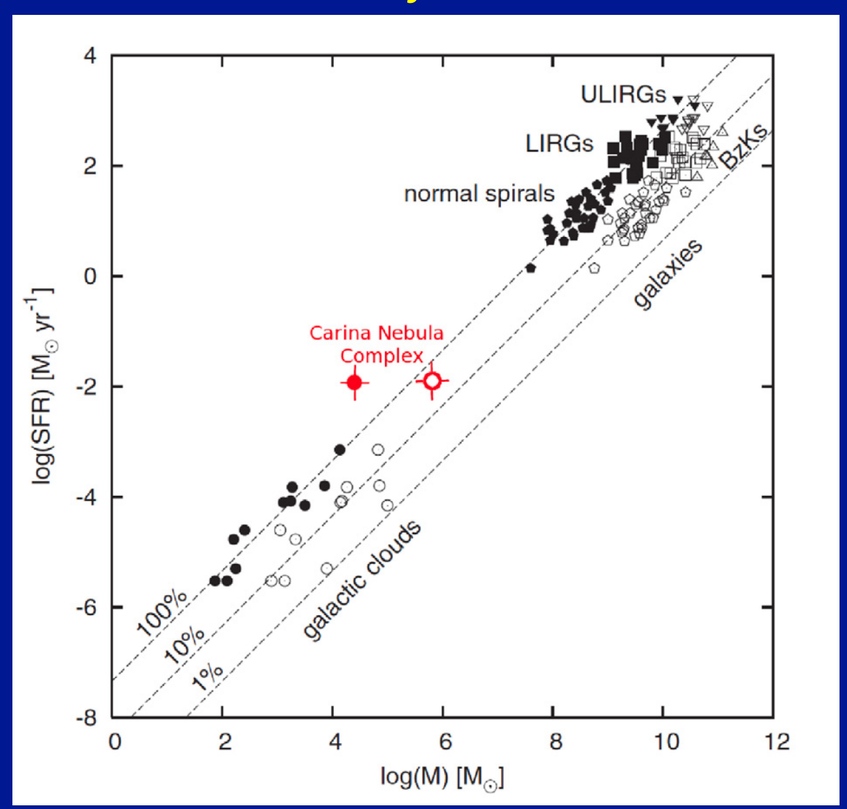


***Fig. 6** Plot adapted from Fig.2 in Lada et al. (2012). Red points: star formation rate and total mass of Carina. The empty points represent the cloud masses computed over an extinction threshold of $A_K > 0.1$ an the filled points over $A_K > 0.8$.*

Young stellar population in Carina ➡ see poster 1B052 of Benjamin Gaczkowski.

Conclusion:
The global temperature structure of the clouds in the CNC is dominated by the radiative feedback.

References:

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