Star clusters in the giant star forming complex G173

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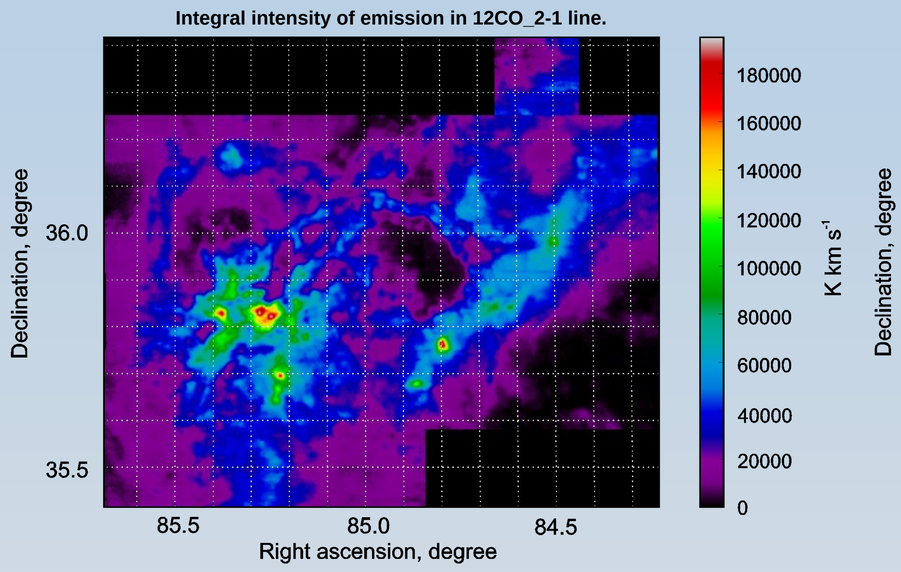
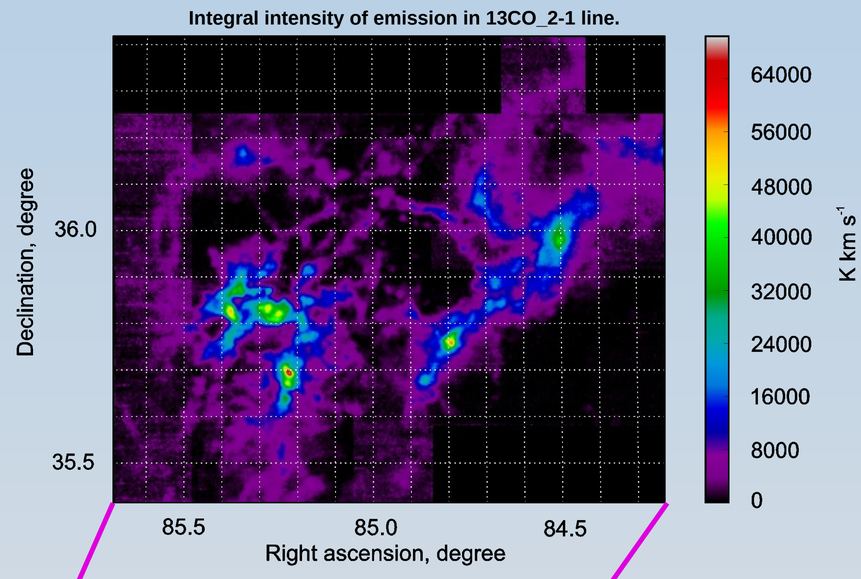
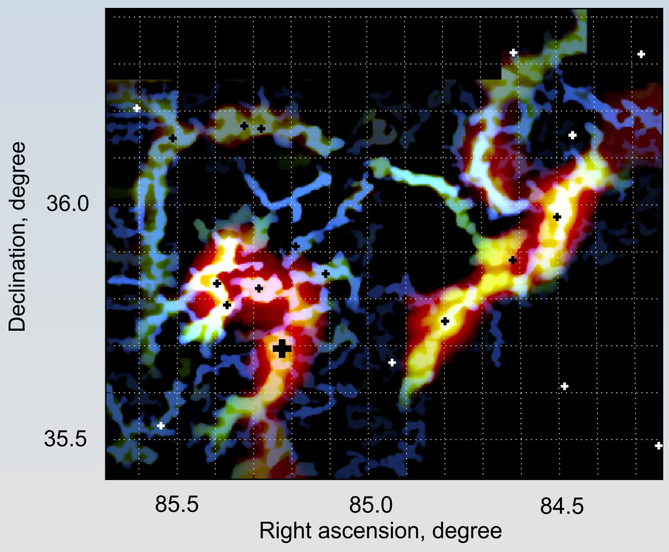
It is well known that initial stages of star formation process take place in molecular cores [1]. Observations show that protostellar cores are often arranged in the chains or molecular filaments [2]. However, relation between stellar density distribution and gas-dust filaments is not well studied yet.

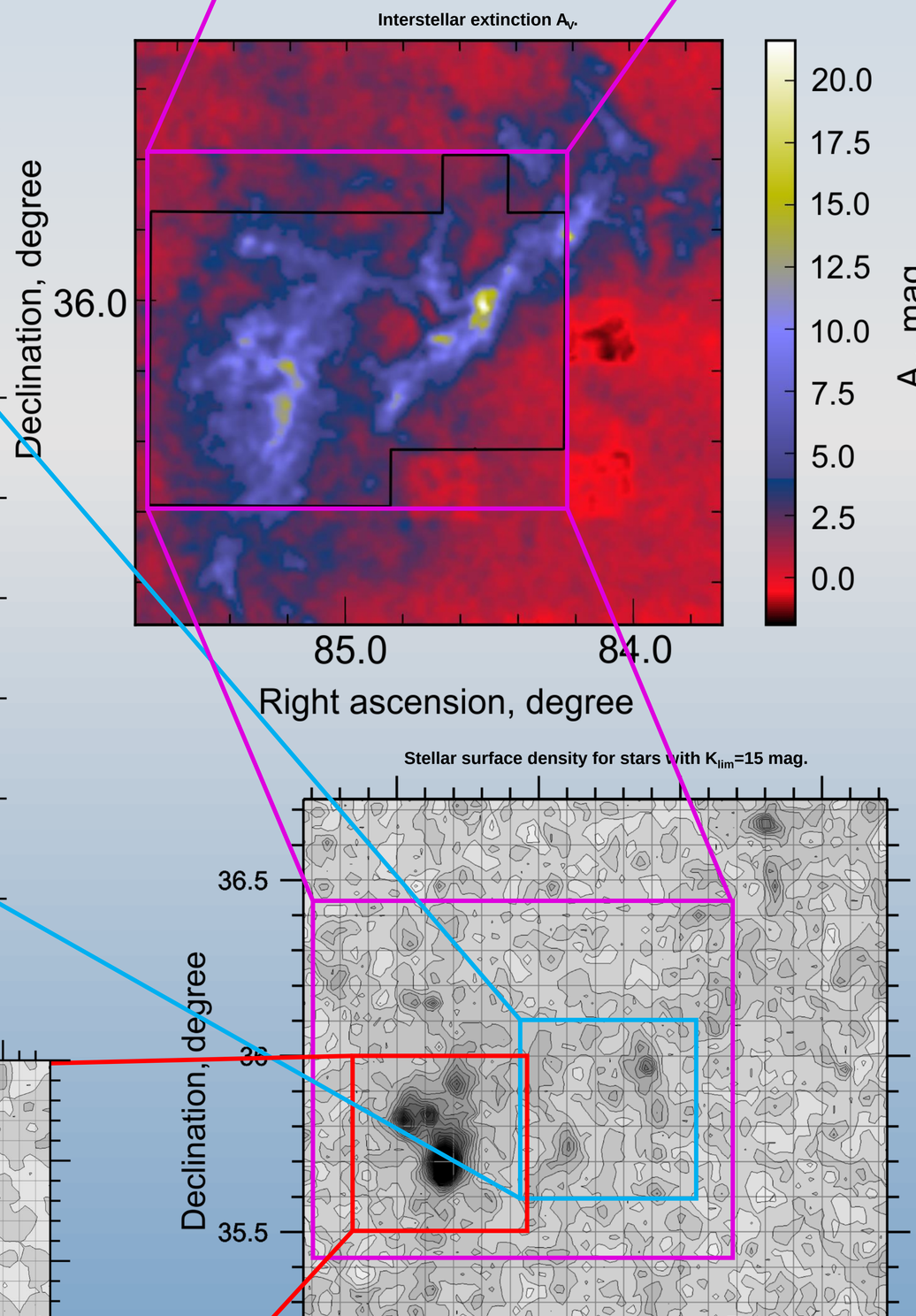




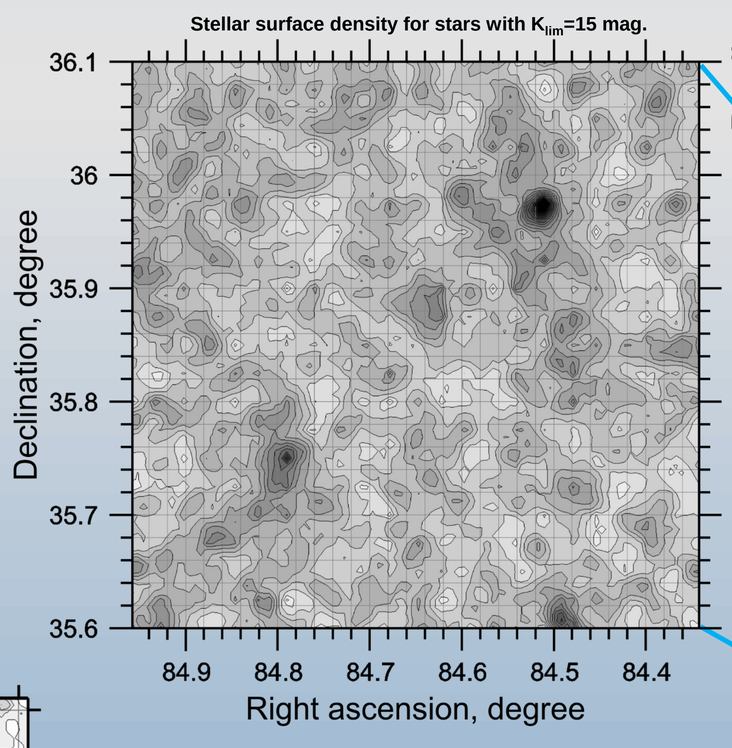
Filaments of different widths selected with the map of 13CO_2-1. Blue color marks filaments of 0.8 pc width, green – 3 pc width, red – 12 pc width. Crosses mark star clusters from the stellar density maps.

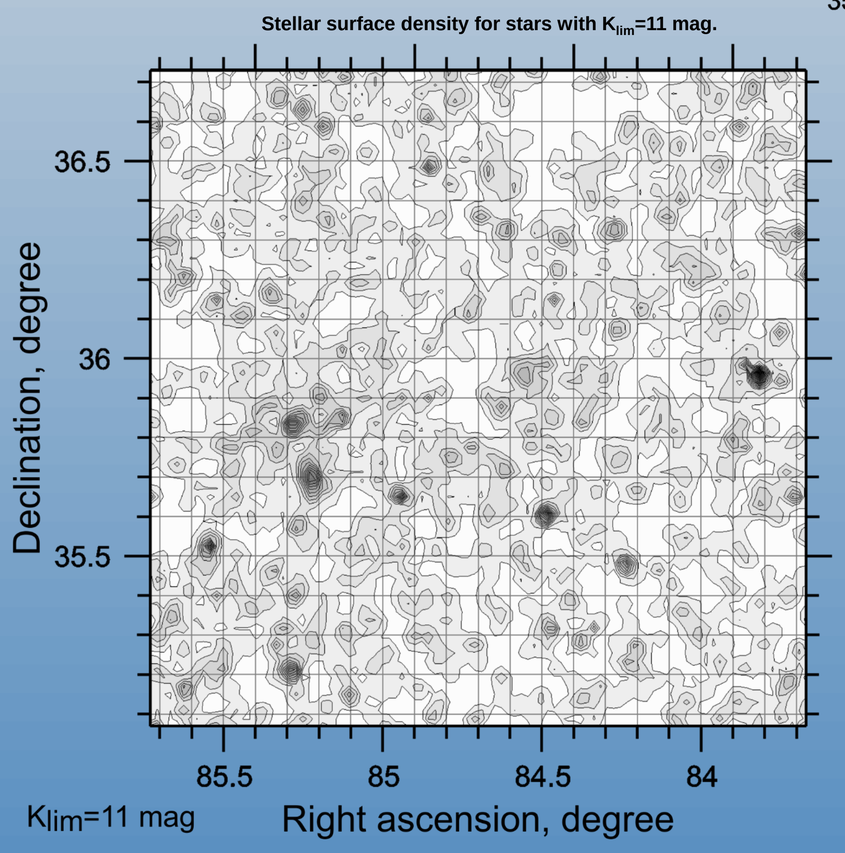


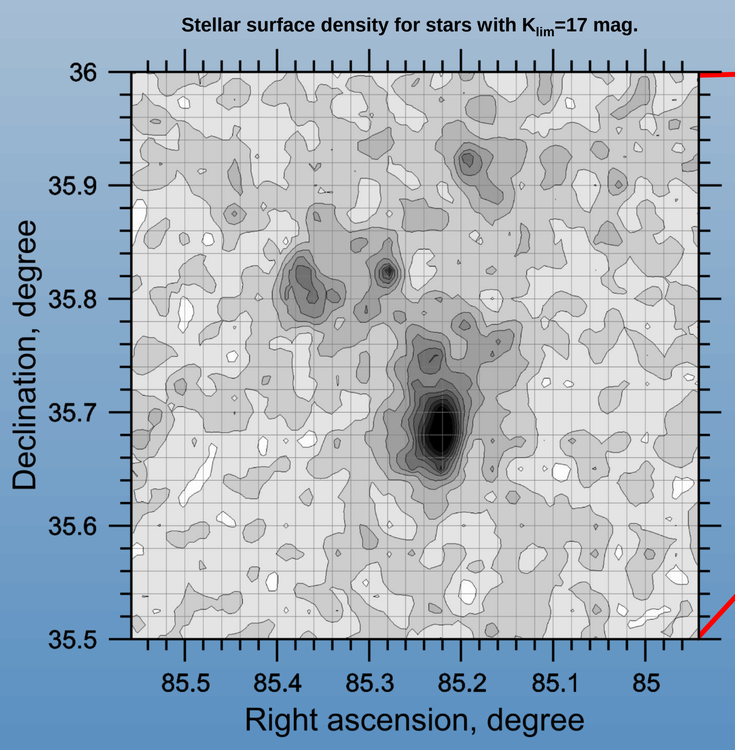
The goal of this work is to study relation between stellar density distribution and gas-dust filaments in a star-formation complex, which contains giant molecular cloud and several developed H II regions. We selected for our study the S231-S235 star-formation complex associated with the giant molecular cloud G173+2.5 (G173 hereafter), located at the distance of about 2 kpc from the Sun in the direction close to galactic anticenter.



G173 is a giant star forming complex with size exceeding of 100 x 200 pc located in Perseus spiral arm of the Galaxy [3]. It is well outlined in continuum maps of the Galaxy from 74 centimeters (408 MHz) to 60 micrometers and pronounced in H-alpha emission. The complex contains giant molecular cloud, HII regions and rich stellar clusters at different stages of evolution [4, 5, 6]. There are evidences that the gas of the complex was affected by several large-scale shocks, one of those is associated with relatively recent supernova explosion [7].







In the current contribution we report about results of the large scale mapping of CO, 13CO and CS emission, calculations of the dust extinction in the near infrared range (using the NICEST method [8]), and star counts with UKIDSS data (using the kernel estimator method [9]).

Distribution of molecular gas in the complex correlates well with the dust extinction. It displays existence of filamentary structures containing embedded stellar clusters. These filaments are considerably broader than the ones which were found to give birth for individual stars in the Herschel Gould Belt Survey and other relevant studies [1,2].

References

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