Construction and origin of the giant star forming complex G173

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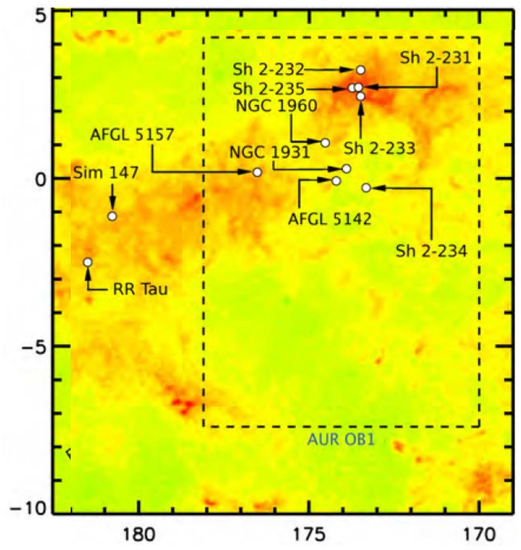
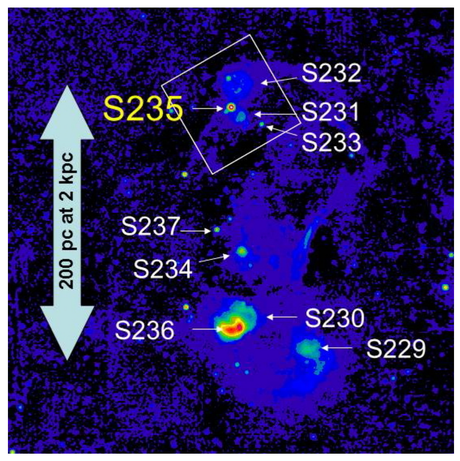
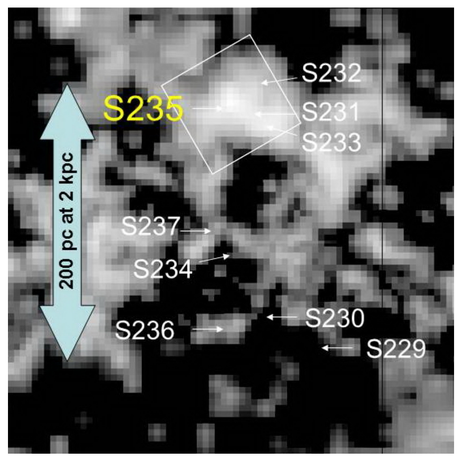
G173 is a giant star forming complex with size exceeding 100 x 200 pc in Perseus spiral arm of our galaxy. It is well outlined in continuum maps of our Galaxy from 408 MHz to 60 micron and pronounced in Hα emission. The complex contains giant molecular clouds, HII regions, Aur OB1 association and rich stellar clusters at different stages of evolution.



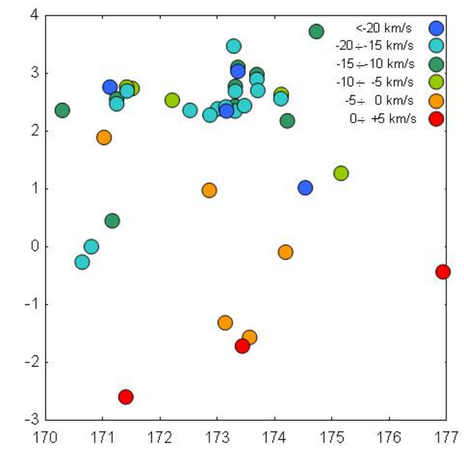
Borders of Aur OB1 association of the young stars (Reipurth & Yan 2008). Measurements of stellar velocities indicate that almost all of the bright young central stars of HII regions are “native” and have velocities close to those of molecular gas.



Map of G173 complex in 11cm continuum emission. Big bubble with its “waist” in galactic plane is well pronounced. Northern part of it is attributed to the supernova explosion (Kang et al. 2012).



Map of G173 complex in CO(1-0) emission (Dame et al. 2001). The main concentration of molecular gas is in the northern part of the complex.



Velocities of CO(1-0) line toward IRAS sources in the complex from Wouterloot & Brand (1989). There is a clear velocity gradient.

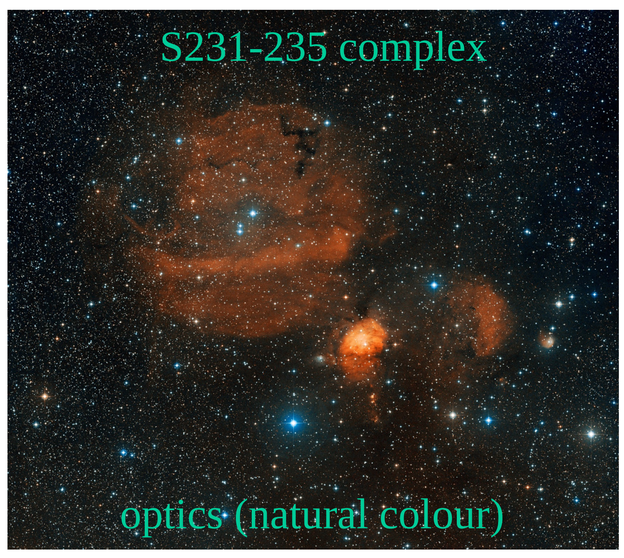
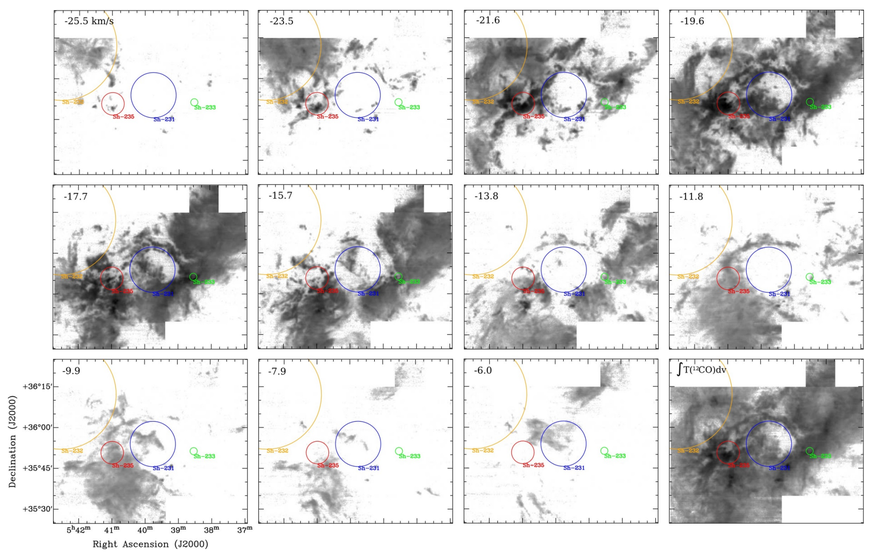
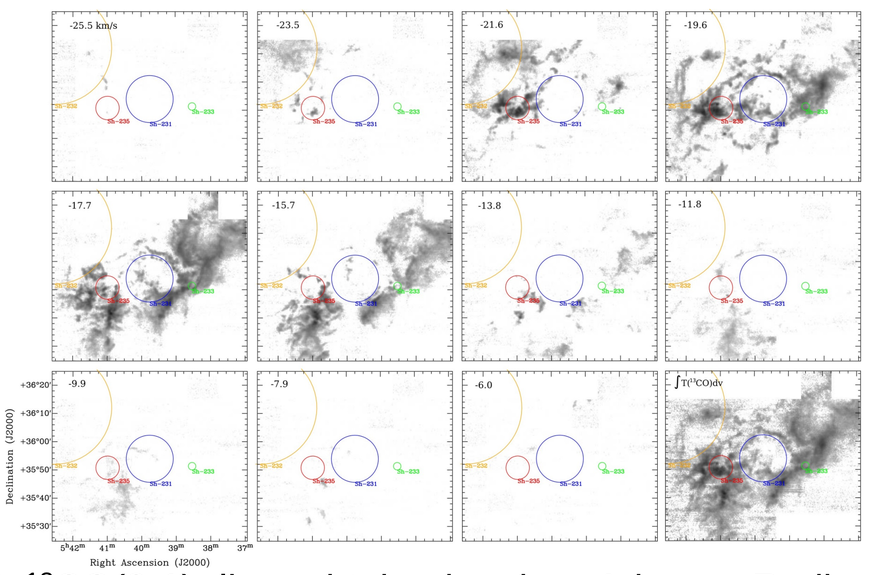
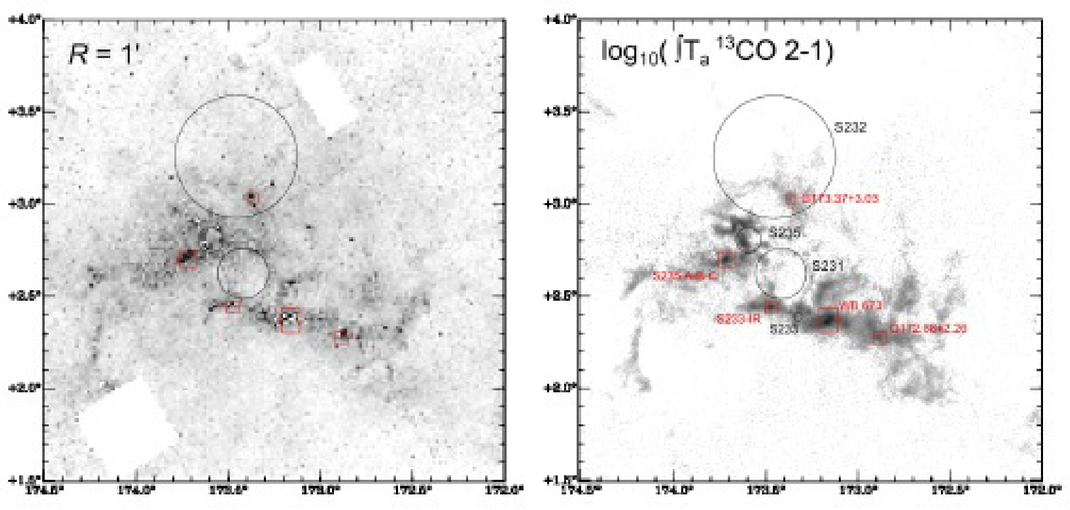


Image of S231-S235 complex in the optics. It is clearly seen that the HII regions are situated in front of the main body of molecular cloud.

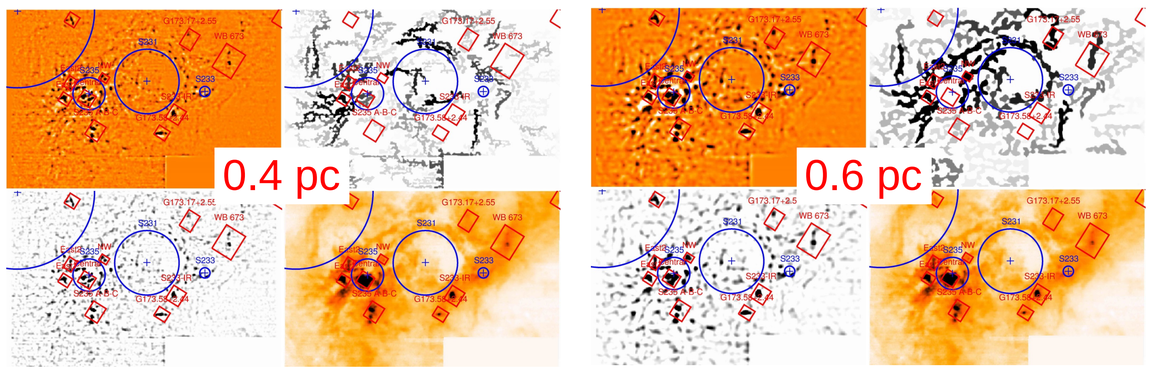




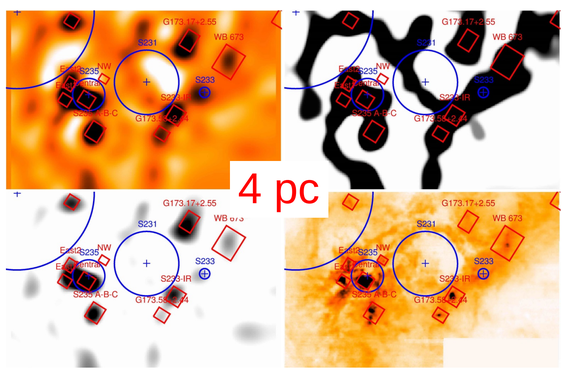
Maps of S231-S235 complex in CO(2-1) and ^{13}CO(2-1) line obtained using Arizona Radio Observatory Heinrich Hertz Submillimeter Telescope (HPBW=33”). Major HII regions are shown by circles. The giant molecular cloud contains numerous clumps and filamentary structures. The complex has a complicated velocity structure with a clear velocity gradient.



Maps of S231-S235 complex in Ks extinction and integrated ^{13}CO(2-1) line emission display high degree of correlation. So, the gas in the complex is likely to be mostly in molecular form.



Decomposition of the map of integrated ^{12}CO(2-1) line emission with different scales using getsources (Men’shchikov, 2013): overall fit (upper left panels), filaments (upper right panels), sources (lower left panels), observations (lower right panels). Major stellar clusters are shown by rectangles.



Conclusions: 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. In the poster we report about results of the large scale mapping of CO emission in S231-S235 complex and calculations of the dust extinction in the near infrared range. Distribution of molecular gas in the complex well correlates with the infrared dust extinction. All embedded star clusters are marked by the presence of discrete cloudlets (sources) with the scales from 0.4 pc (this is about linear resolution of observations) up to 4 pc. Maps display existence of filamentary structures containing embedded stellar clusters. All prominent clusters reside in the filaments of the scale about 4 pc. Clusters at more advanced stages of formation contain filaments of smaller scales.