

Studies of the Perseus Region.I.

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Abstract. Studies of molecular clouds have shown that they evolve from turbulent gas and dust to form coherent, dense and connected structures. We have conducted a multi-wavelength study of one such molecular cloud, the Perseus star-forming region, which includes Barnard 1 (B1), Barnard 3(B3), Barnard 5 (B5), NGC 1333, IC 348, L1455 and L1448. The data obtained using the Infrared Array Camera (IRAC), Multiple Imaging Photometer (MIPS), the Sub-mm Common User Bolometer Array(SCUBA) and the 2 Micron All Sky Survey (2MASS) provides information about the geometric structure of the dust and gas covering large areas around young stellar objects (YSO), dust temperatures, effect of turbulence and processes of molecule formation and their relevance in the chemical and physical evolution of the cloud. This paper presents our first results.

Keywords. molecular cloud ,star formation, turbulence

The Perseus molecular cloud, located at a distance of about 350 pc, contains star-forming regions, molecular outflows, masers, dense gas and dust. Our analysis of this region (table 1) consists of the following- measuring the extinction in the K band ($2.15 \mu\text{m}$) as it is the most sensitive to embedded young stars; measuring the K band luminosity function (KLF); looking for significant asymmetric structure. The K band extinction is measured by an algorithm which calculates an average H-K colour from stars embedded in the molecular cloud taken from 2MASS survey. Then SCUBA maps are used to compare against this value and improve upon it. The KLF is measured using K band apparent histograms. We also look for new sources from the IRAC (3.6, 4.5, 5.8 and $8 \mu\text{m}$) and MIPS 24 μm maps.

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Table 1. Objects in Perseus with their distances.Coordinates taken from Simbad(J2000). The program ID (PID) of the IRAC and MIPS observations from Spitzer taken for this study are given in Column 5.

Object	RA	Dec	Distance(pc)	PID
Barnard 1	3h33m16.3s	31d7m51.0s	330	178
Barnard 3	3h40m 0.0s	31d 58m 0.0s	-	178
Barnard 5	3h47m38.3s	32d52m43.0s	350	178
IC 348	3h44m34.0s	32d9m48.0s	300	178,6,58,36
L1455	3h28m4.0s	30d10m24.0s	350	178
L1448	3h24m20.6s	31d20m47.0s	300	178
NGC1333	3h29m2.0s	31d20m54.0s	300	58,178,6