DENSITY LAW, VERTICAL DISTRIBUTION AND VERTICAL GRADIENT OF METAL ABUNDANCES FOR G AND K GIANTS

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A systematic photometric investigation on stars of spectral type G4 to K4 is performed in both polar caps in symmetric coaxial cones. According to a calibration of the Geneva system, Mv, Teff and [M/H] ratio have been now derived for about 400 stars. For the computation of density law, a special care has been taken to avoid selection biaises related to variations of mean age or metal abundance. A change of luminosity function for evolved stars in function of z has been detected. Using the geometrical properties of the cones and direct counts in the solar vicinity, we derive the following density law for stars with Mv ϵ [0.0, 1.3] and (B-V) ϵ [0.7, 1.3]

z(pc)	: 0	100	200	400	600	800
log $\rho(z)/\rho(o)$	: .00	-.17	-.39	-.75	-1.04	-1.29

with a central density of $1.7.10^{-3}$ star.pc^{-3}. This result confirms the old determination of Oort (1932), but deviates sensibly from the more recent ones of Upgren (1962) and Elvius (1951). The distribution of metal abundances at various heights is deduced from G and K stars of all luminosities and compared with that obtained from nearby G and K dwarfs. The increasing concentration to the galactic plane in function of the metal richness is a proeminent feature. The vertical gradient of [M/H] is estimated to -0.35.kpc^{-1} for z between 0 and 700 pc. This value is more than twice smaller than the recent ones of Blaauw (1975) or Jennens (1975). With a radial gradient of -0.05, (Grenon (1972), Mayor (1976)) we have a ratio of vertical on radial-gradient of about 7, which provides a new constraint for galaxy modelling.

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