Photographic variability survey in the M42 region

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Abstract. In order to detect variable stars in the well known star forming region, the Orion Nebula Cluster, a series of 22 exposures taken from November 1996 to October 1998, using the ESO 100/152cm Schmidt telescope, covering a field of $5° \times 5°$ was analyzed. The films (Kodak Tech-Pan 4415 emulsions, effective spectral range from $\sim$630 nm to 690 nm) were digitized by the SuperCOSMOS machine, the measurements calibrated to the R magnitude of the USNO B1.0 catalogue and differential photometry was performed throughout the whole field. In the process, a set of 260 stars that remained constant in the 22 films and were well distributed over the field was selected and used as comparison stars for the differential photometry of all the other stars in the field. Diverse statistical studies were performed in order to characterize the type and degree of variability of the objects. The 22 films, all exposed for 30 minutes each, were stacked together at our request by the SuperCOSMOS team, producing perhaps the deepest wide field image of M42 ever taken.

This database (>150 000 objects, mostly stars and $\sim$2% galaxies) is going to be used as a starting point for the Variable Young Stellar Object Survey (VYSOS) project, which consists of 2 fully automated robotic telescopes of 41cm each, one installed on Mauna Loa (Hawaii, USA) and the other at Cerro Armazones (Chile), both using the Pan STARRS set of photometric filters. We discovered thousands of new variable stars within the $5° \times 5°$ region studied. We have variability statistics for all objects and are classifying the variable stars according to the variability type and amplitude. We intend to make this database available via the WEB.

Keywords. stars: variables, stars: pre-main sequence, stars: formation, astronomical data bases, surveys, open clusters and associations: individual (M42)