Towards a new all-sky catalogue of YSOs

- First results on AKARI FIS BSC –

Sarolta Zahorecz[1], L. Viktor Tóth[1], Munetaka Ueno[2], Gábor Marton[1], Akiko Kawamura[3], Motohide Tamura[4]

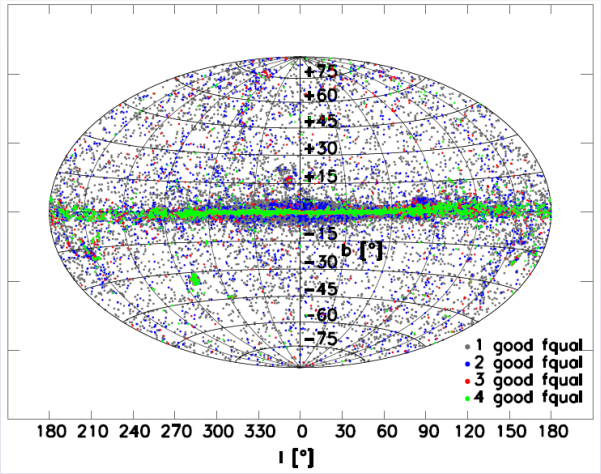
[1] Department of Astronomy, Eötvös Loránd University, Budapest, Hungary, [2] Department of Earth Science and Astronomy, Graduate School of Arts and Sciences, The University of Tokyo, Tokyo, Japan, [3] Division of Particle and Astrophysical Sciences, Graduate School of Science, Nagoya, University, Nagoya, Japan, [4] National Astronomical Observatory of Japan, Tokyo, Japan

We present an analysis of AKARI FIS and various other photometric data of the Taurus-Auriga region one of the most closest and richest low mass star-forming region. Our aim was to locate and describe YSOs. In the Tau-Aur region there are 173 AKARI FIS BSC point sources.

Observations:

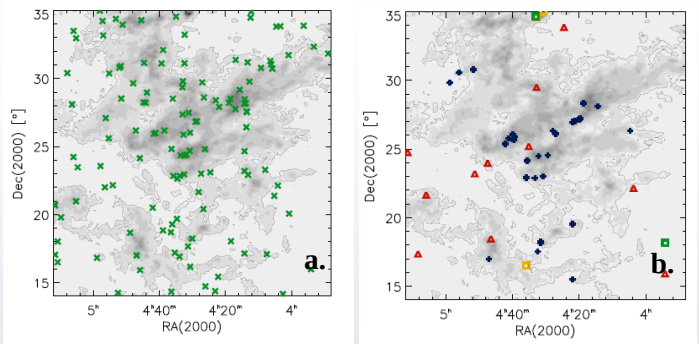
The main objective of the AKARI (Murakami et al. 2007) Japan infrared astronomical mission was to carry out the All-Sky Survey with the Far-Infrared Surveyor (far-infrared wavelengths, FIS; Kawada et al. 2007), and with the Infrared Camera (mid-infrared wavelengths, IRC; Onaka et al. 2007) with a sensitivity one order of magnitude better and resolution a few times higher than IRAS. **The Far-Infrared Surveyor (FIS):** provided two broad bands and two narrow bands, central wavelengths: 65, 90, 140 and 160 μm, band widths: 21.7, 37.9, 52.4 and 34.1 μm respectively.

Figure 1. The galactic distribution of AKARI FIS Bright Source Catalogue (BSC)Version β-1 (Yamamura et al., 2008) point sources:



It contains 63370 sources: 19085 sources with at least two, and 3401 sources with four good quality fluxes. The average position uncertainty is 8”, and the estimated absolute flux uncertainty is 20-25 %(Yamamura et al., 2008).

Figure 2. AKARI FIS BSC point sources in the Taurus-Auriga region overlaid on the CO line intensity map of Dame et al. (2001).



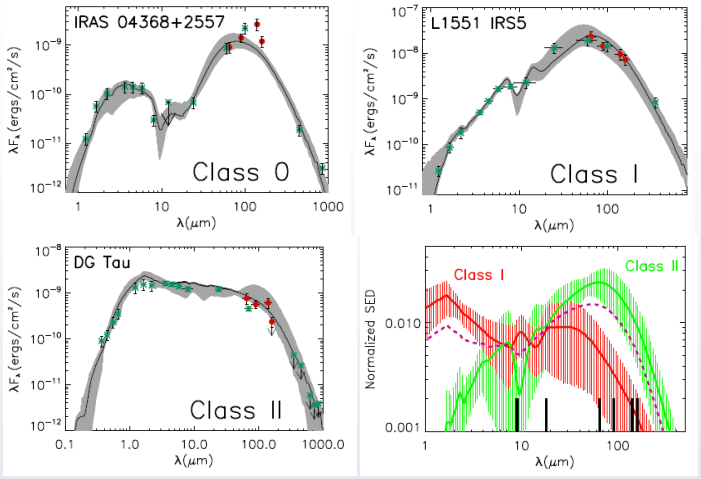
a., 127 point sources with only one good AKARI FIS flux

b., 46 sources with at least two good quality fluxes: 30 YSOs (blue pluses), 2 infrared sources (green squares), 11 galaxies (red triangles), 3 other objects (yellow squares).

The position difference is 4.36” with a standard deviation of about 2” between the 2MASS and AKARI FIS BSC positions in this region.

CO contour level is at W(CO)=1.5 K km/s.

Figure 3. SEDs for different evolutionary stages and average SEDs for Class I and Class II objects.

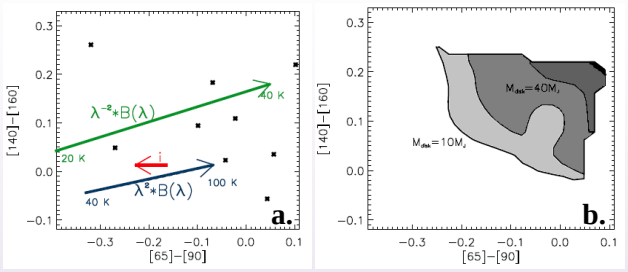


Flux densities are marked with green asterisks (archive data) and red points (AKARI FIS BSC data), flux errors and FWHM of filters are shown with bars, upper limits by arrows. Grey zone:10 best fitting model.

Bottom right: Average SEDs with nominal wavelengths of the AKARI IRC and FIS bands (black lines).

We used the SED Fitting Tool of Robitaille (2006, 2007), which were computed using a Monte-Carlo radiation transfer code, covering a wide range of stellar masses and evolutionary stages.

Figure 4. Variation of stellar parameters on the [65]-[90] - [90]-[140] colour-colour diagram of the nine AKARI FIS BSC point sources with four good quality fluxes in the Taurus-Auriga region.



a., The blue and green solid line show the colour variation with modified blackbody temperature. Temperature grows towards the arrow. The red arrow shows the effect of inclination on the colour (from 18 to 82 degrees). Errors are comparable with the box sizes.

b., Variation of disk masses. The disk mass is growing in the direction to the upper right corner. Contour levels: 10, 20, 40 and 60 M_J.

AKARI colours were defined as:

$$[\lambda_1]-[\lambda_2]=\log_{10}(F_{\lambda_1})-\log_{10}(F_{\lambda_2})$$

Results:

We studied 32 YSOs in the Tau-Aur, succesfully modeled 21YSOs with the SED Fitting Tool of Robitaille. AKARI FIS BSC data are in good agreement with previous measurements. We can made primary estimates for the order of magnitude of the stellar parameters (e.g. stellar age, mass, temperature).

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References: Dame, T.M. et al. 2001, ApJ, 547, 792; Kawada, M. et al. 2007, PASJ, 59, S389; Murakami, H. et al. 2007, PASJ, 59, S369; Onaka, T. et al. 2007, PASJ, 59S, 401O; Robitaille, T. P. et al. 2006, ApJS, 167, 256; Robitaille, T. P. et al. 2007, ApJS, 169, 328; Yamamura M. et al. 2008 AKARI/FIS All-Sky Survey Bright Source Catalogue Version β-1 -- Release Note (Rev. 2) --

Contact:
szahorecz@enkidu.elte.hu