constellation

The origin of stellar masses

Deriving dust core properties from recent Herschel maps

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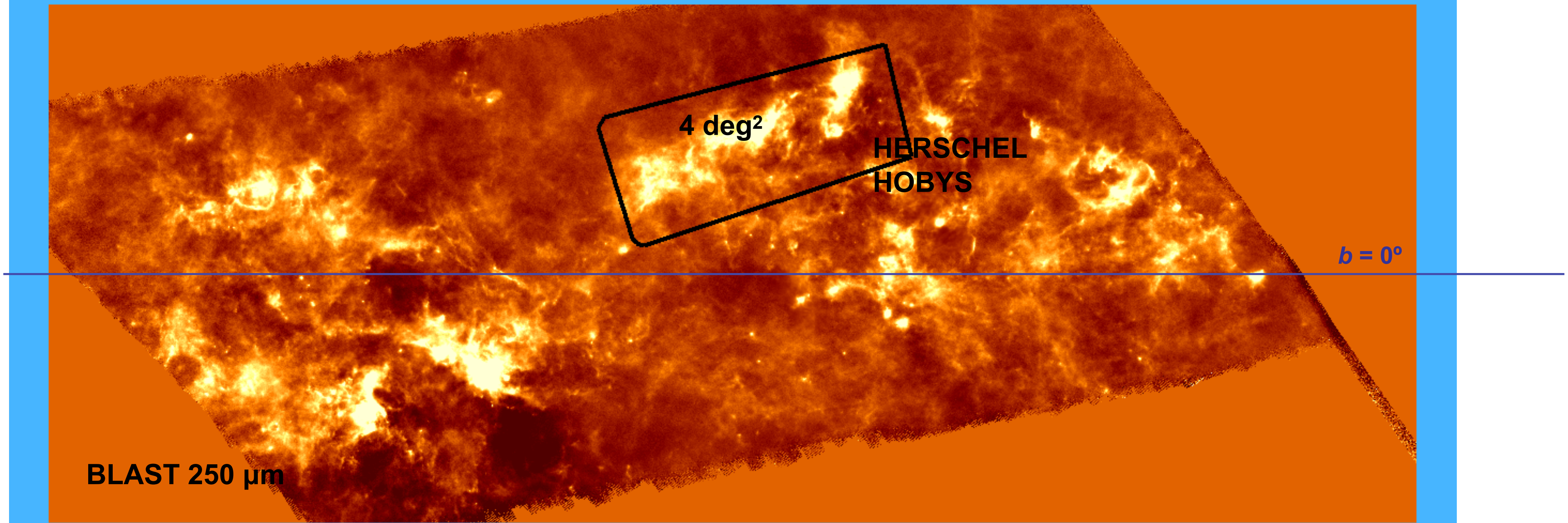
…and: HOBYS & HI-GAL teams

Vela – C cloud



Cloud C of the Vela Molecular Ridge (Murphy & May, 1991)

dist = 700 ± 200 pc (Liseau et al. 1992)

Site of intermediate mass star formation (Massi et al. 2003; Baba et al. 2006)

Vela-C in the HOBYS program

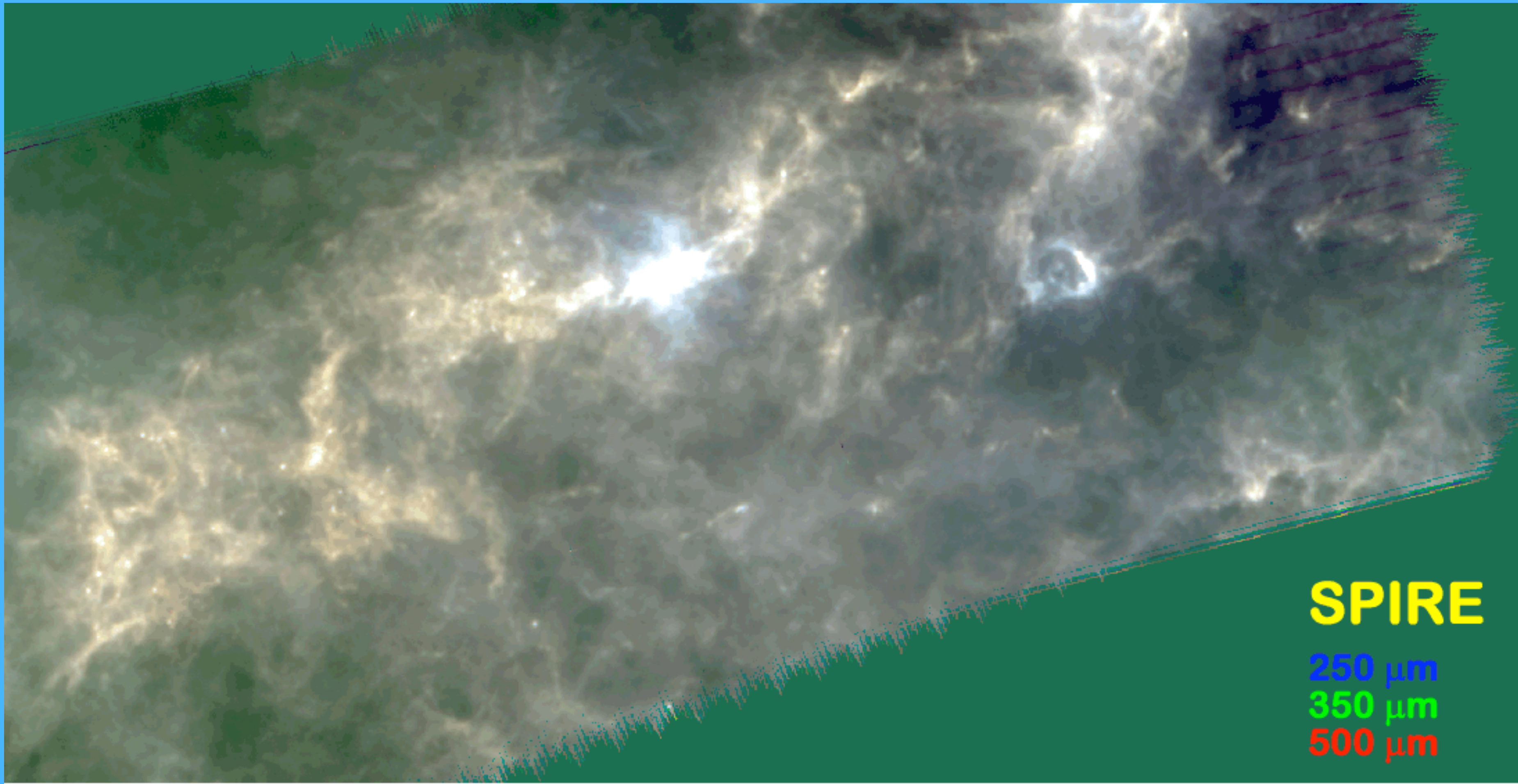
HOBYS uses SPIRE and PACS to image essentially all of the regions forming OB-type stars at distances 3 kpc from the Sun (total area of 22 deg^2).

- **Vela-C data reduction and analysis are assigned to two groups (IFSI+Obs. of Rome, Saclay).**

- **See also the Tracey Hill's poster and the Sylvain Bontemps' talk.**

- **We are still comparing and optimizing techniques (data reduction, map making, source detection, flux estimate).**

The first SPIRE/BLAST comparison...



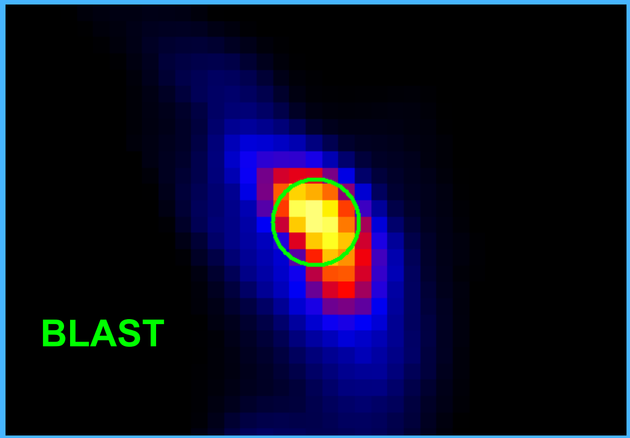
D_{BLAST} = 1.8 m

$D_{Herschel}$ = 3.5 m

Compact source extraction

BLAST:

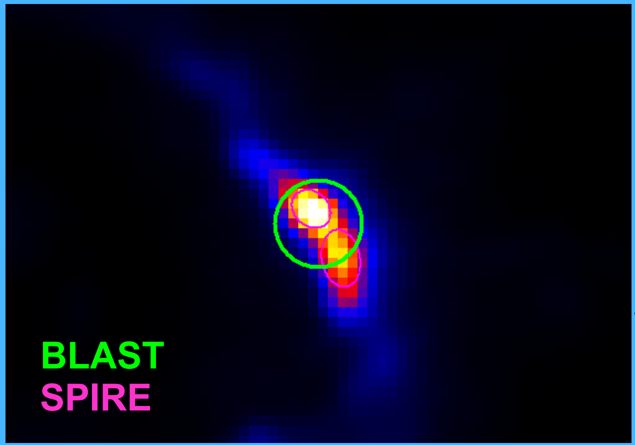
- Sources are searched on the 250 μm or the 350 μm map
- A circular Gaussian is fitted on them, and also on the same positions in the 500 μm map
- At 350 μm and 500 μm the FWHM of the Gaussian is estimated as the convolution of the one found at 250 μm with the beam



BLAST 250 μm

SPIRE:

- Sources are searched separately on each map
- An elliptical Gaussian is fitted on them
- The sources are finally associated to obtain a band-merged catalog

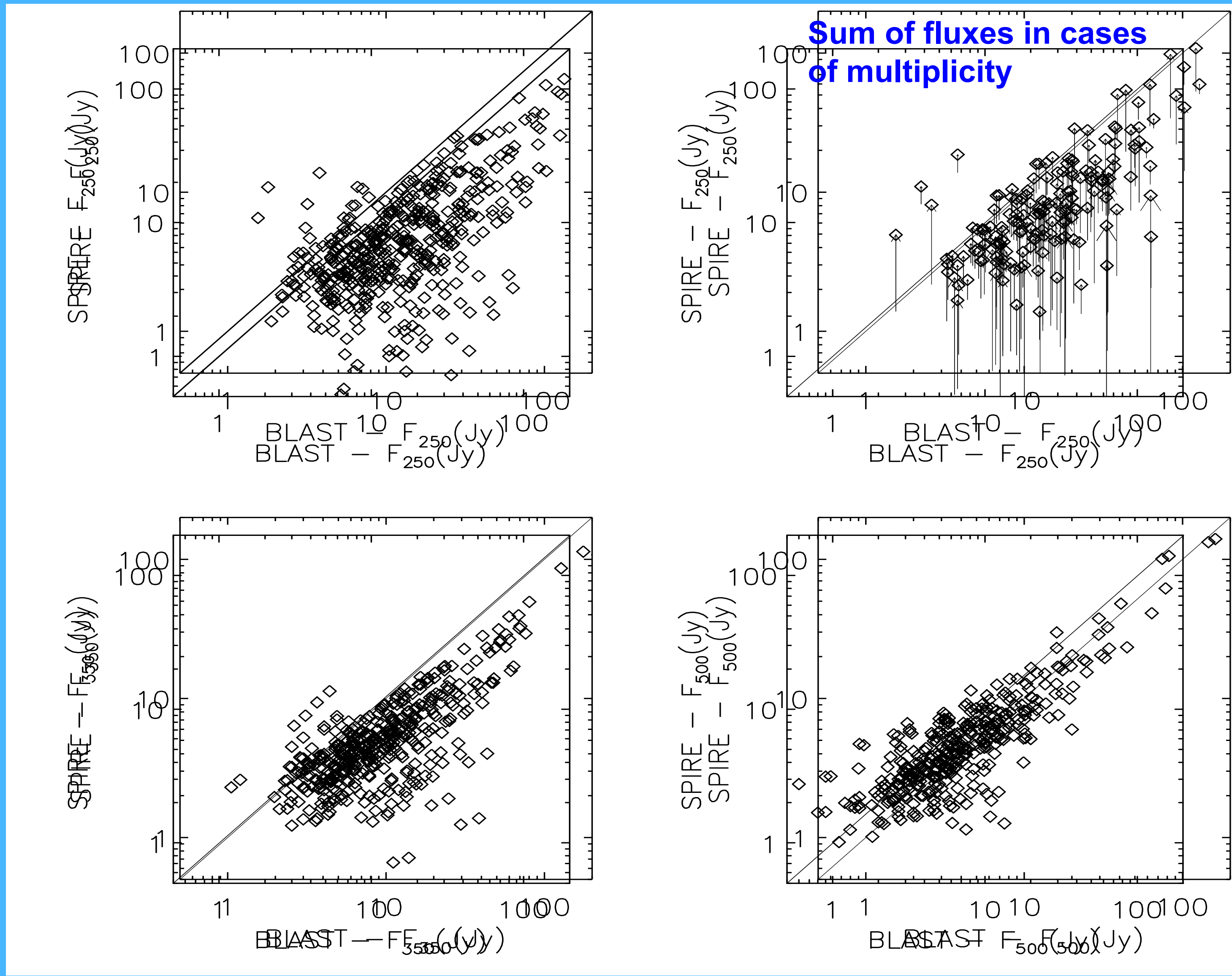


SPIRE 250 μm

BLAST vs SPIRE photometry

BLAST fluxes are from Netterfield et al. 2009

Association is done within 30 arcsec



BLAST vs SPIRE photometry

BLAST

	$n_{S/N>4}$	n_{tot}
250 µm	237	243
350 µm	222	243
500 µm	169	243

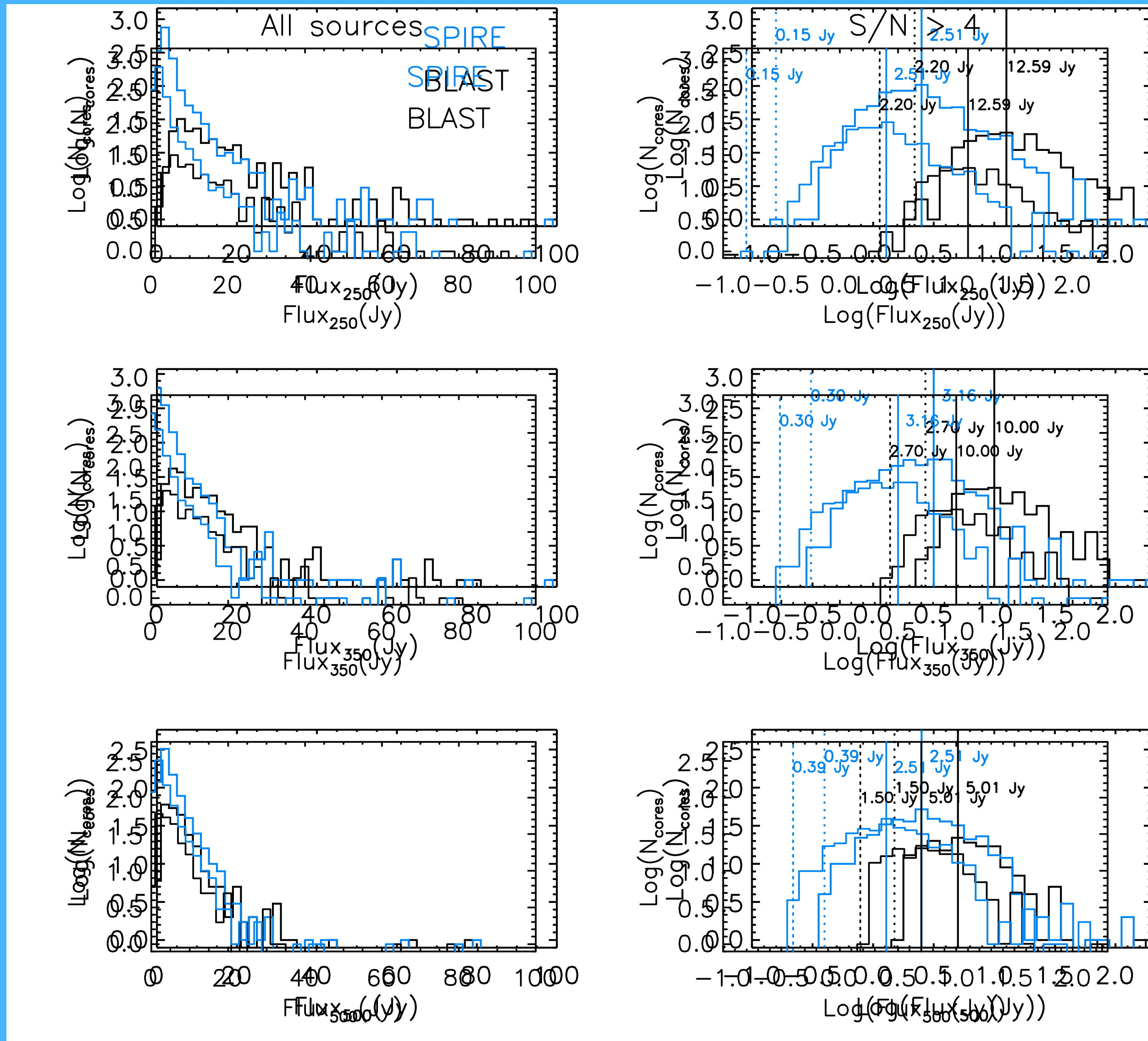
n_{3band}: 243

SPIRE

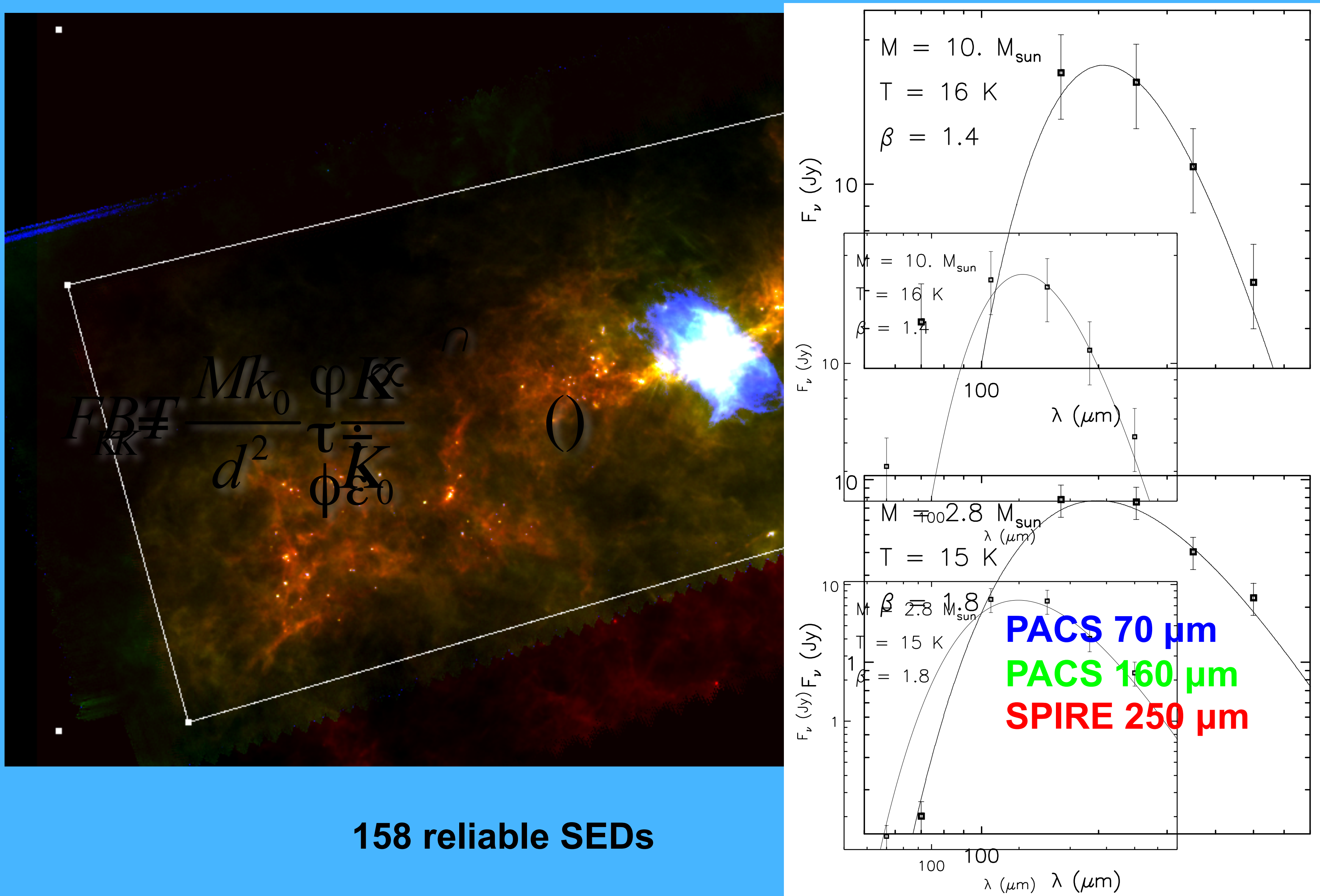
	$n_{S/N>4}$	n_{tot}
250 µm	763	1649
350 µm	490	1310
500 µm	420	786

n_{3band}: 601

$n_{S/N>4,\ 3band}$: 198



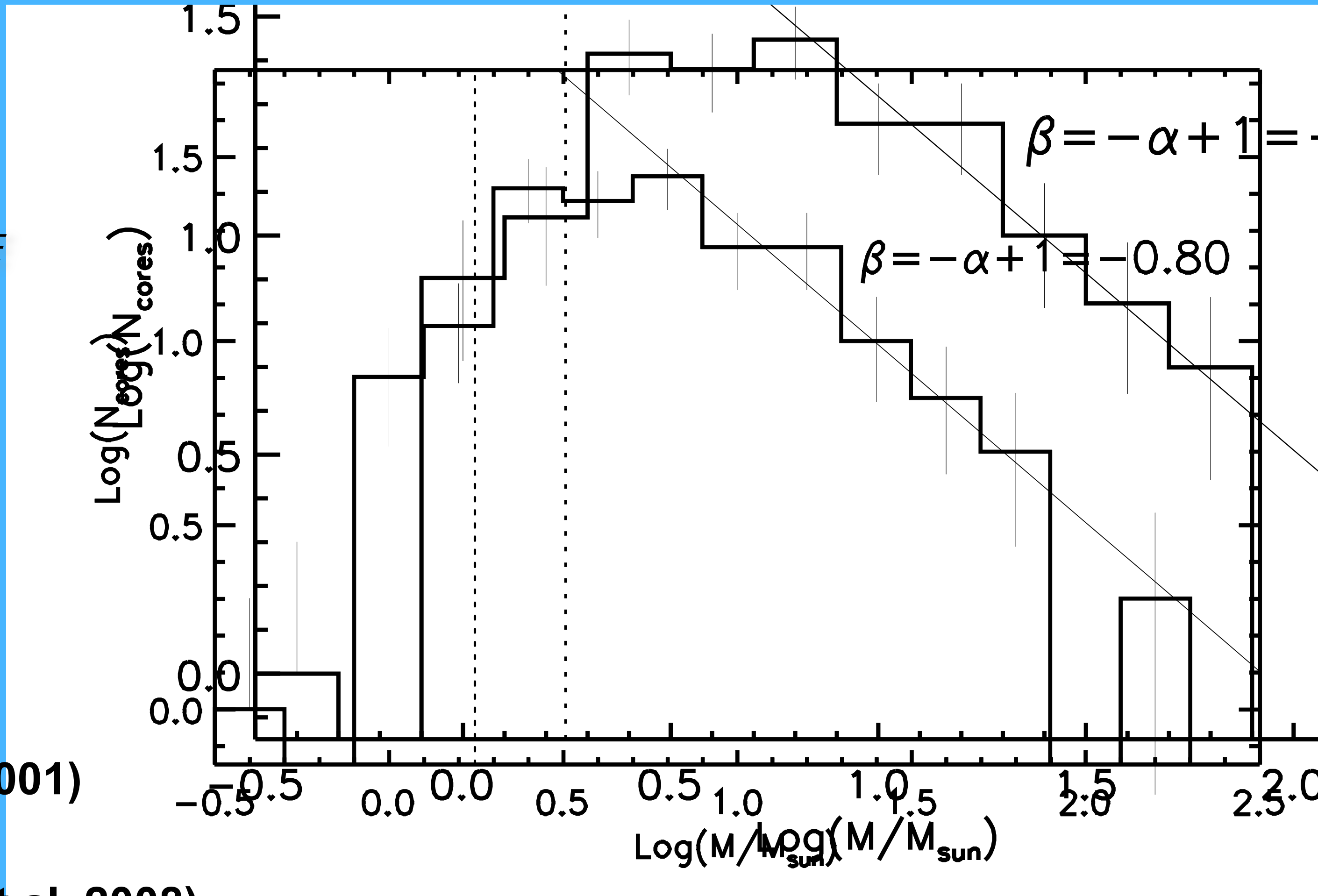
SED fitting



158 reliable SEDs

Vela-C CMF

$$\frac{dN}{dM}] M^{2\in}$$

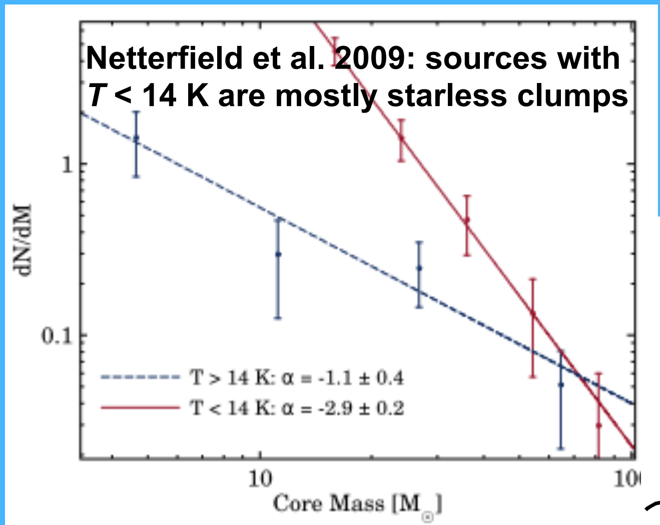


α_{IMF} = 2.3 (Kroupa 2001)

α_{cores} = 2.3 (Enoch et al. 2008)

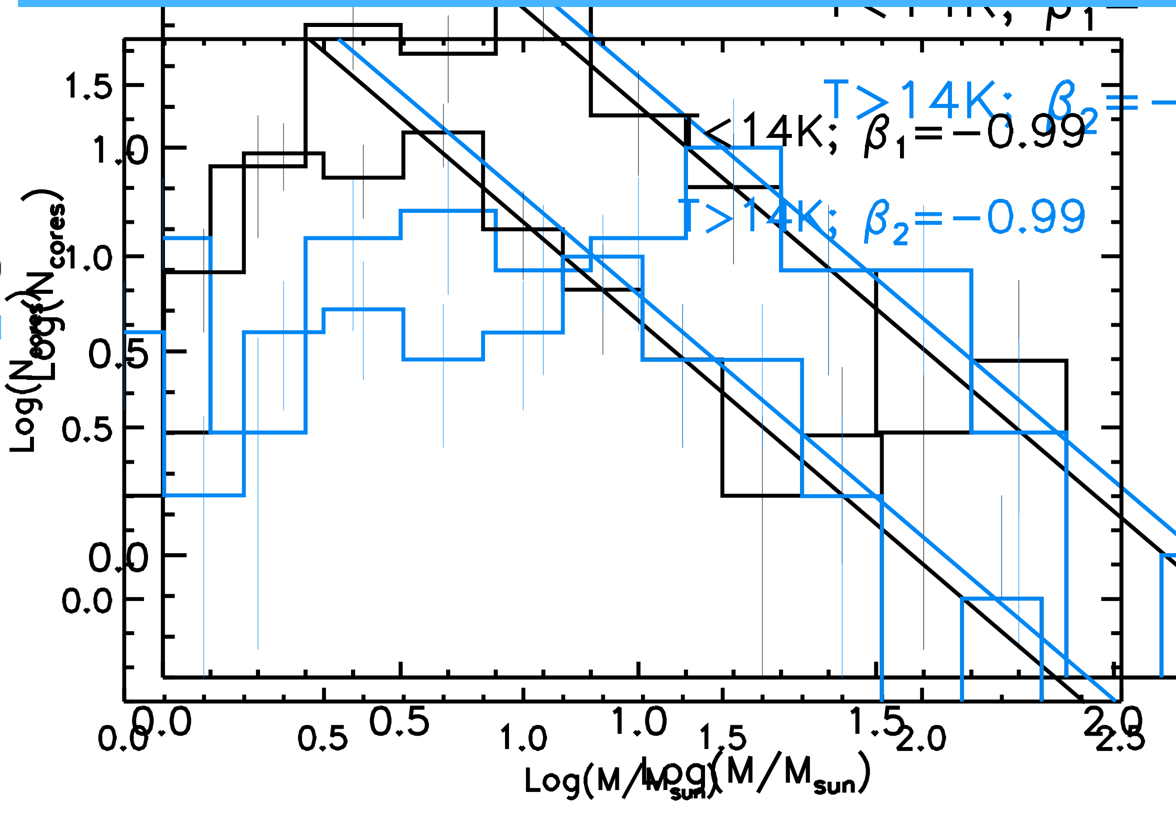
α_{Vela-D} = 1.4—1.7 (see Fabrizio Massi's poster)

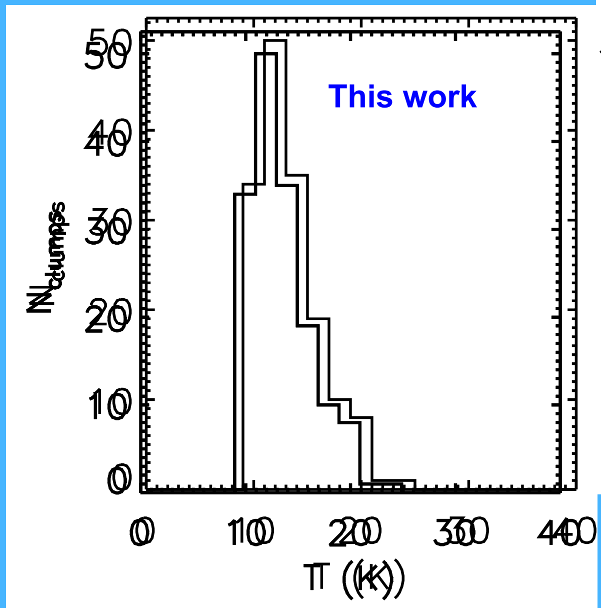
Vela-C CMF



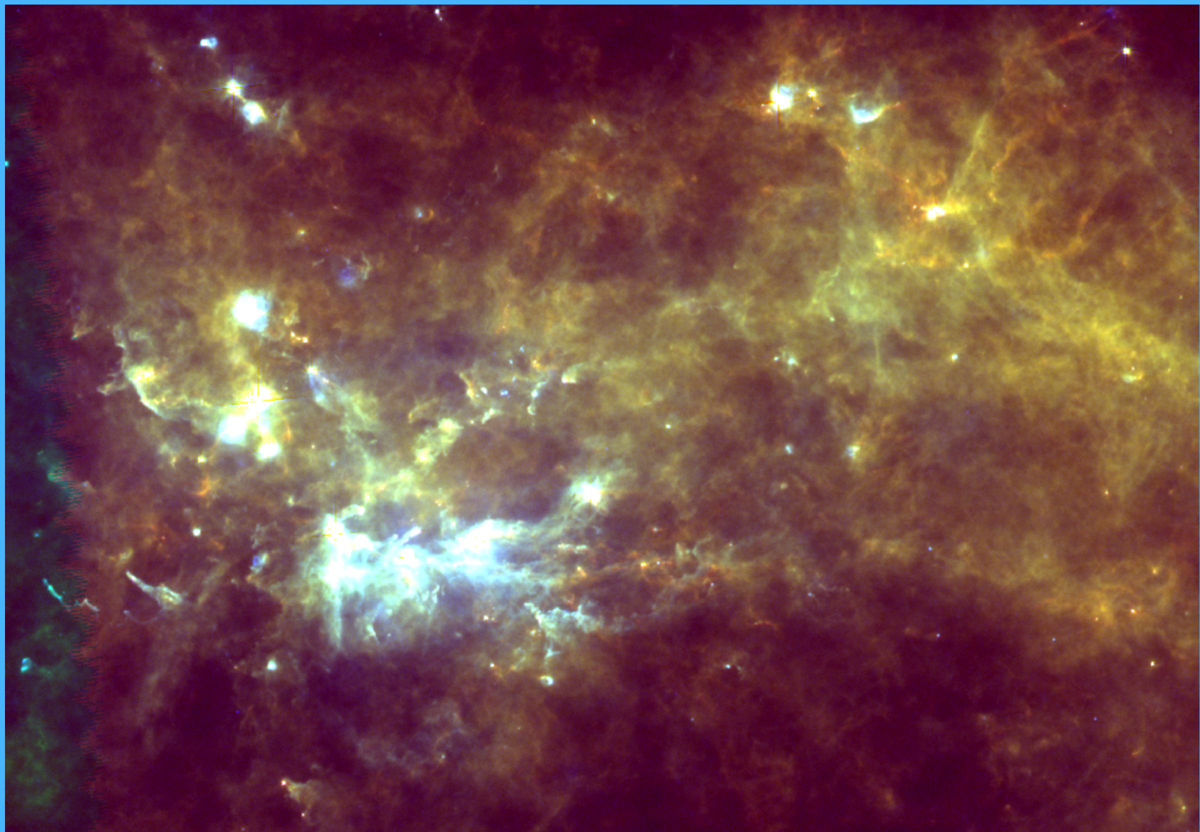
$n_{T<14K}$=102

$n_{T>14K}$=56





Hi-GAL field at ℓ=59º



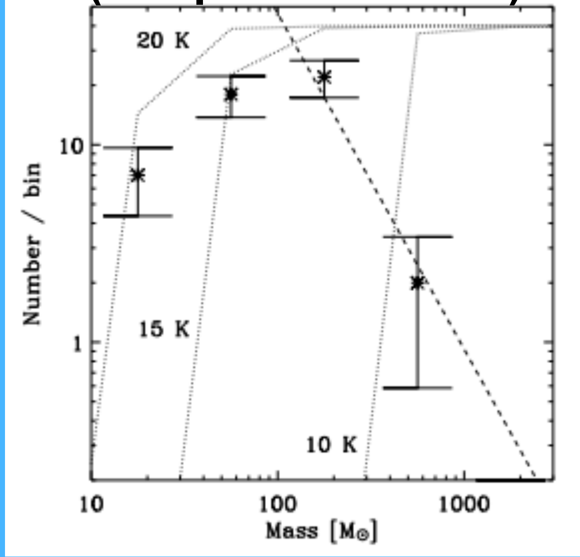
Also observed with BLAST (Chapin et al. 2008).

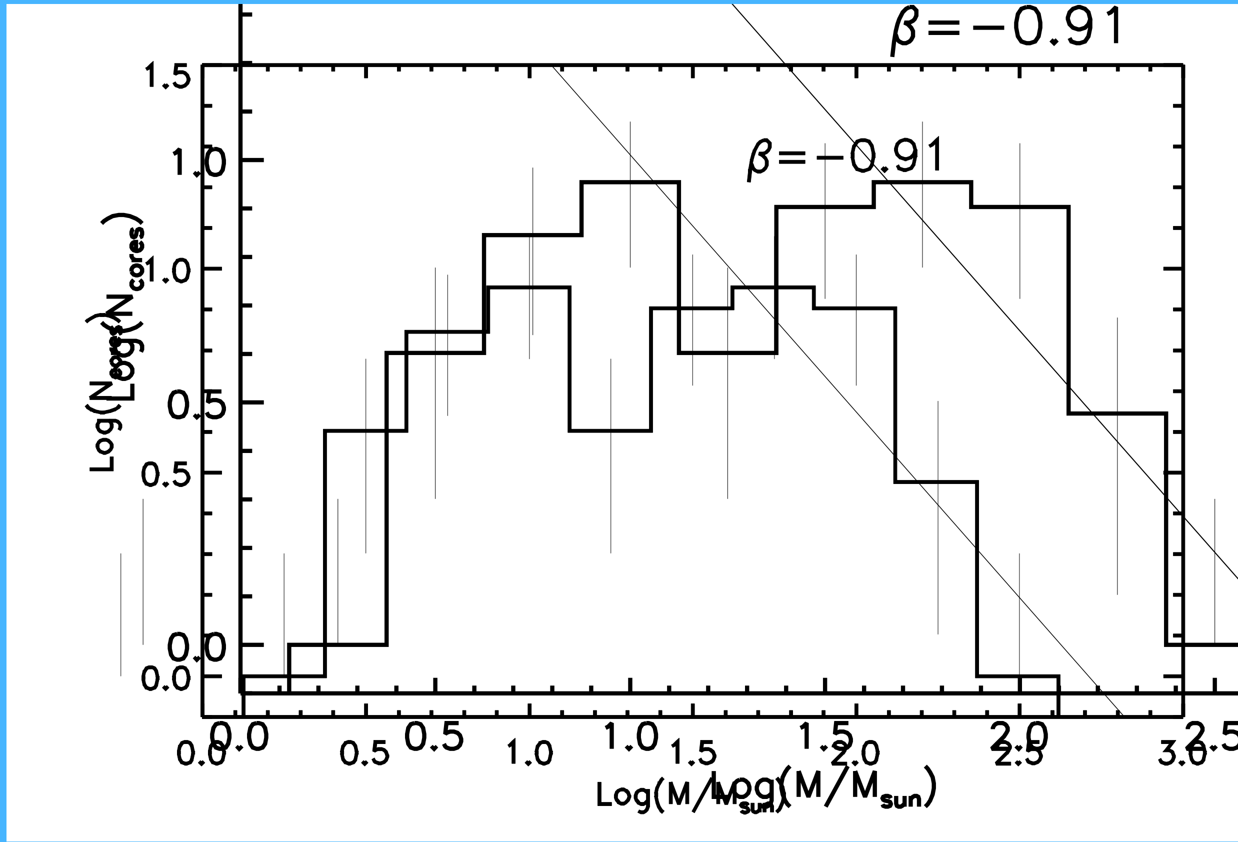
58 reliable PACS+SPIRE+BOLOCAM SEDs of sources located at *d* = 2300 pc in this field (see also Elia et al. 2010)

Masses derived from grey-body fit

CMF of the ℓ=59° field

α = 1.7
(Chapin et al. 2008)



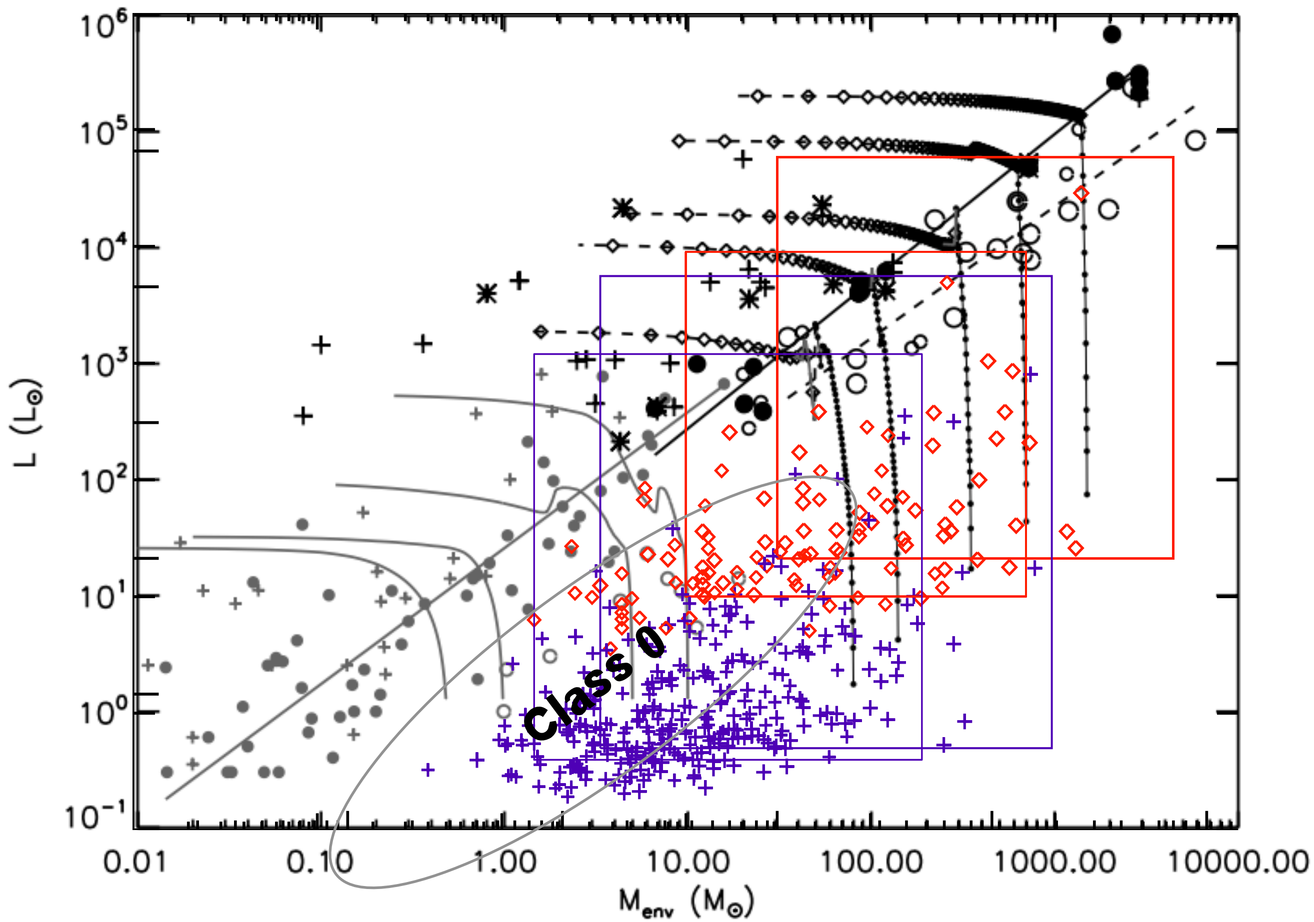


L vs *M* diagram

◊ l=59º (d=2300 pc) ✚ Vela C ●,+,*, ●,+ Molinari et al. (2008)

Chapin et al. 2008

Netterfield et al. 2009



Some conclusions...

The HOBYS observations of the Vela-C cloud offer the opportuniy to make a direct comparison between BLAST and Herschel-SPIRE performance. The better spatial resolution and sensitivity of SPIRE allow us to detect fainter and smaller structures.

A very preliminary catalog of Herschel compact sorces in the Vela-C cloud has been compiled. The grey-body fit of PACS160+SPIRE SEDs provides us with clump mass and temperature.

The mass function slope is compatible with typical values for clumps, and shallower than both the typical stellar or the core mass function slopes.

Unlike Netterfield et al. 2009, no differences are found in the CMF of the two T<14K and T>14K subsamples.

A comparison with the clump population of the Hi-GAL field ℓ=59º reveals a different mass regime and, probably, also a different evolutionary stage (sources in Vulpecula more evolved than in Vela-C).

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