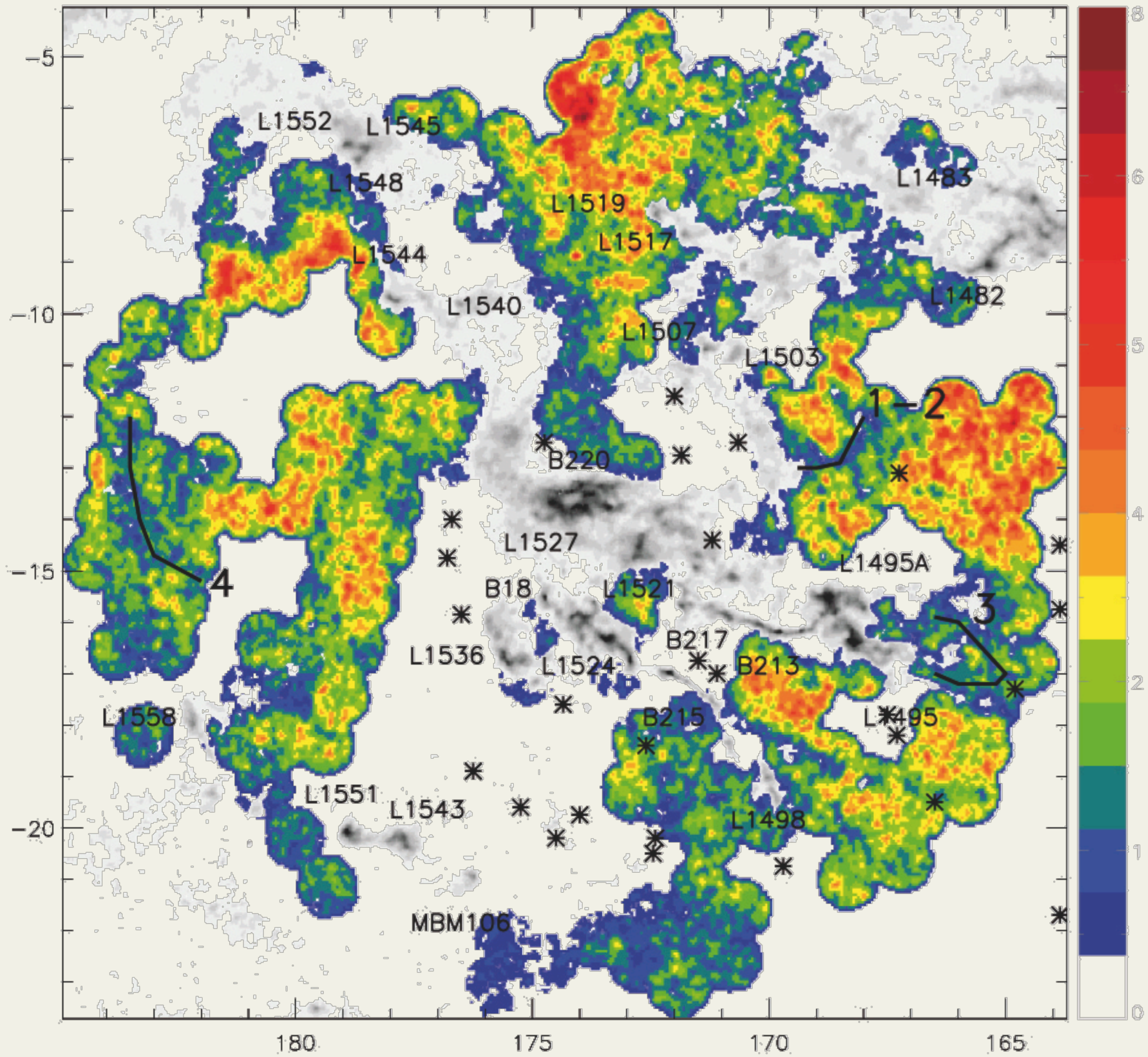
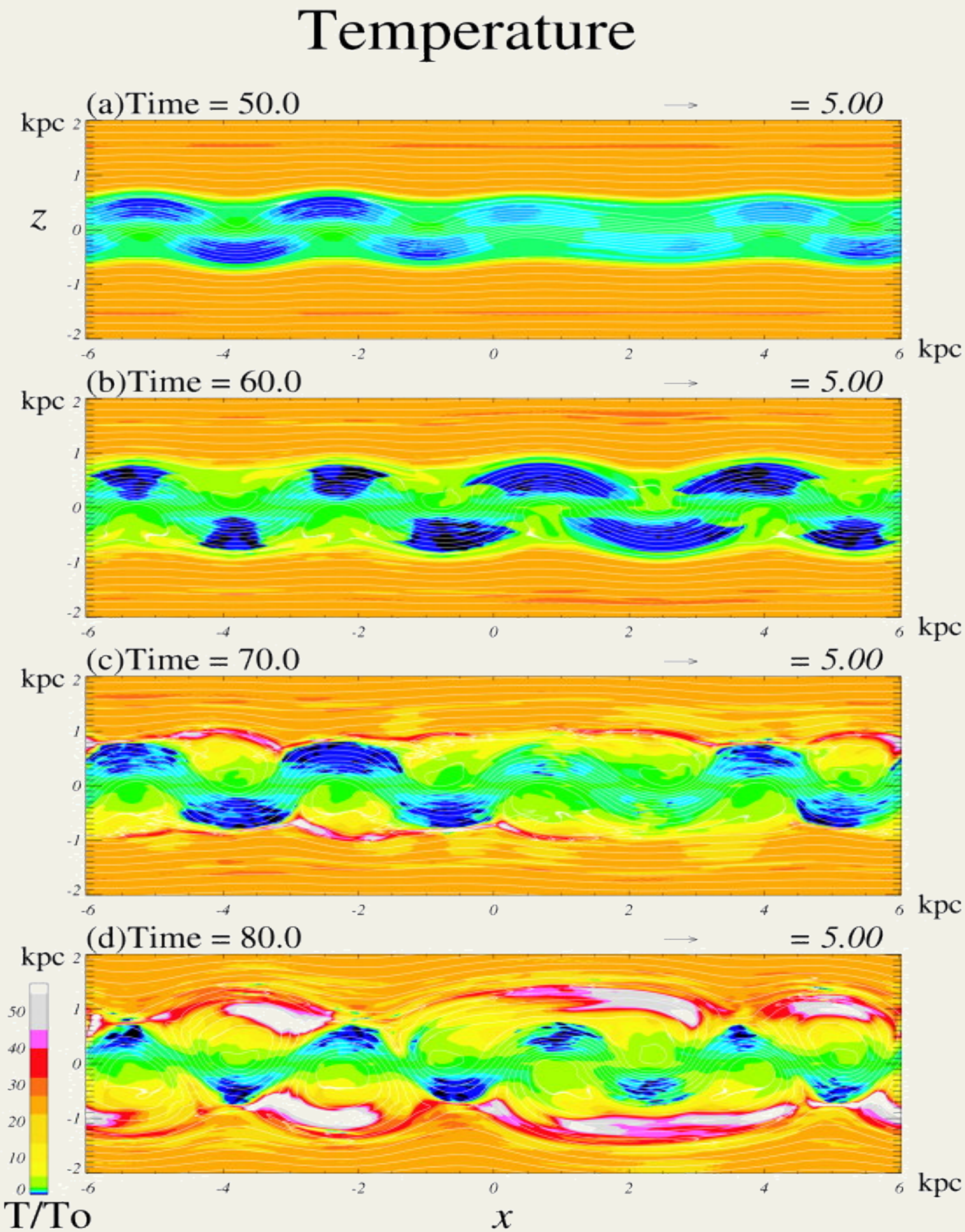


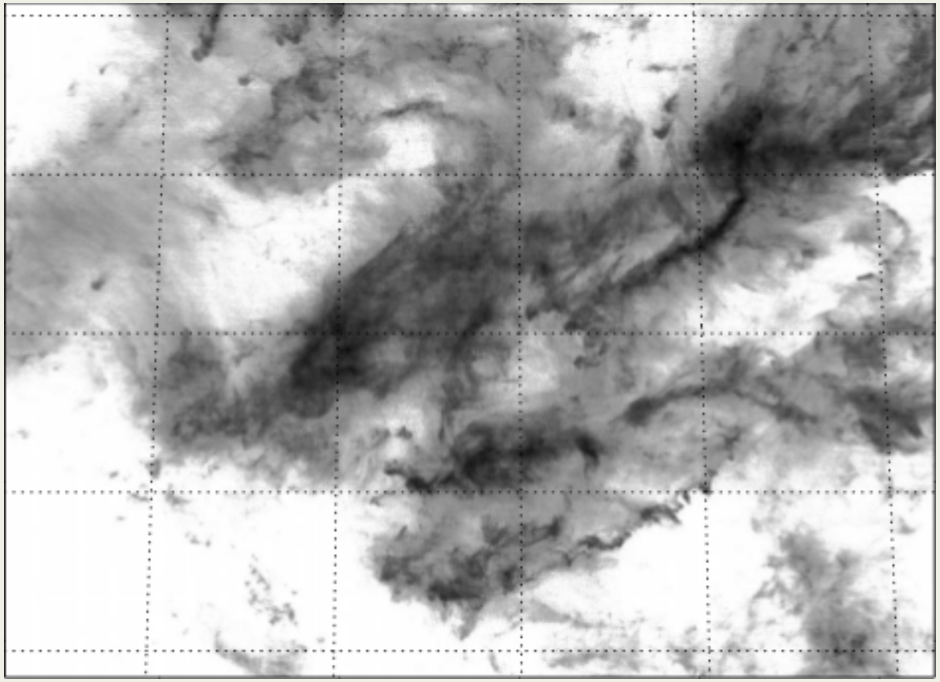
Ana I Gomez de Castro, Javier Lopez-Santiago, Fatima Lopez Martines, Nestor sanchez, Paola Sestito, Elisa de Castro, Manuel Cornide, Javier Yañez.

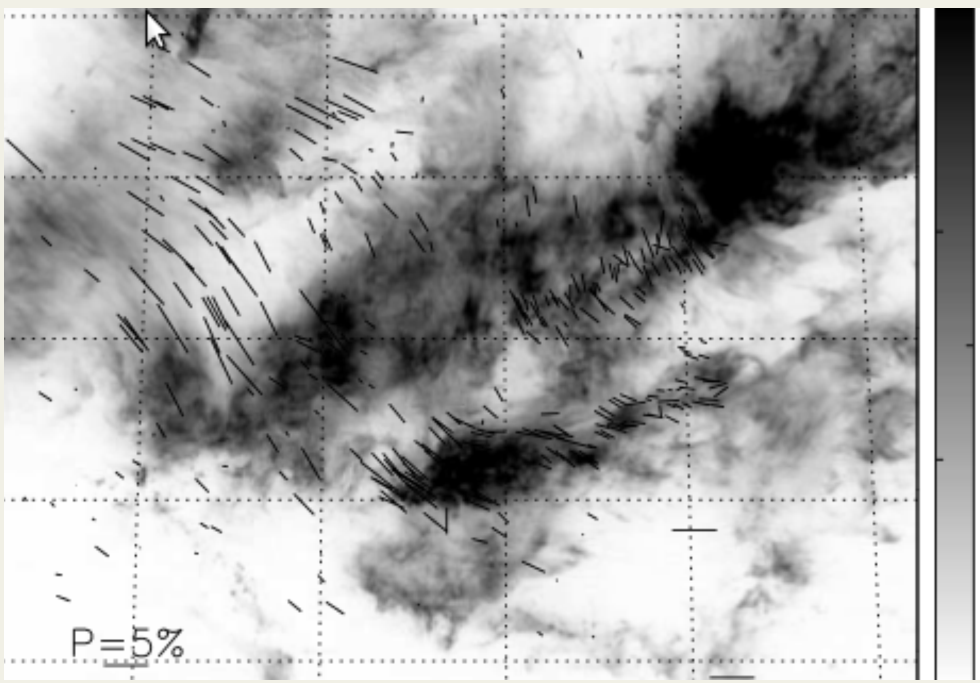
THE GALEX SURVEY OF THE TAURUS STAR FORMING REGION: EXTINCTION LAW & STAR COUNTS



PRELIMINARY

- Jeans-Parker instability operates in 10-20 Myr
- It transports matter to a low halo reaching about 2 kpc and creating a thick gas disk
- It generates dense mass "pockets" where mass is concentrated and the large molecular complexes form
- Coupling between matter and the field is controlled by two frecuencies: girosyncrotron and collisions neutrals-charges



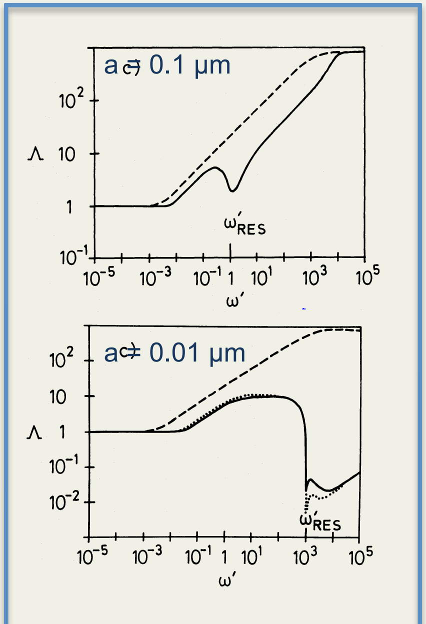


Goldsmith et al 2008

PHYSICS BEHIND THE EXTINCTION LAW IN MOLECULAR CLOUDS

- Magnetic and gravitational energy densities are similar (Goodman & Myers 1990)
- Velocity anisotropies aligned with the local projected mean field direction (Heyer & Brunt 2012)
- Ambipolar filamentation (Franqueria et al. 2004)
- Coupling field-plasma relies on the dust grains. Dust grains contain most of the mass of the ionized component

Pointing Flux



Pilipp et al 1987

WHY DUST GRAINS ARE IMPORTANT?

Grains contain most of the mass of charged particle and provide a susbtantial fraction to the charge component

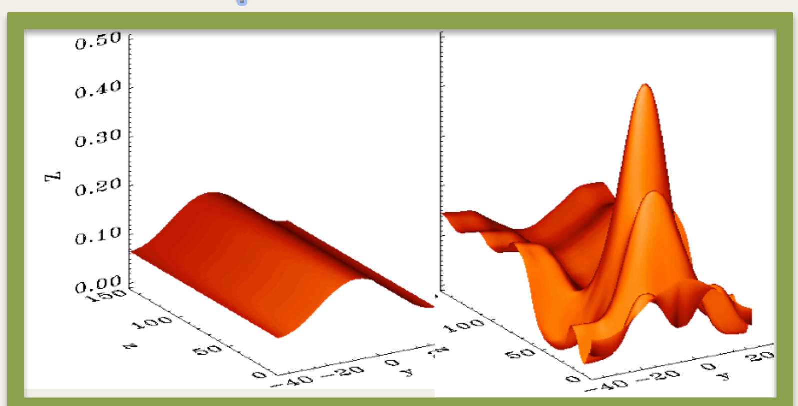
$$\Omega_\alpha = \frac{q_\alpha e B_0}{m_\alpha c},$$

The size of the dust grains is relevant for the resonance frequencies and the neutral-charge coupling

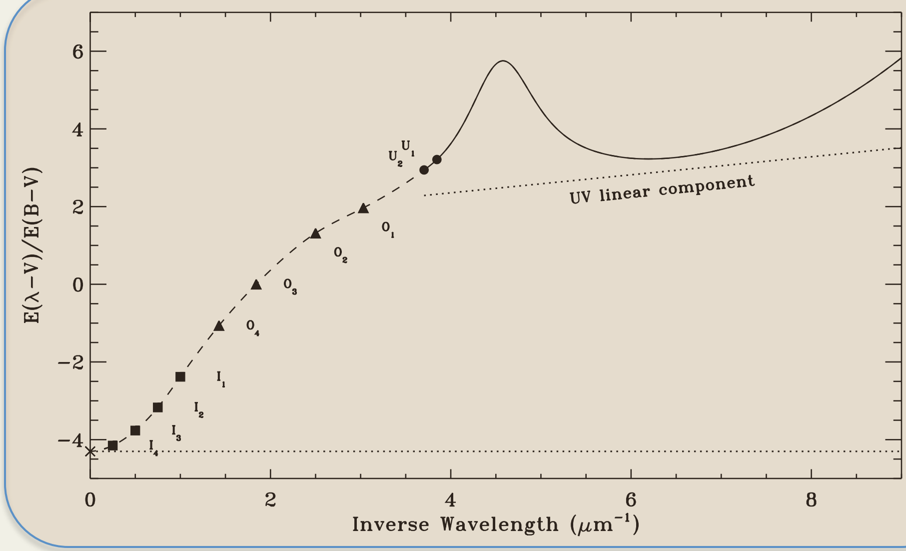
$N(H_2) = 10^4$ cm^{-3}
B =100 µG, $x_e = 10^{-7}$
M_{gas}/M_{dust} =100

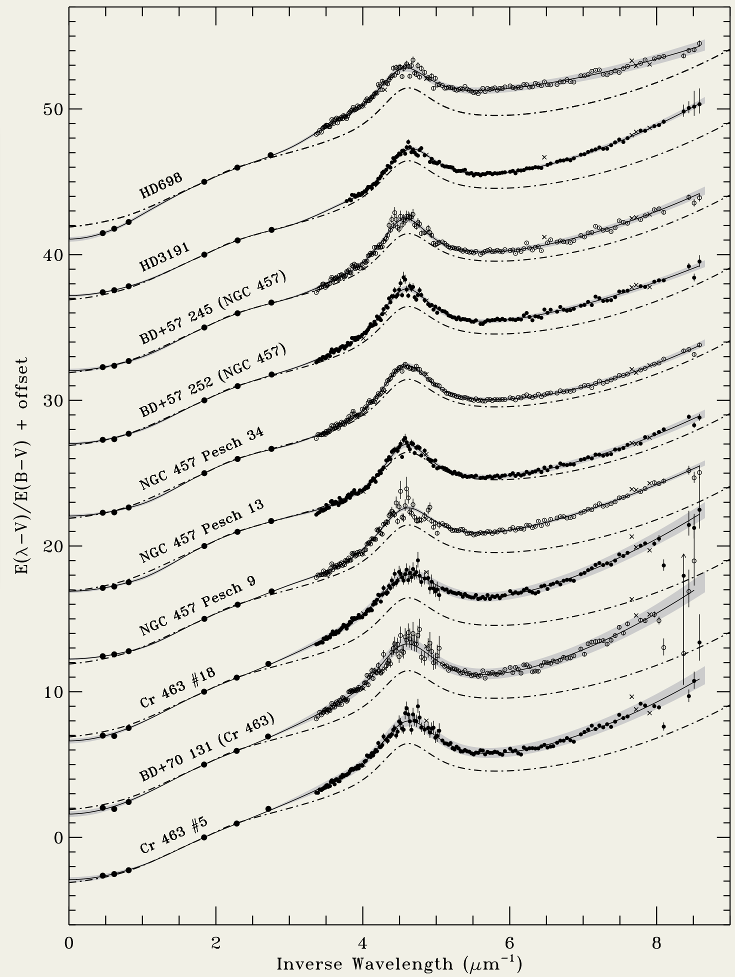
$\omega' = \omega/1.2\times10^{-2}$ yr^{-1}

Ambipolar filamentation



Franqueira et al. 2004





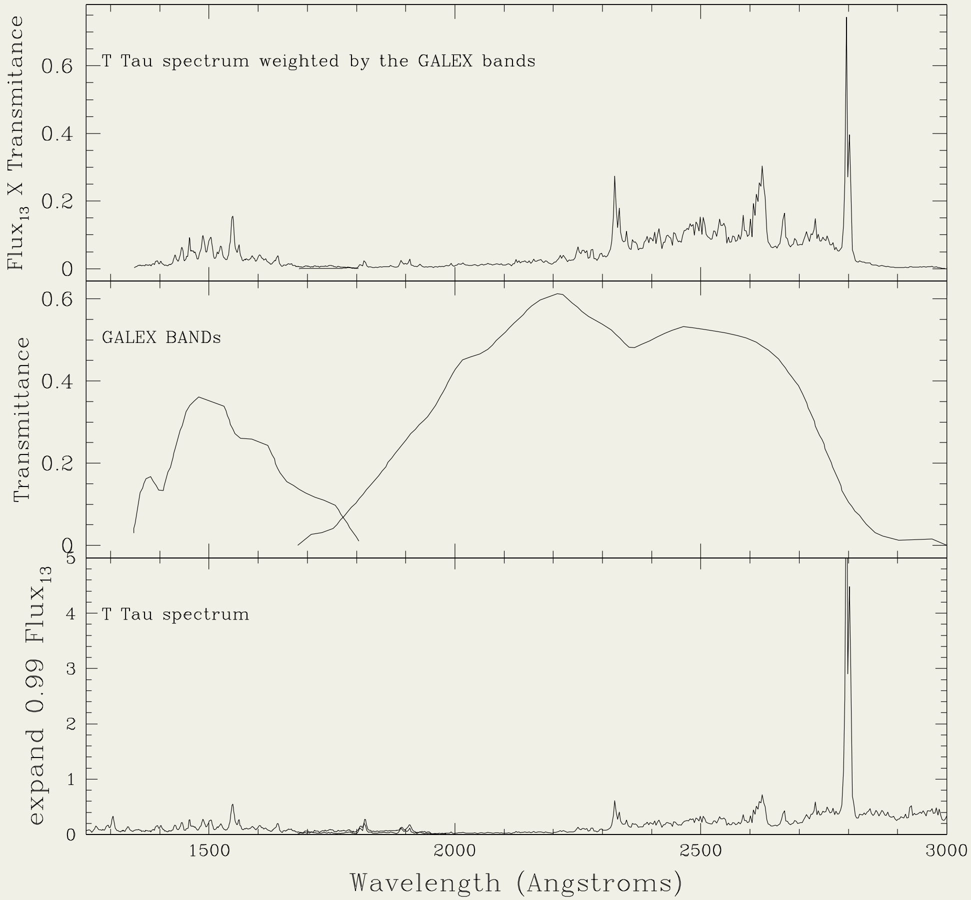
Fitzpatrick and Massa (2005) extinction law

$$k(\lambda - V) = c_1 + c_2 x + c_3 D(x, x_0, \gamma) + c_4 F(x),$$

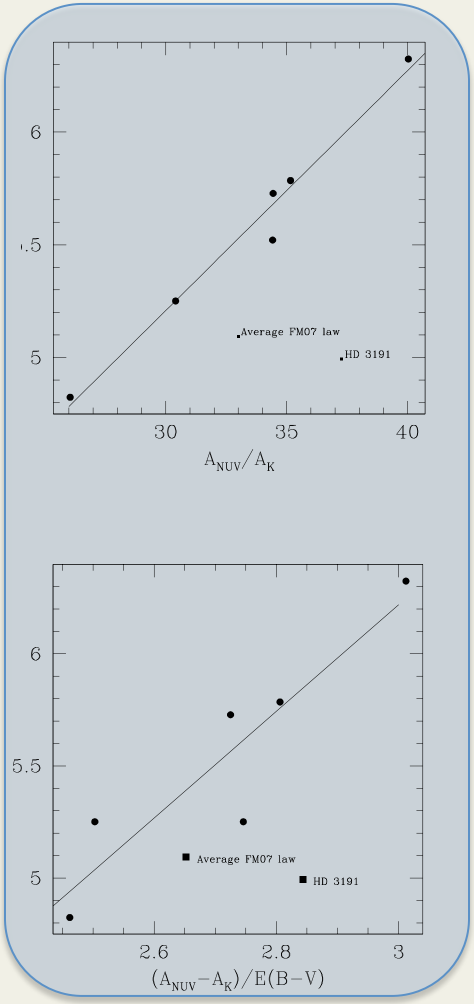
where

$$D(x, x_0, \gamma) = \frac{x^2}{\left(x^2 - x_0^2\right)^2 + x^2\gamma^2},$$

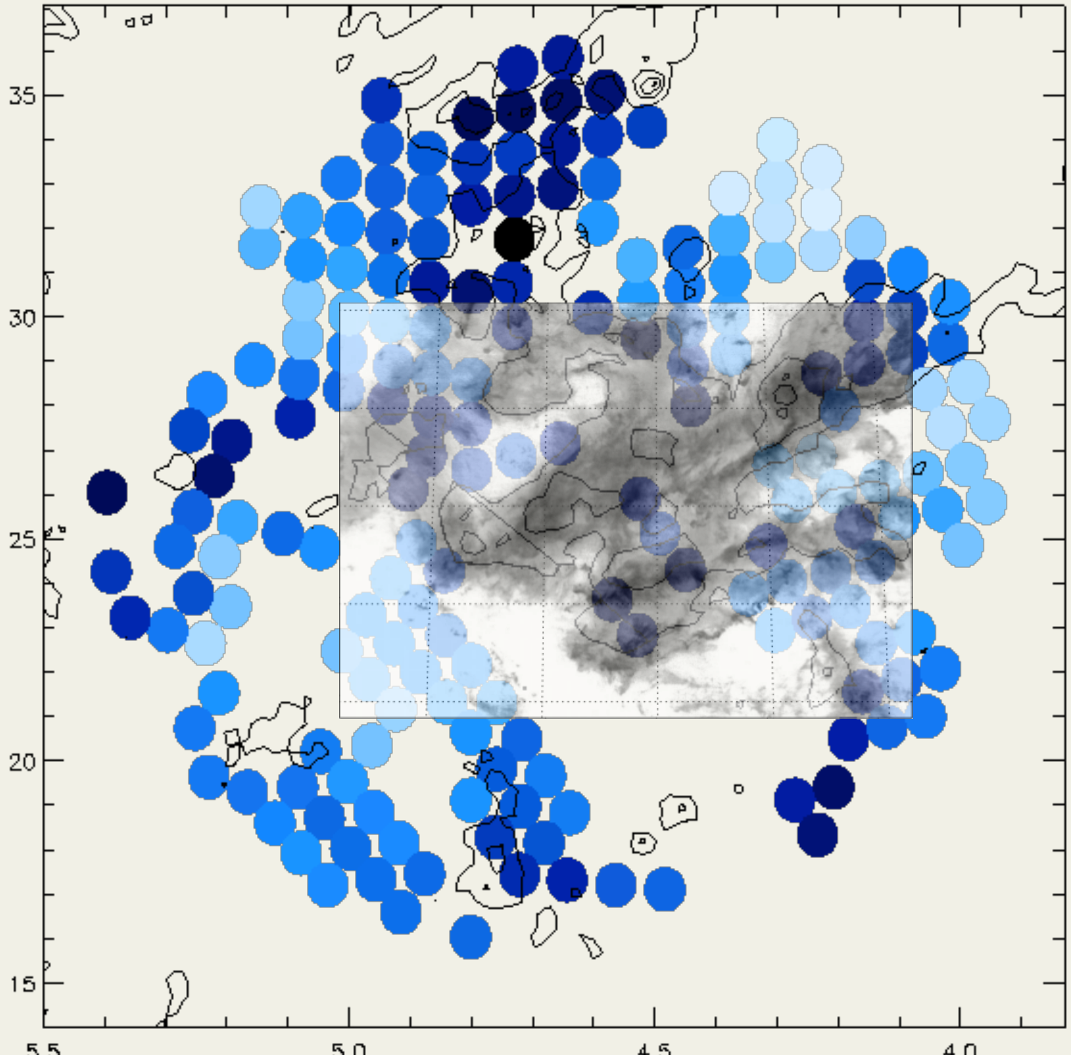
THE GALEX NUV BAND



Variation of the area of the bump with NUV band extinction

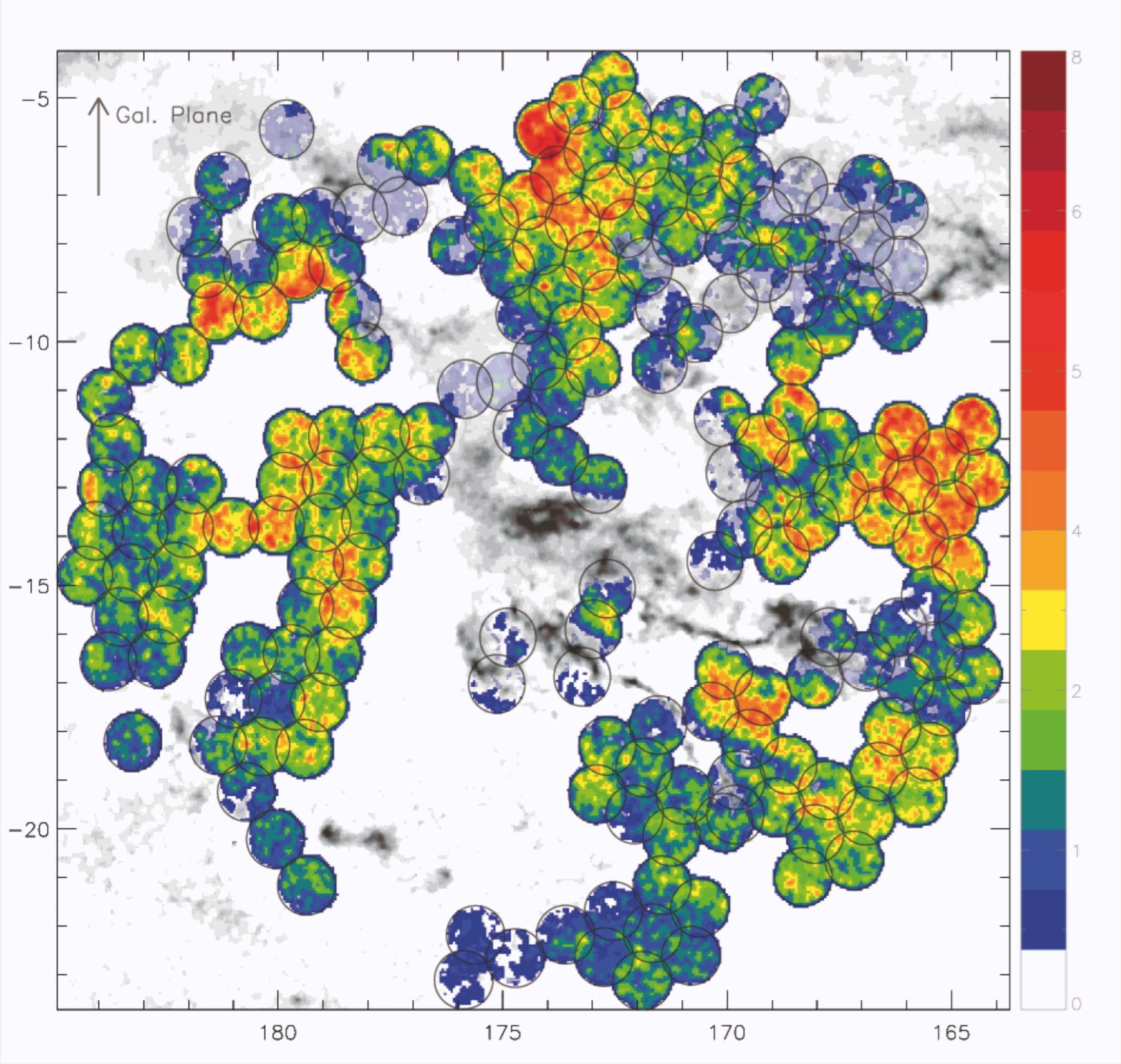


THE GALEX SURVEY OF THE TMC

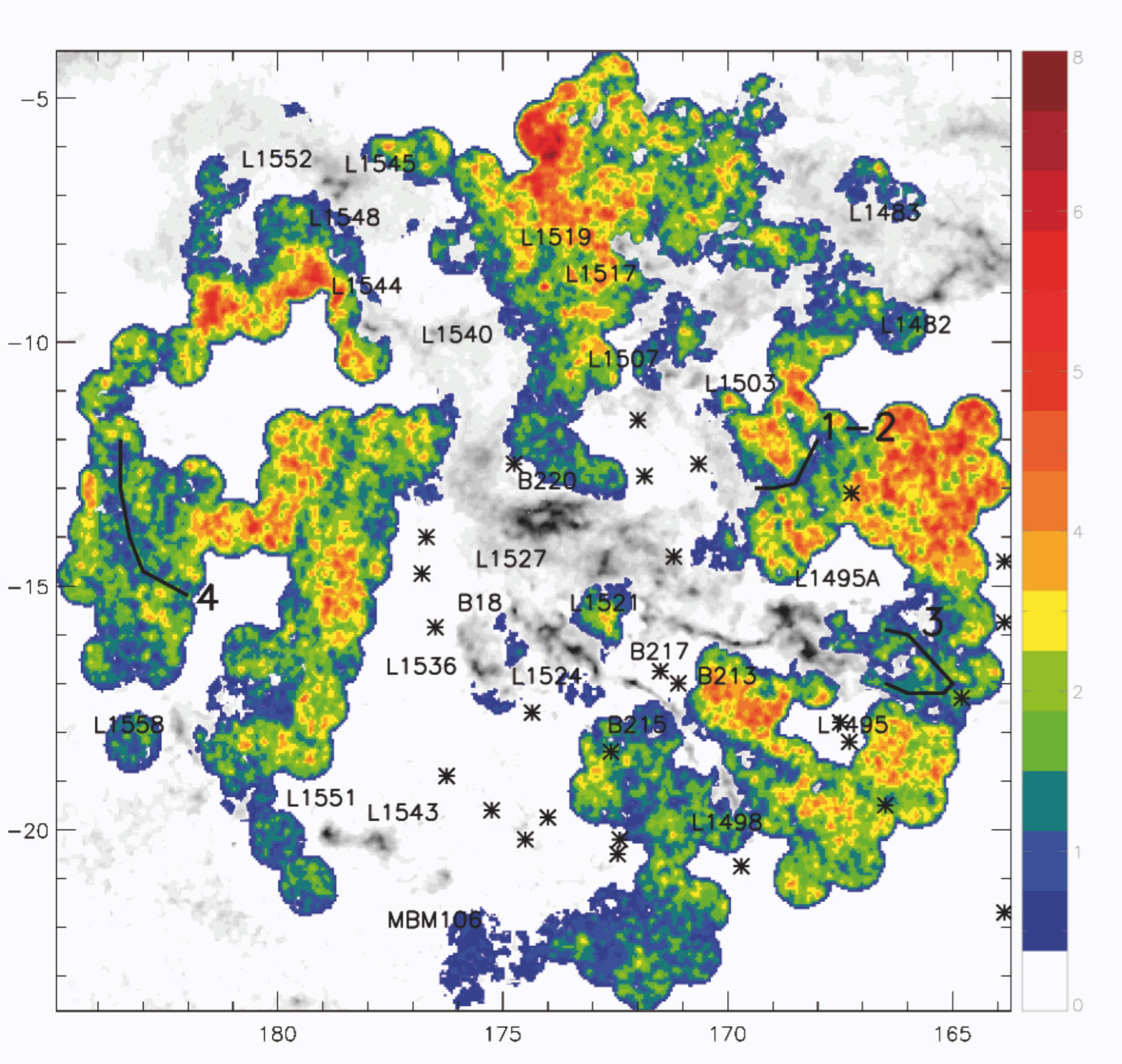


Gómez de Castro et al 2011

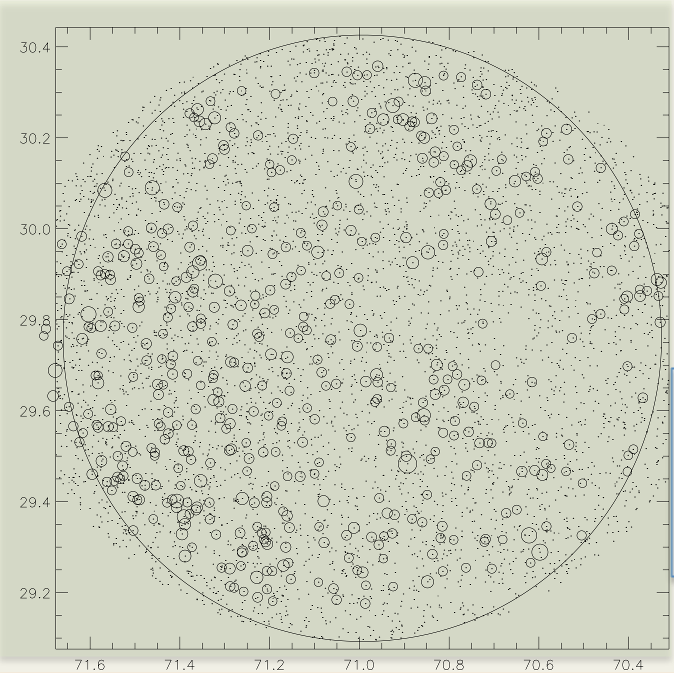
STELLAR DENSITY IN STARS/9arcmin^2



STELLAR DENSITY IN STARS/9arcmin^2



METHOD 1



$A_{NUV} = 2.8\,^{4.0}_{2.4}$ mag

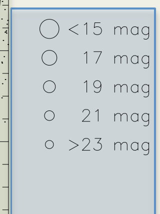
$A_{B} = 1.4\,^{2.5}_{1.2}$ mag

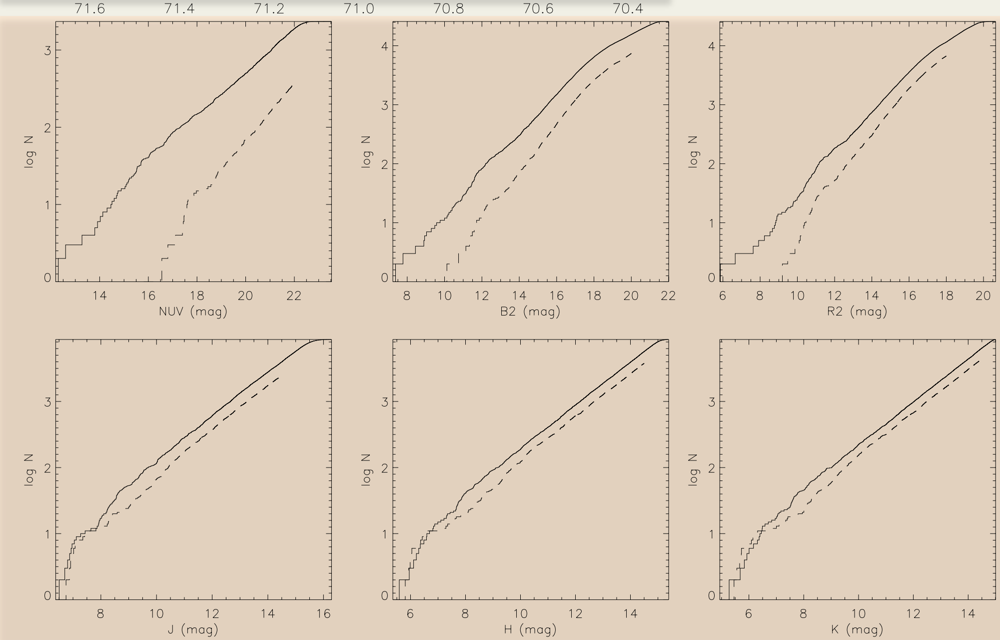
$A_{R} = 0.9\,^{3.2}_{0.8}$ mag

$A_{J} = 0.6\,^{0.9}_{-0.2}$ mag

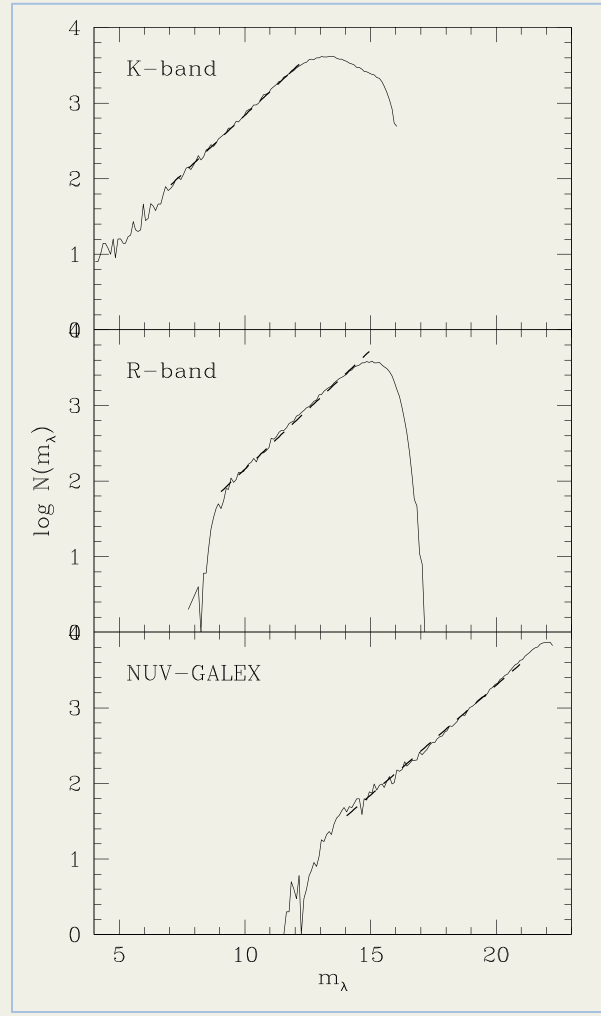
$A_{H} = 0.5\,^{0.8}_{-0.3}$ mag

$A_{K} = 0.5\,^{0.8}_{-0.5}$ mag



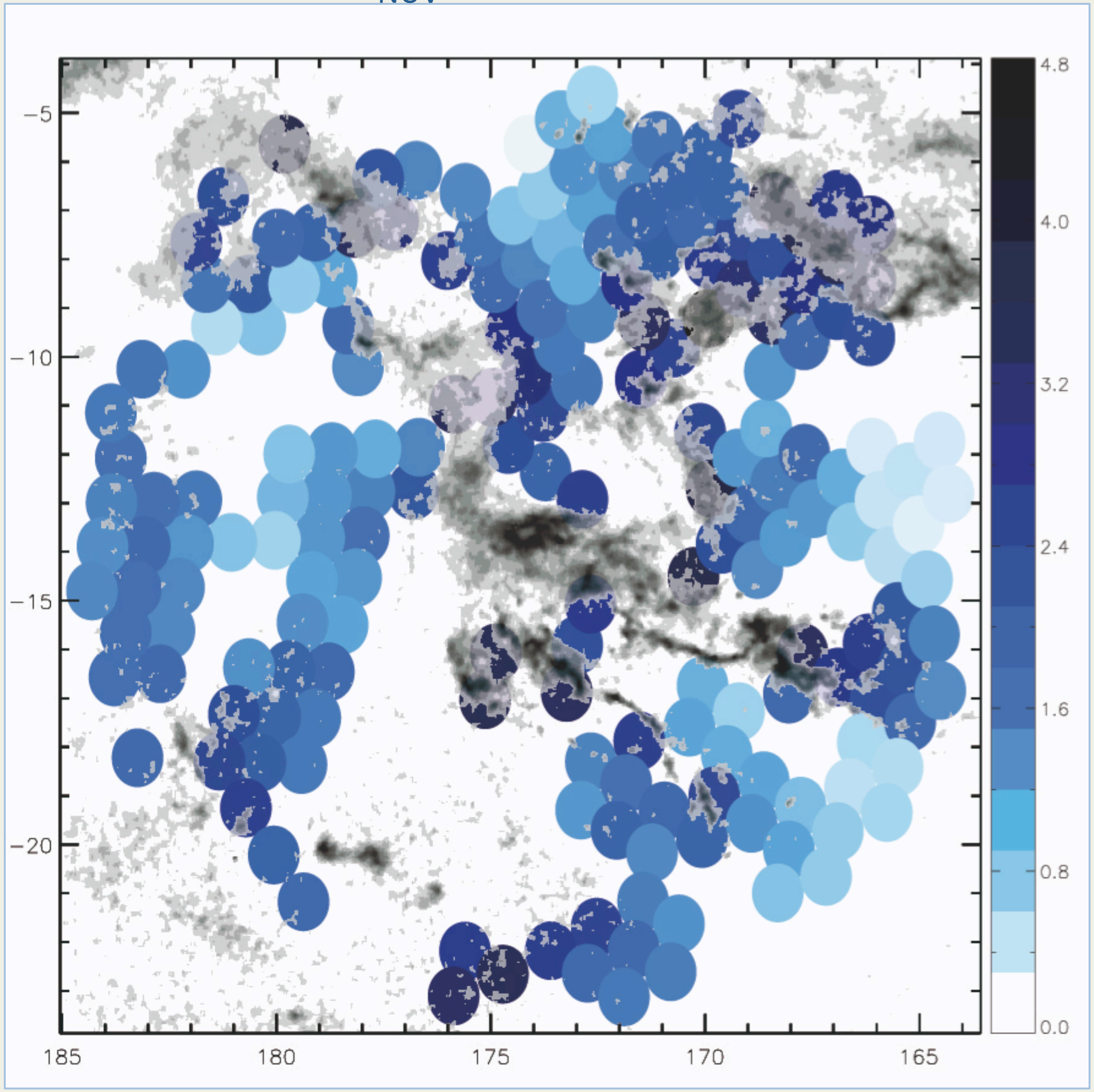


METHOD 2

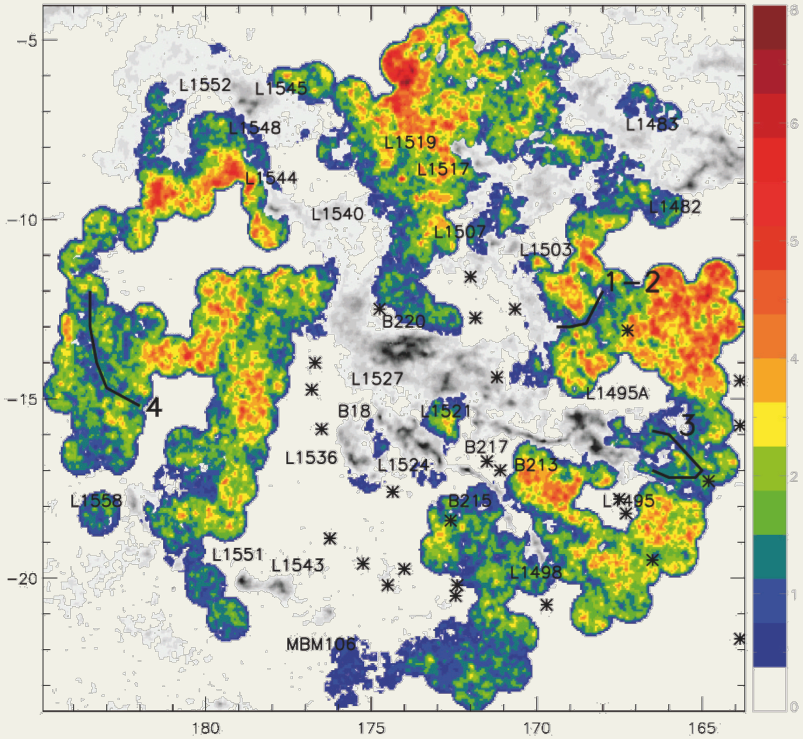


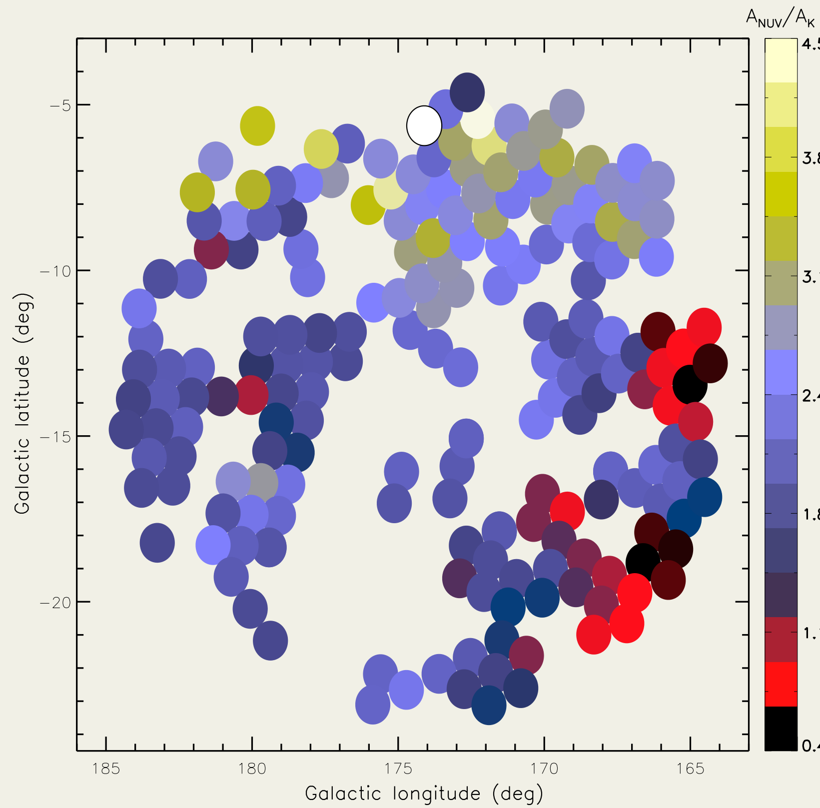
$$A_\lambda = \log(N_0/N)/b_\lambda$$

AVERAGE A_{NUV} per GALEX AIS tile

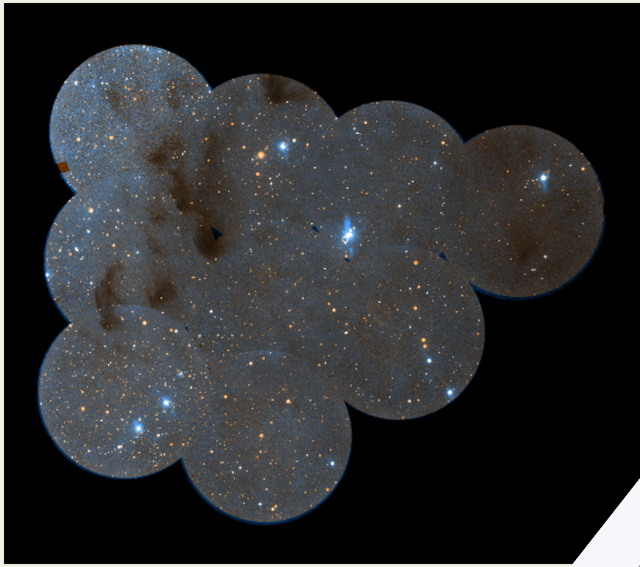


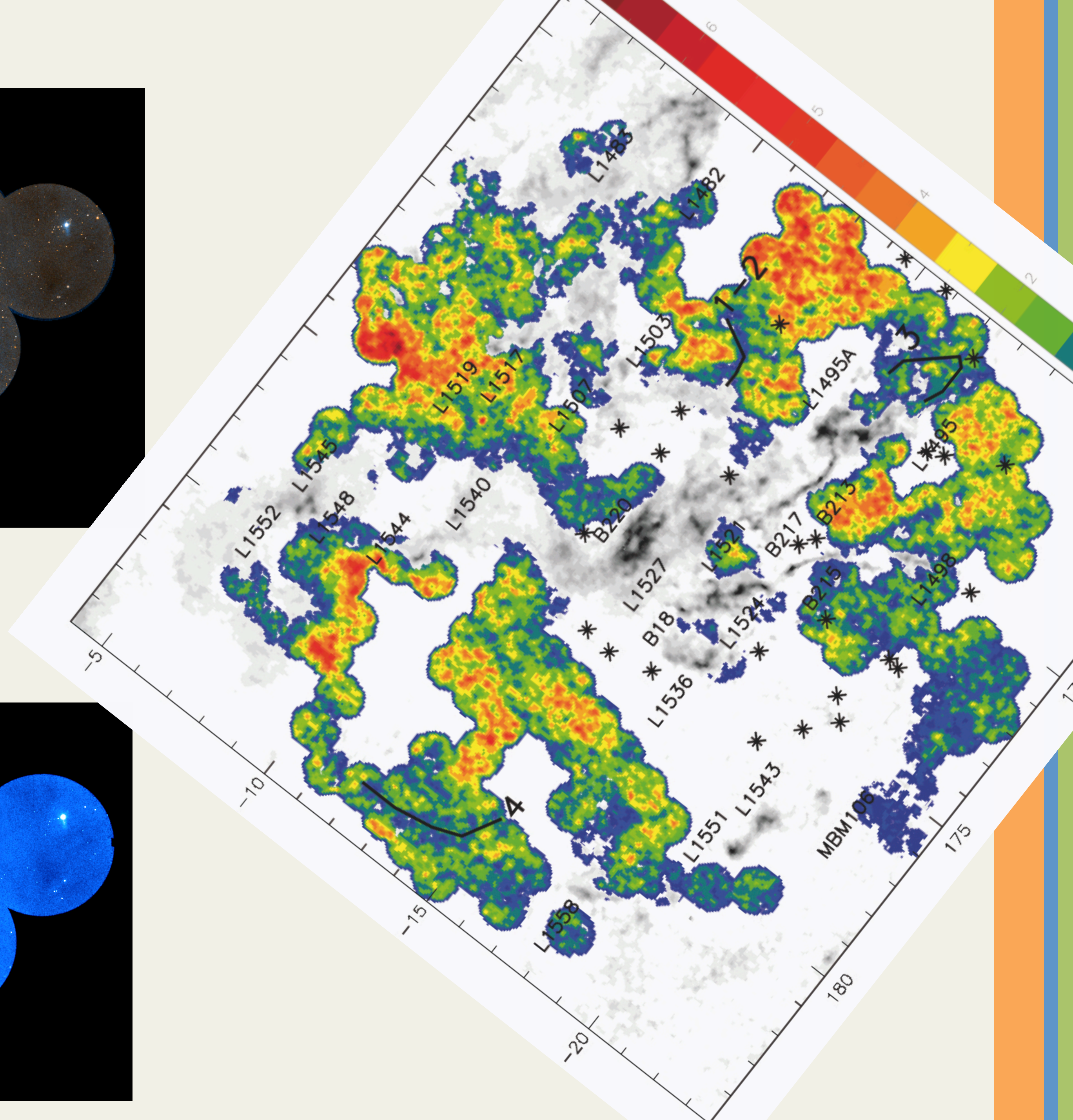
AVERAGE A_{NUV}/A_K per GALEX AIS tile





- There are significant variations in the A_{NUV}/A_K ratio over the cloud
- The A_{NUV}/A_K ratio depends on the filling factor of the cloud material in the GALEX field
- $(A_{NUV}-A_K)/E(B-V)$ will not depend on the filling factor - OPTIMAL




6
5
4
2
L1483
L1482
1–2
L1503
L1495A
3
L1519
L1517
L1507
L1545
L1495
L1552
L1548
L1540
B220
B213
L1544
L1527
L1521
B217
B215
L1498
B18
L1524
L1536
L1543
4
L1551
MBM106
L1558
−5
−10
−15
−20
170
175
180