

κ_d

Chris Clark

Simon Schofield

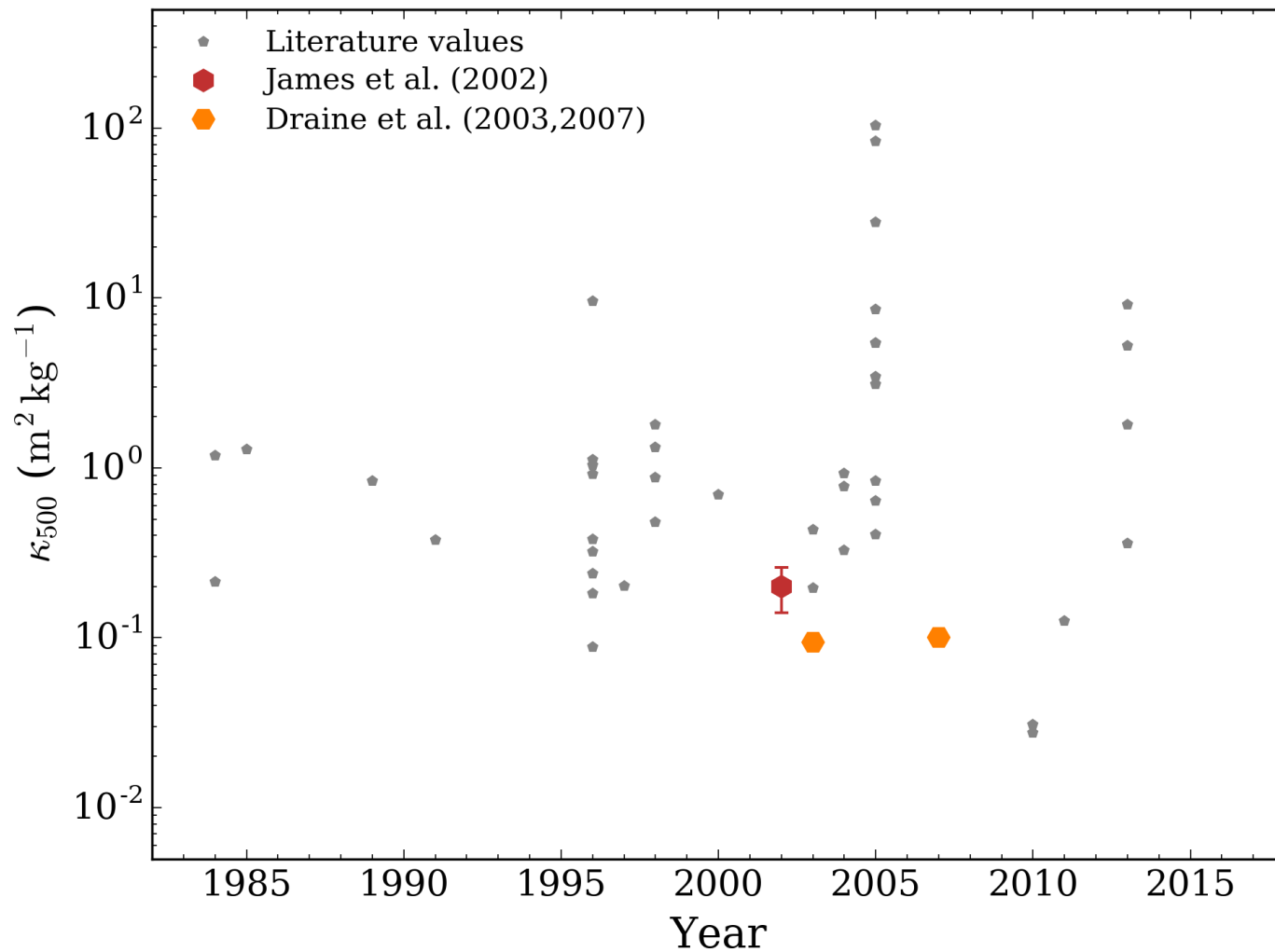
Haley Gomez

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Science & Technology
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The Elusive κ_d



$$M_d = M_g \epsilon_d f_Z$$

M_d = Dust mass

M_g = Gas mass

ϵ_d = ISM dust-to-metals ratio = 0.5 +/- 0.1

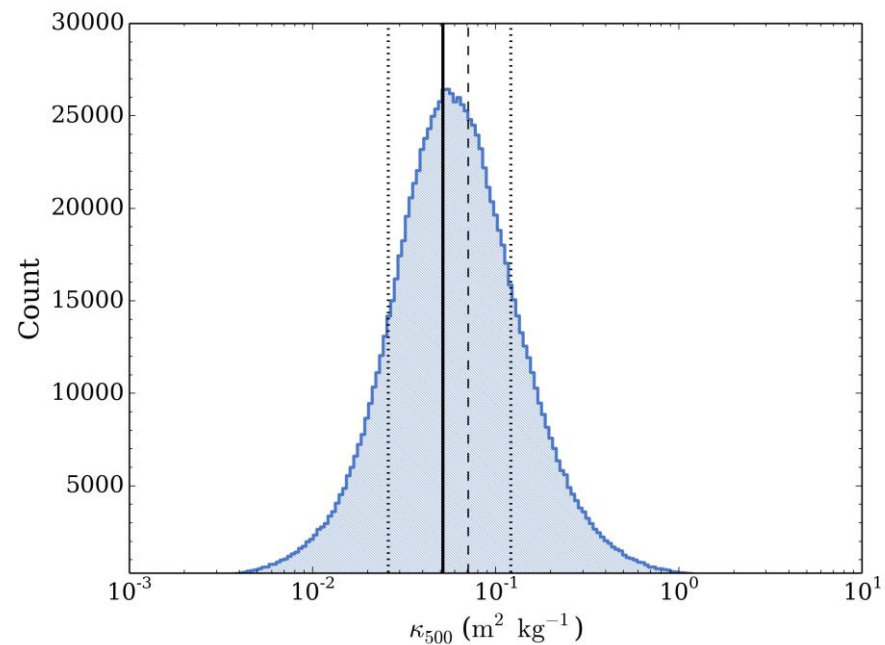
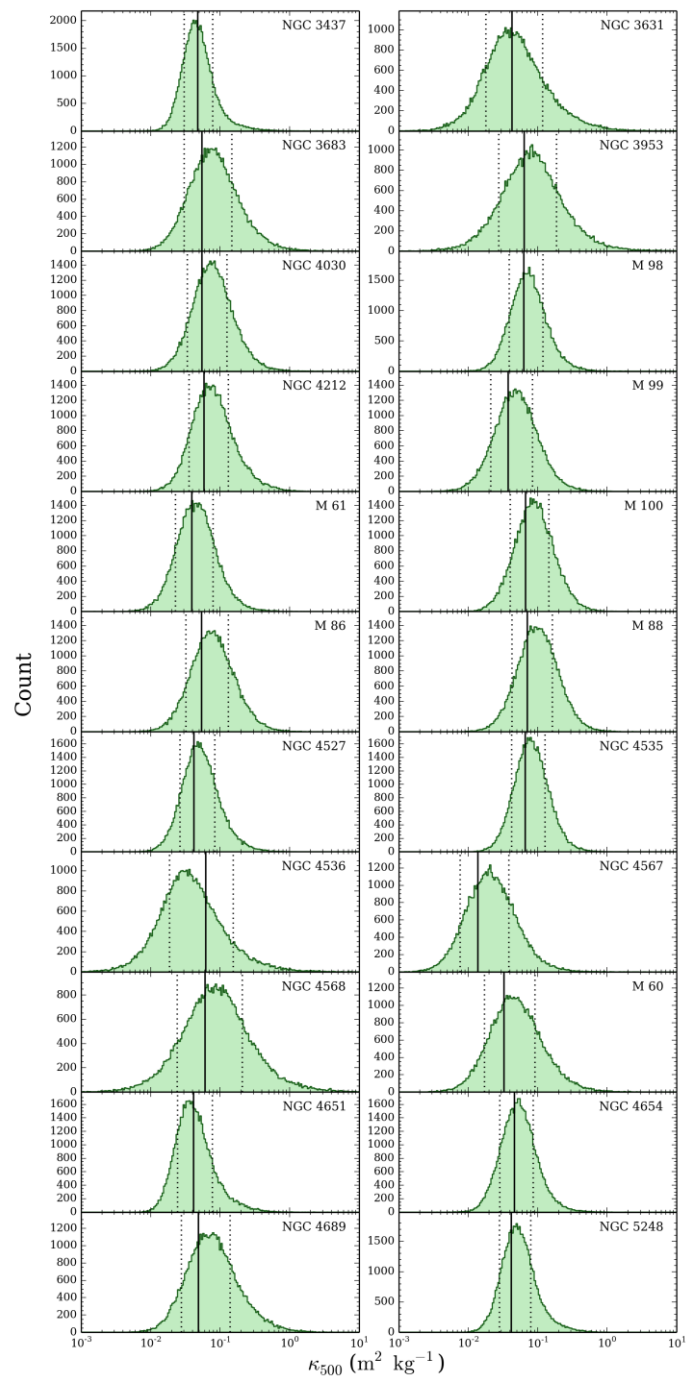
f_Z = ISM metal mass fraction (ie, ISM metallicity)

Improvements Over James et al (2002)

Using data from the HRS

- We now have *Herschel* photometry; James et al only had IRAS & SCUBA, and so could not constrain dust temperature.
- We have integrated (and normalised) ISM metallicities from drift-scan spectroscopy
- We have integrated CO maps; they only had central pointings.
- James et al did not consider the effect of oxygen depletion on their metallicities – we do.
- James et al did not account for Helium or gas-phase metals in their ISM masses – we do.

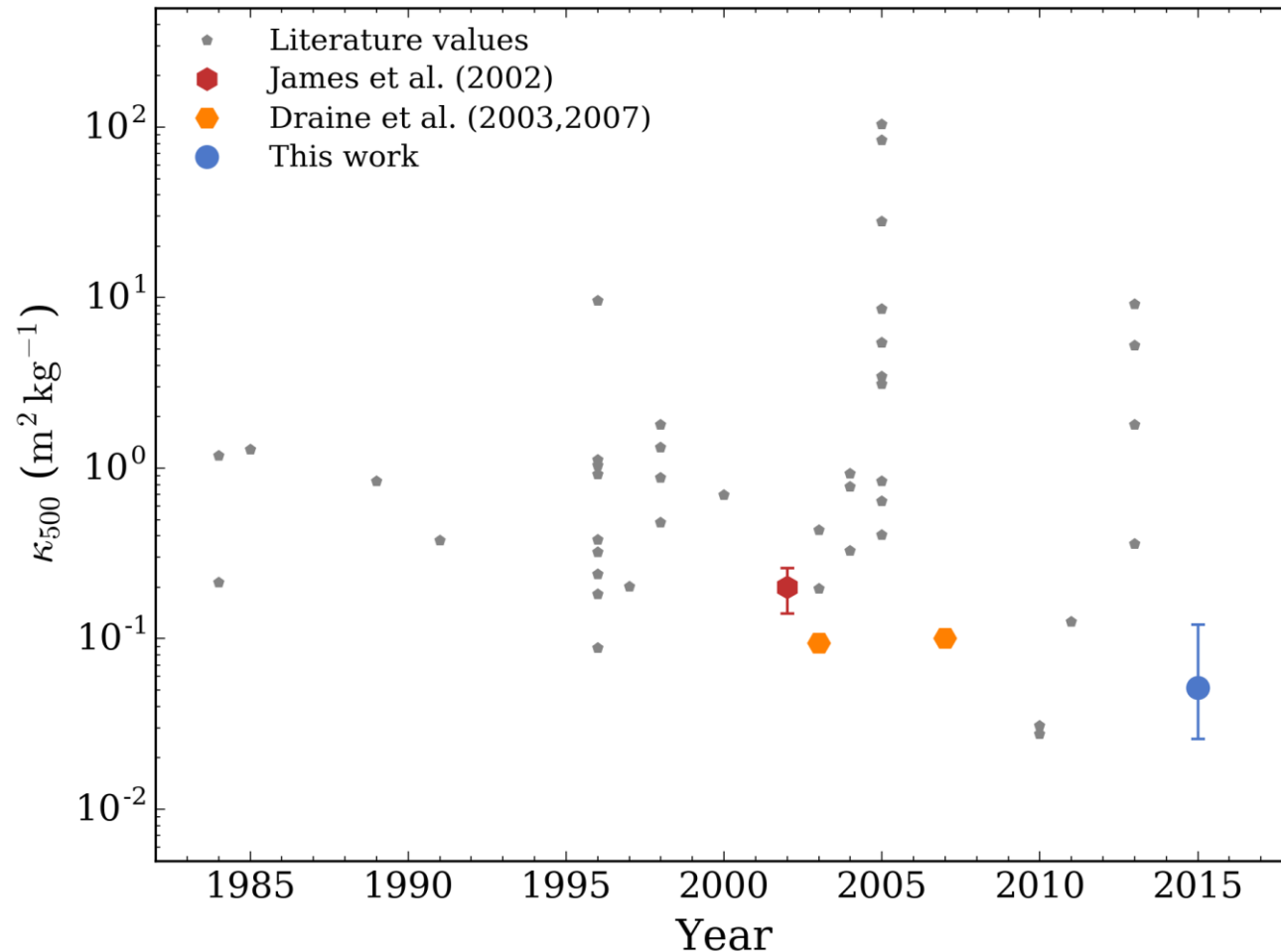
$$\kappa_{\lambda} = \frac{D^2}{\xi (M_{HI} + M_{H_2}) \varepsilon_d f_{Z_{\odot}} Z} \left(\frac{S_{\lambda_w}}{B_{\lambda}(T_w)} + \frac{S_{\lambda_c}}{B_{\lambda}(T_c)} \right)$$



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An Empirical Value For κ_d

$$\kappa_{500} = 0.05 \text{ l m}^2 \text{ kg}^{-1} (+/- \sim 0.24 \text{ dex})$$





DustPedia

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DustPedia Overview

- THEMIS – A physically-motivated dust model based upon laboratory observations of astrophysical minerals (see papers by A Jones, N Ysard).
- SKIRT – Radiative transfer modelling suite that can fit a dust model to galaxy observations in 3D (see papers by M Baes, P De Camps, S Verstoken).
- A hierarchical Bayesian SED fitting toolkit that can be used to model both galaxies both globally and pixel-by-pixel (see papers by F Galliano).
- A database of multiwavelength imagery and photometry database for all 876 nearby galaxies observed by *Herschel* for which $V < 3000$ km/s and $D25 < 1'$ (see upcoming paper by me).



DustPedia

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