

Parasitic Light

from optical surfaces, from Earth's atmosphere, dust

$$I_{\text{obs}} = I_{\text{true}} - \gamma \cdot I_{\text{true}} + \gamma \cdot [PSF \otimes I_{\text{true}}]$$

point spread function PSF

$$PSF = (1 - \alpha - \beta) \delta(x - x_0, y - y_0) \\ + \alpha L(x - x_0, y - y_0) + \beta G(x - x_0, y - y_0, \sigma)$$

wide-angle scattering L and narrow-angle scattering G ,
often $L =$ Lorentzian and $G =$ Gaussian, but problems with
normalisation of a 2D Lorentzian

for simplicity: use constant function for wide-angle scattering
and calculate intermediate intensity I_{int} following

$$I_{\text{int}} = (I_{\text{obs}} - \alpha \bar{I}) / (1 - \alpha)$$

then deconvolve with a Gaussian with the PSF

$$PSF = (1 - \beta) \delta(x - x_0, y - y_0) + \beta G(x - x_0, y - y_0, \sigma),$$

$$I_{\text{true}} = \mathcal{F}^{-1}\{\mathcal{F}(I_{\text{int}}) / \mathcal{F}(PSF)\}$$

observing sunspots and/or pores

Table 3. Apparent diameter and true continuum contrast at 600 nm for the three pores.

No.	ϕ	I_{600}
I	4''	31%
II	3''	43%
III	2''	53%

from Sütterlin, 1998

from Maltby et al., 1986

estimates of parasitic light parameters

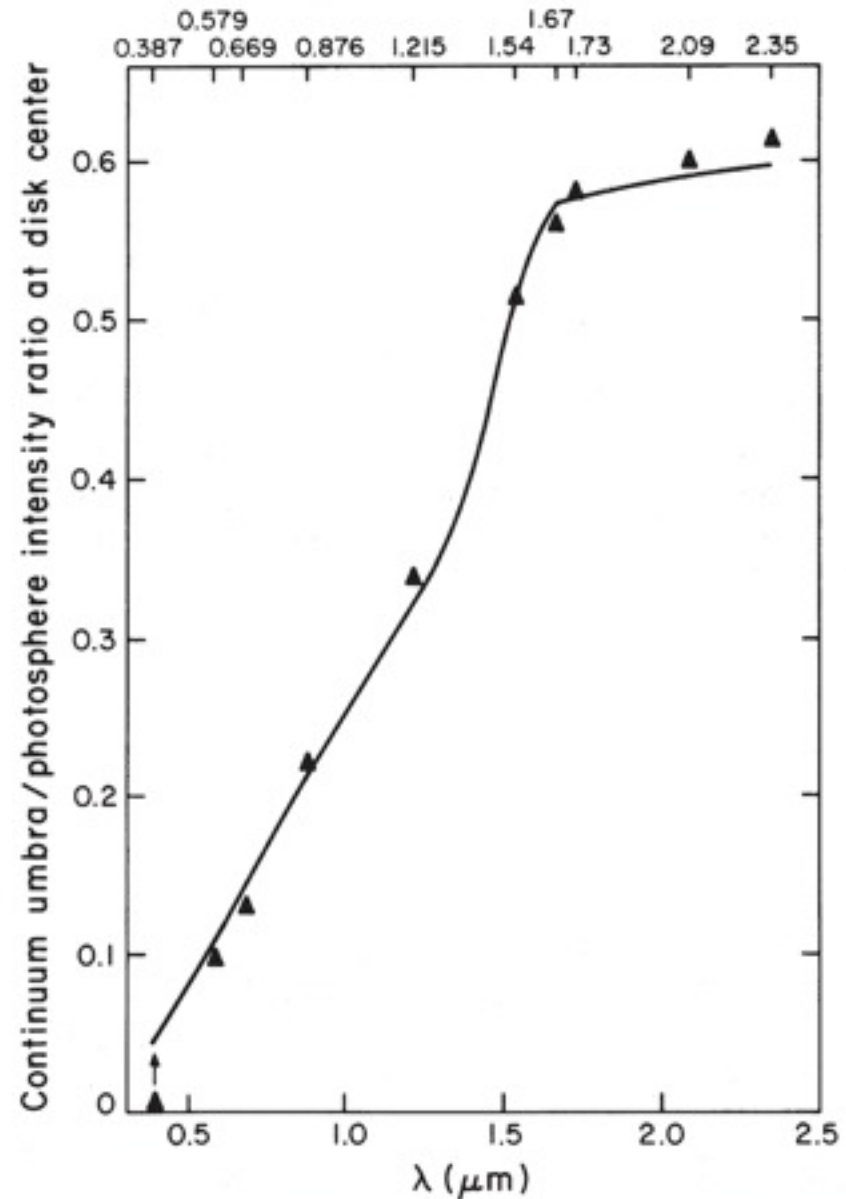
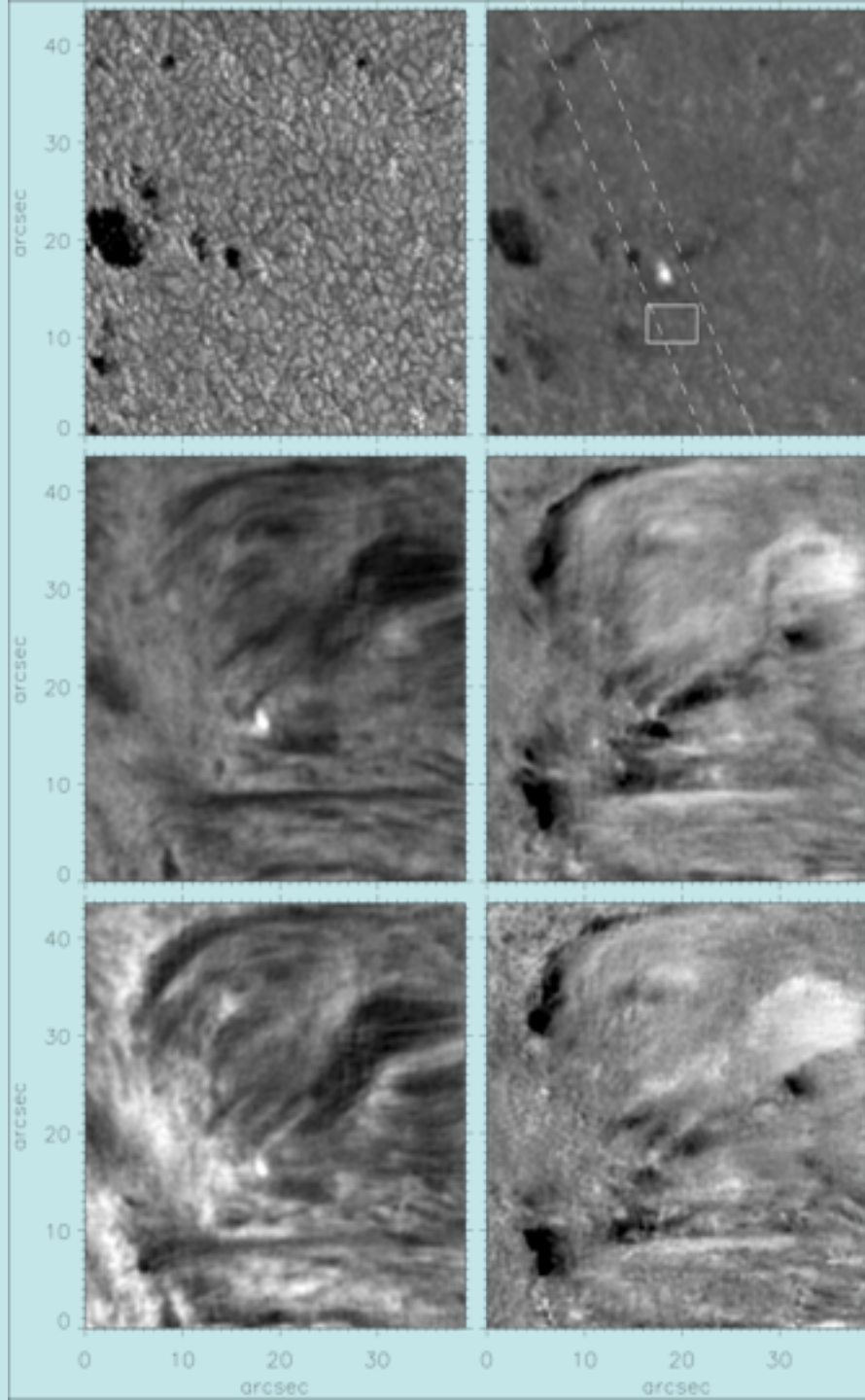
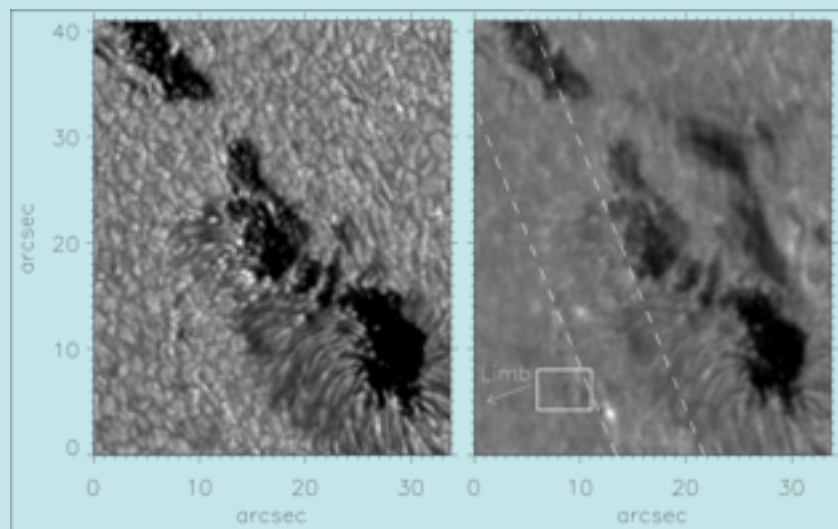
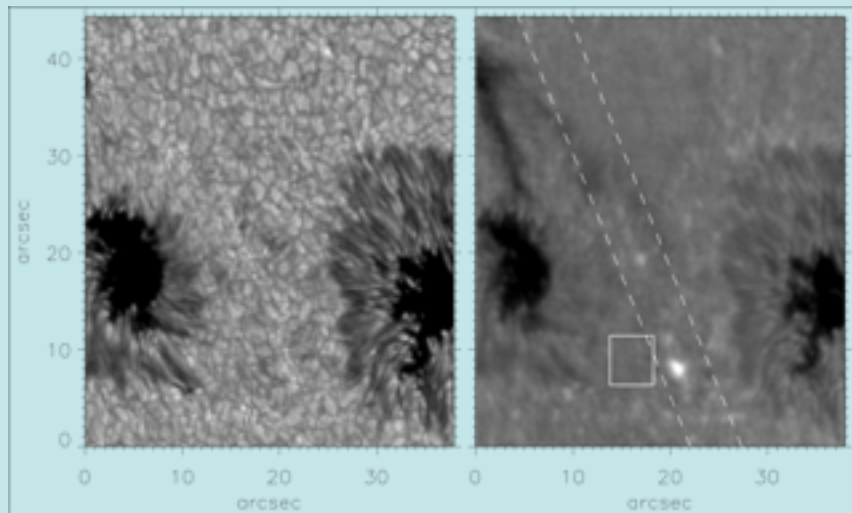
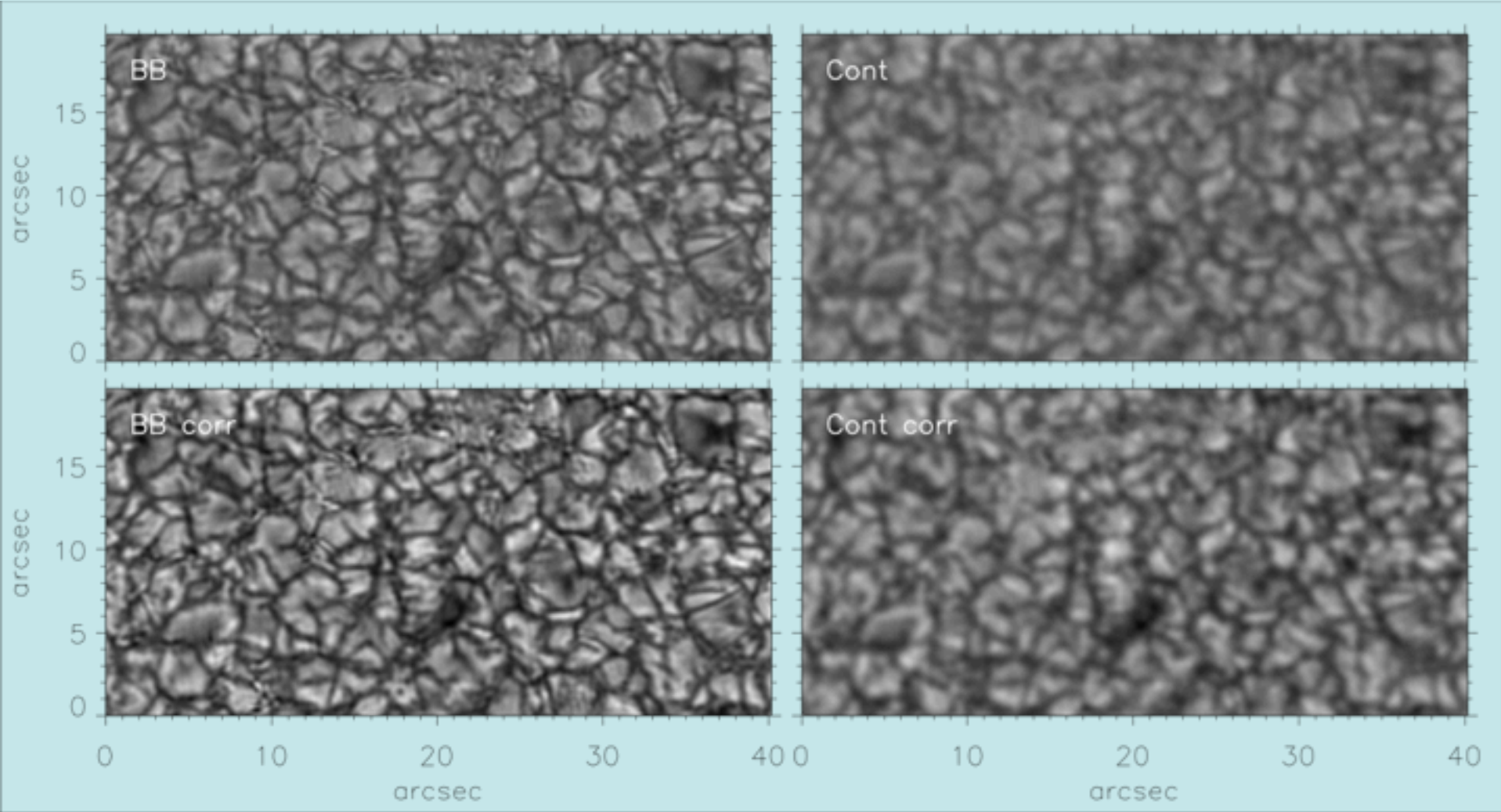
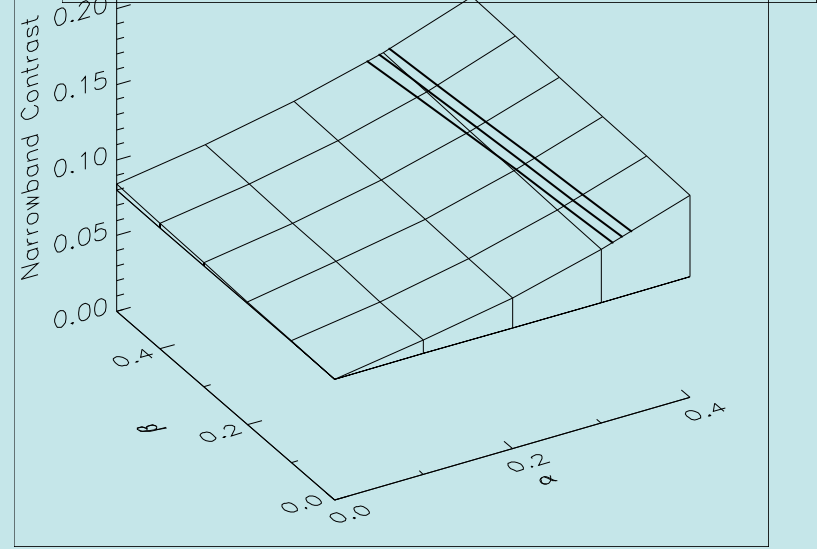
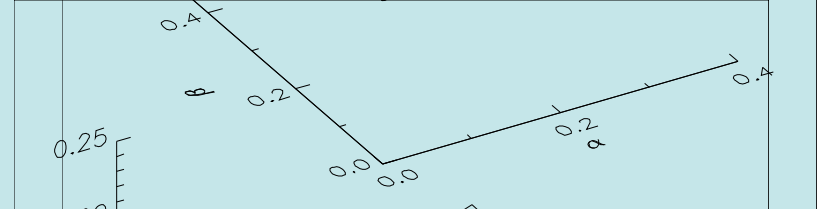
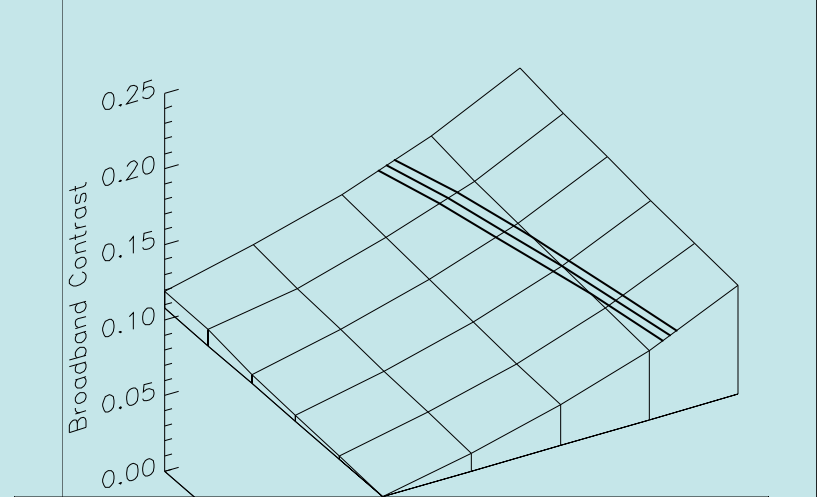
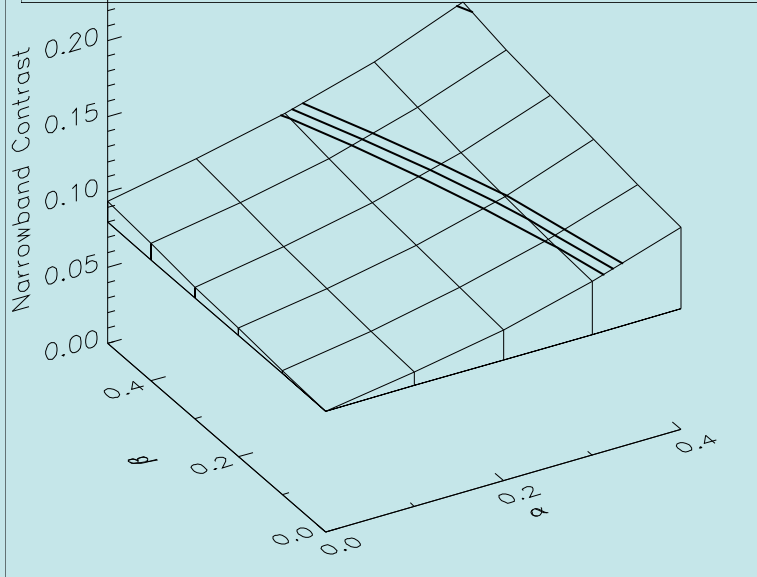
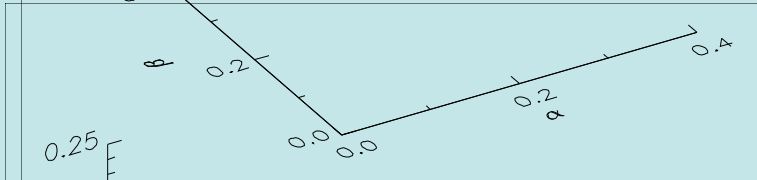
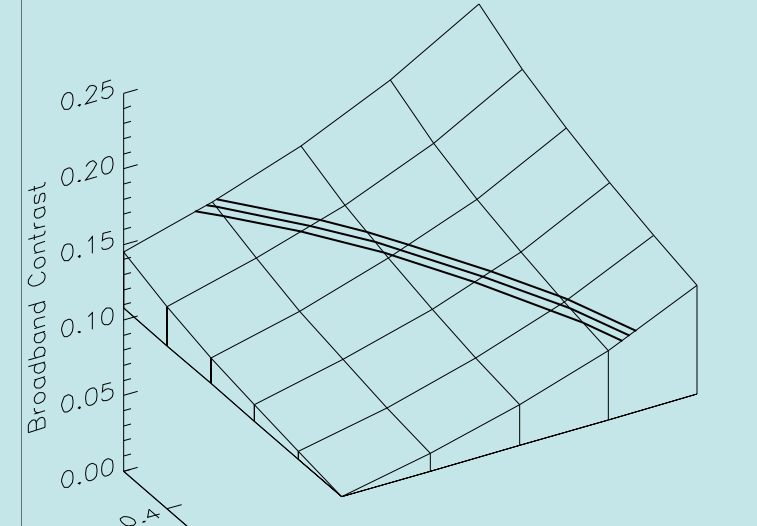


FIG. 2.—Wavelength dependence of the computed continuum umbra/photosphere intensity ratio at disk center, $\phi_c^c (\mu = 1)$, for the preliminary model M_L . Observed values (triangles) corrected for the effect of spectral lines (see Table 4). For the 0.387 μm region, the correction is unknown.



comparison with contrasts from simulations





more information: compare power spectra from simulations with observations