



SPECTRAL SENSITIVITY OF PHOTOGRAPHIC EMULSIONS

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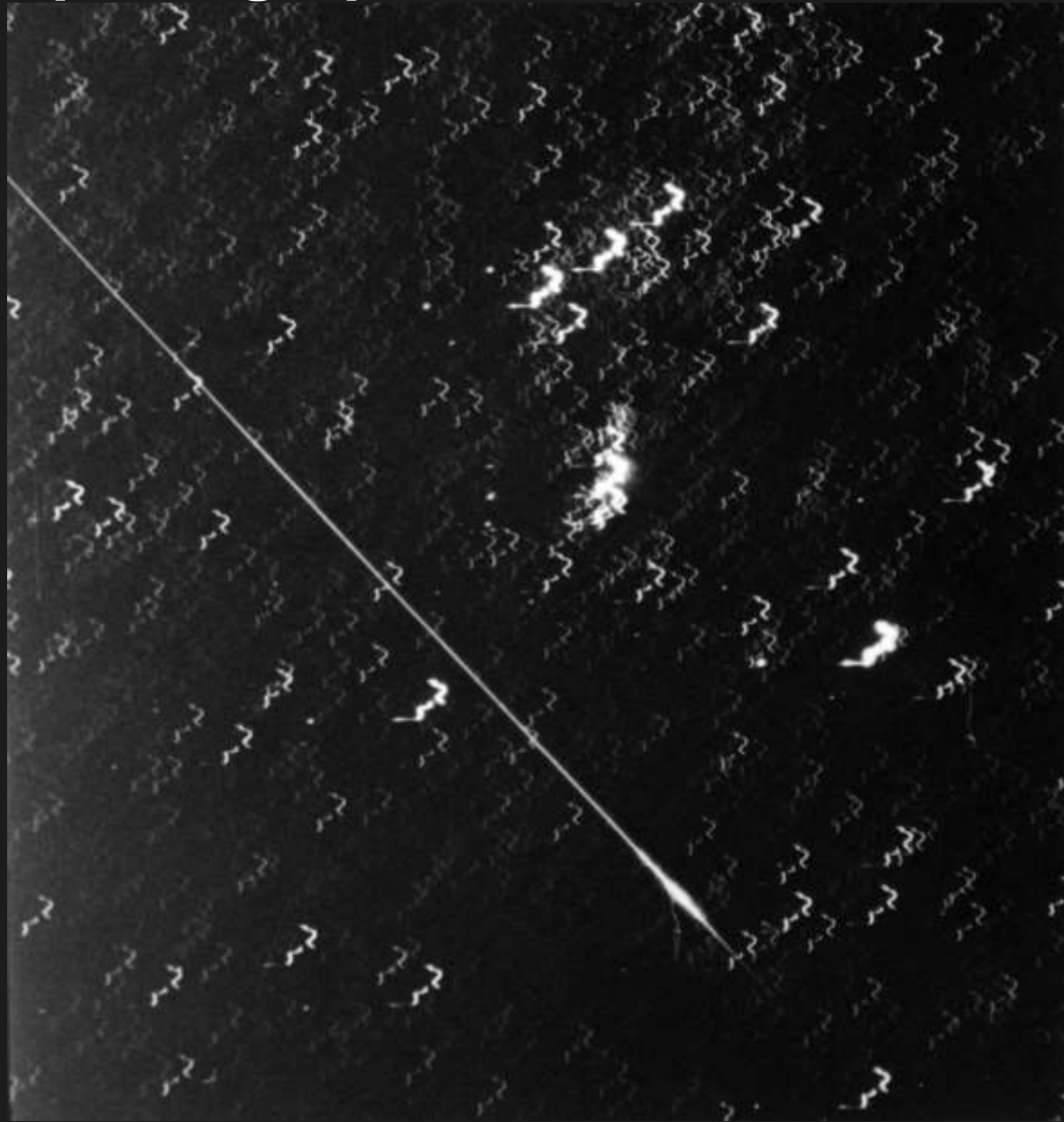
E-mail: cmn@rgn.hr <http://cmn.rgn.hr>



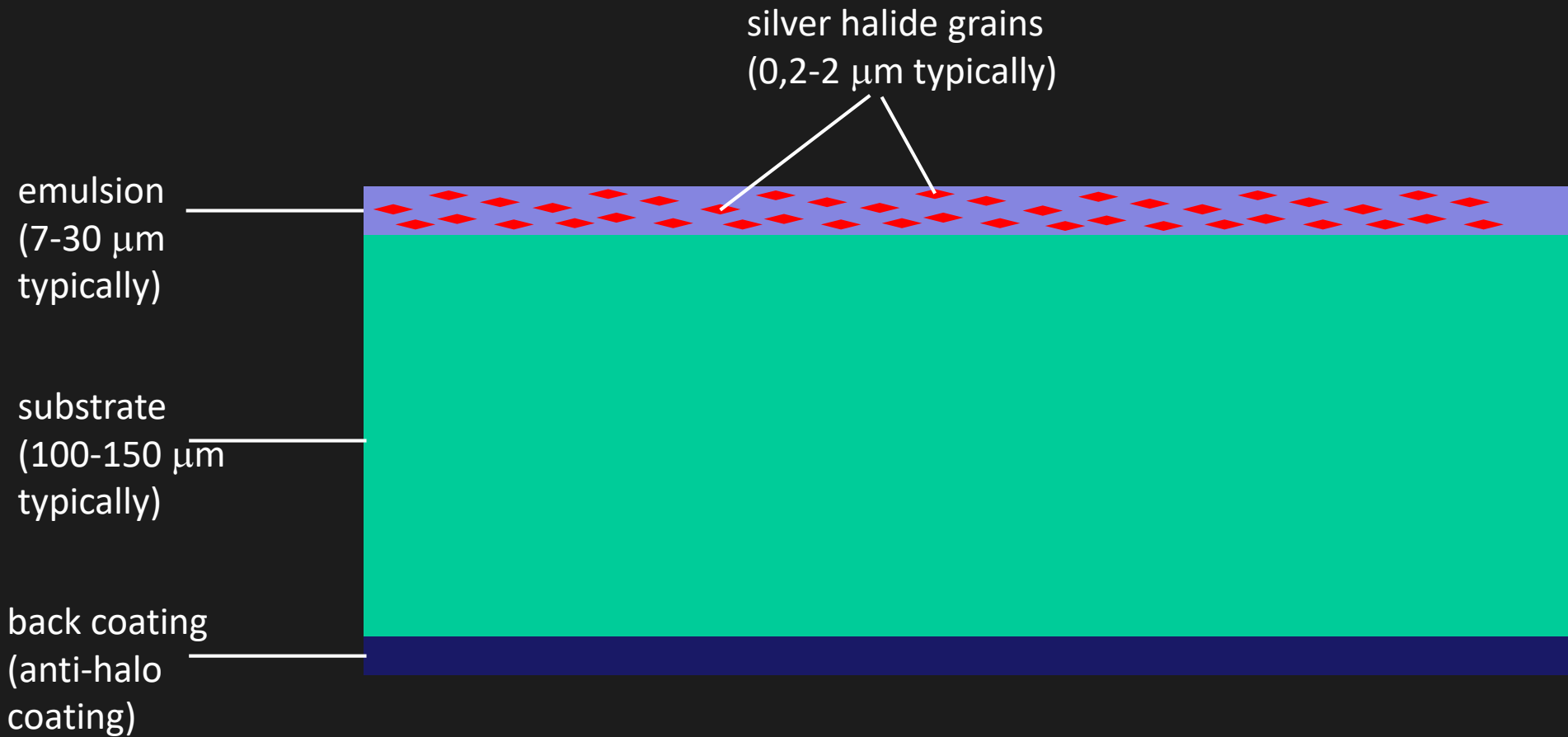
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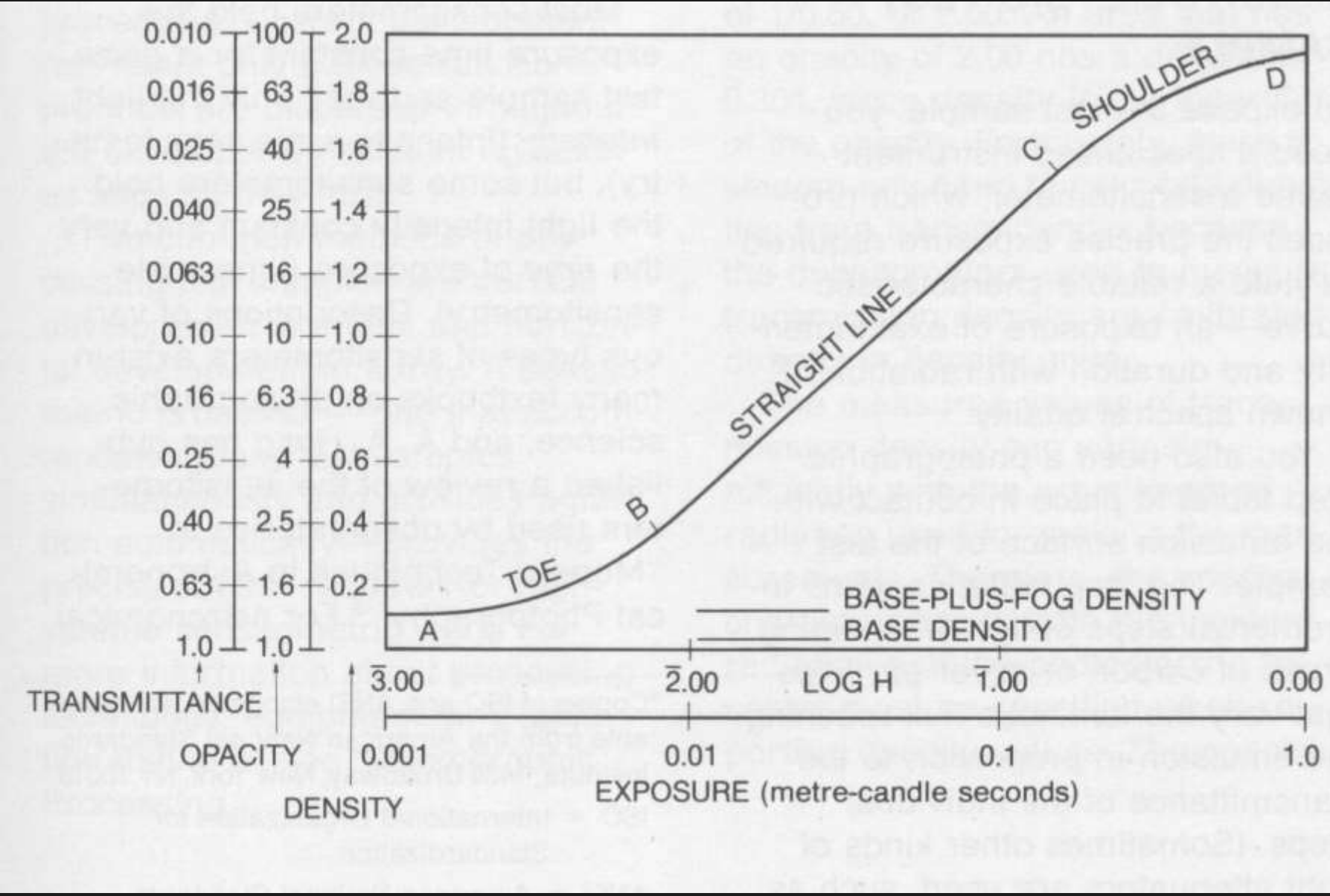
Meteor recorded by a photographic camera



The photographic emulsion



Sensitivity to light



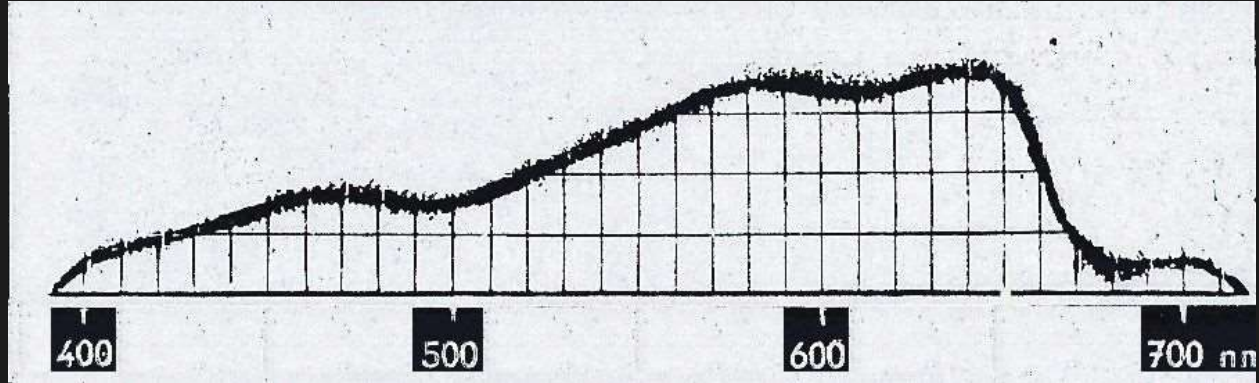
Spectral sensitivity - modern definition

Spectral sensitivity = relative response to light, as a function of the wavelength
(or frequency)

sometimes term "equal energy response" is used, meaning response to light
of the same intensity at every wavelength

Spectral sensitivity data - what data we have?

Orwo NP-27 datasheet 1973
3200 K
ORDINATE = ???



some old book
Ordinate = log S
equal energy?

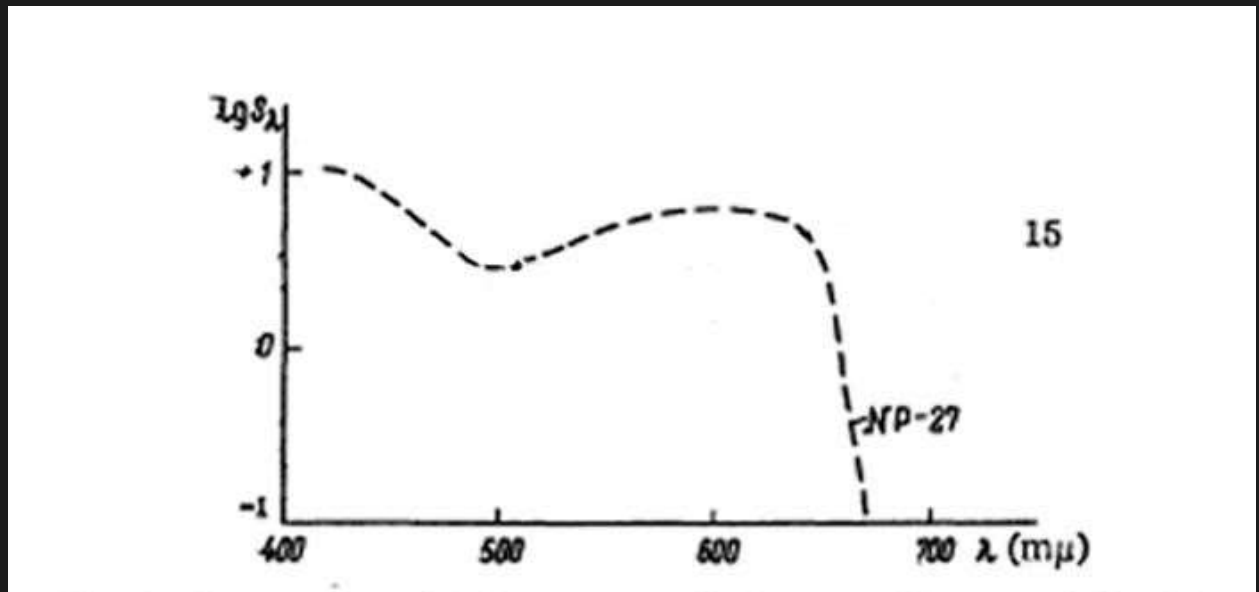
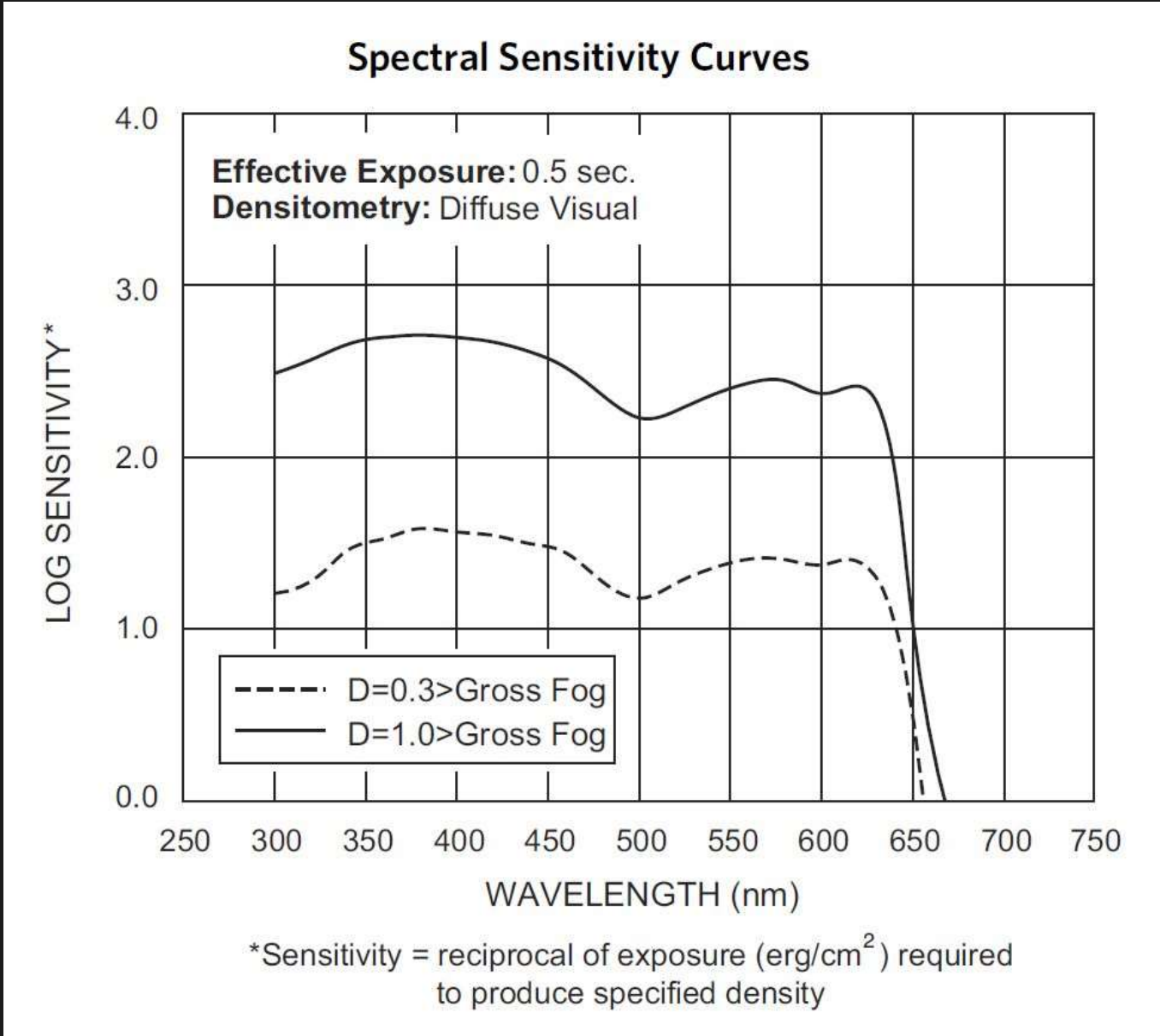


Fig. 1. Spectral sensitivity curves of photographic materials. 1) ORWO NP-27;

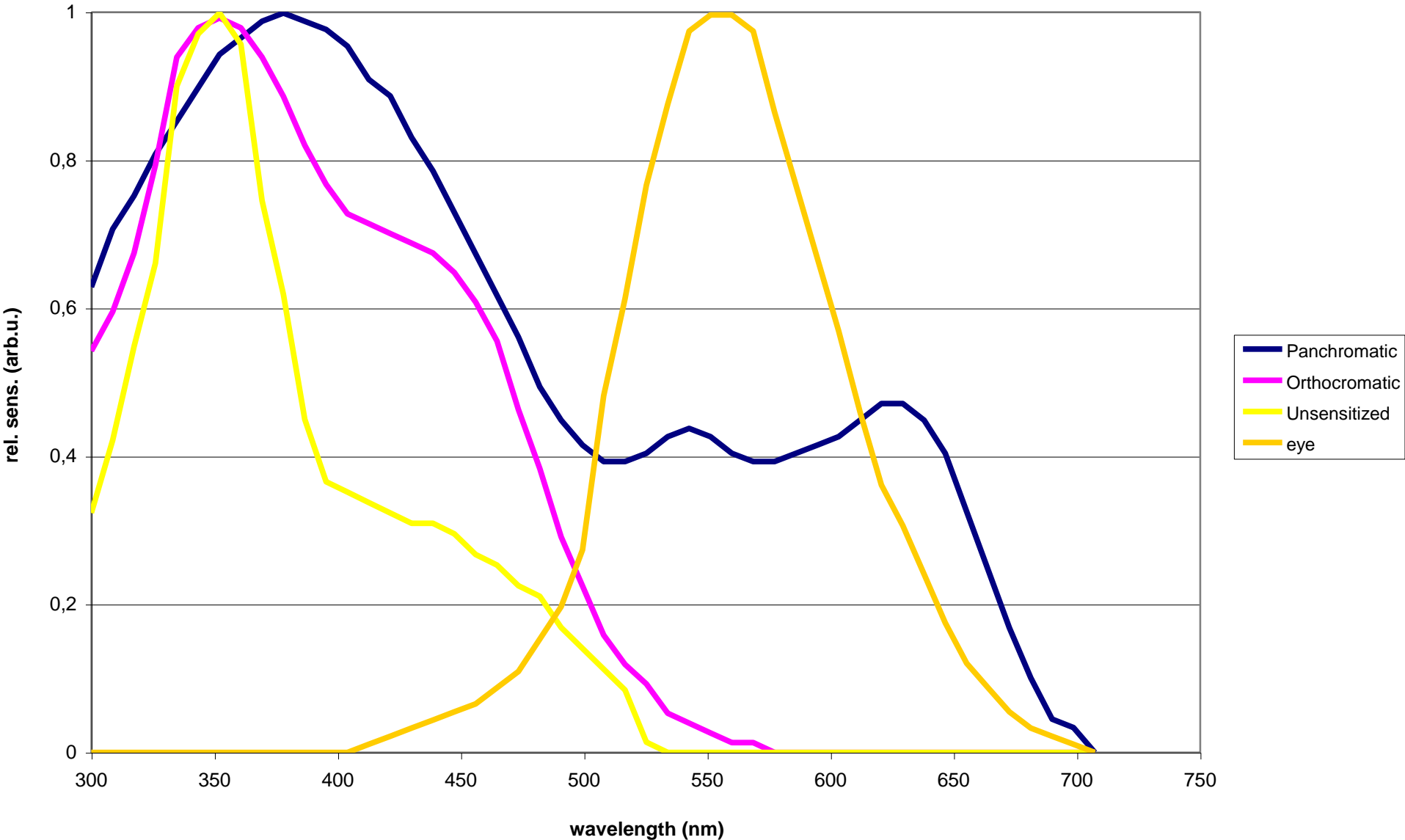
Sometimes we get lucky!

Kodak datasheet
for Tri-X film

For calculations,
we need a data file
of some sort!



Spectral sensitivity (generic emulsions)



Beyond spectral sensitivity curve

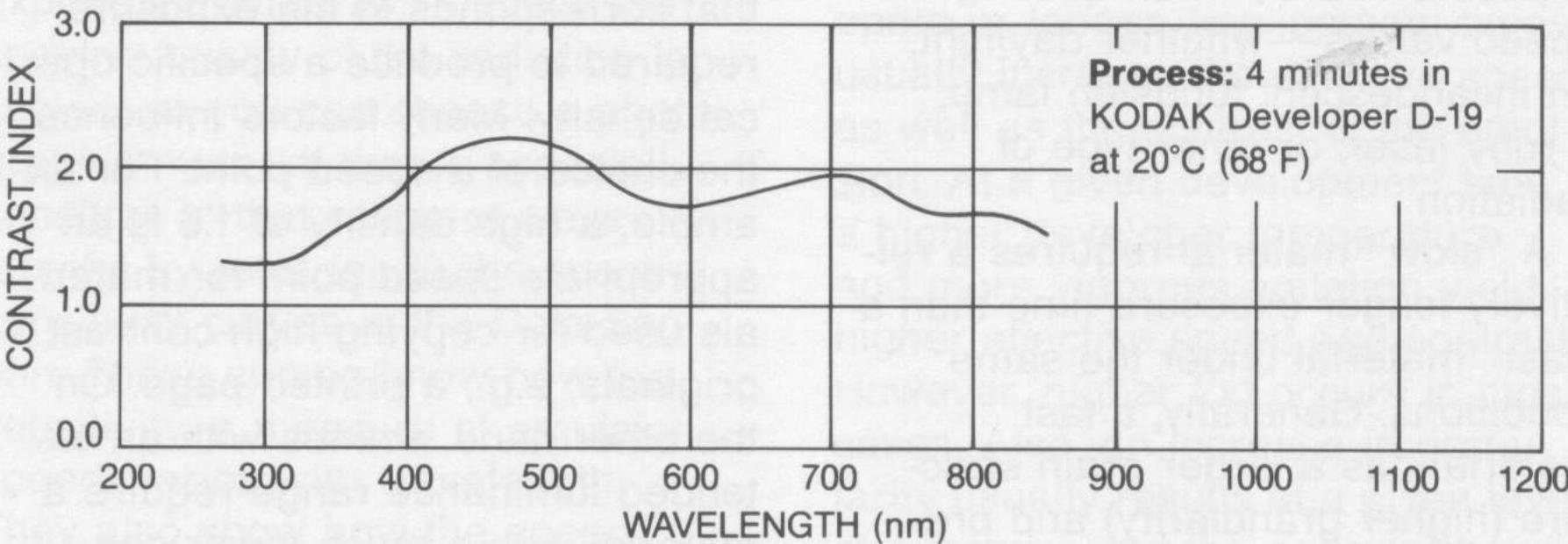
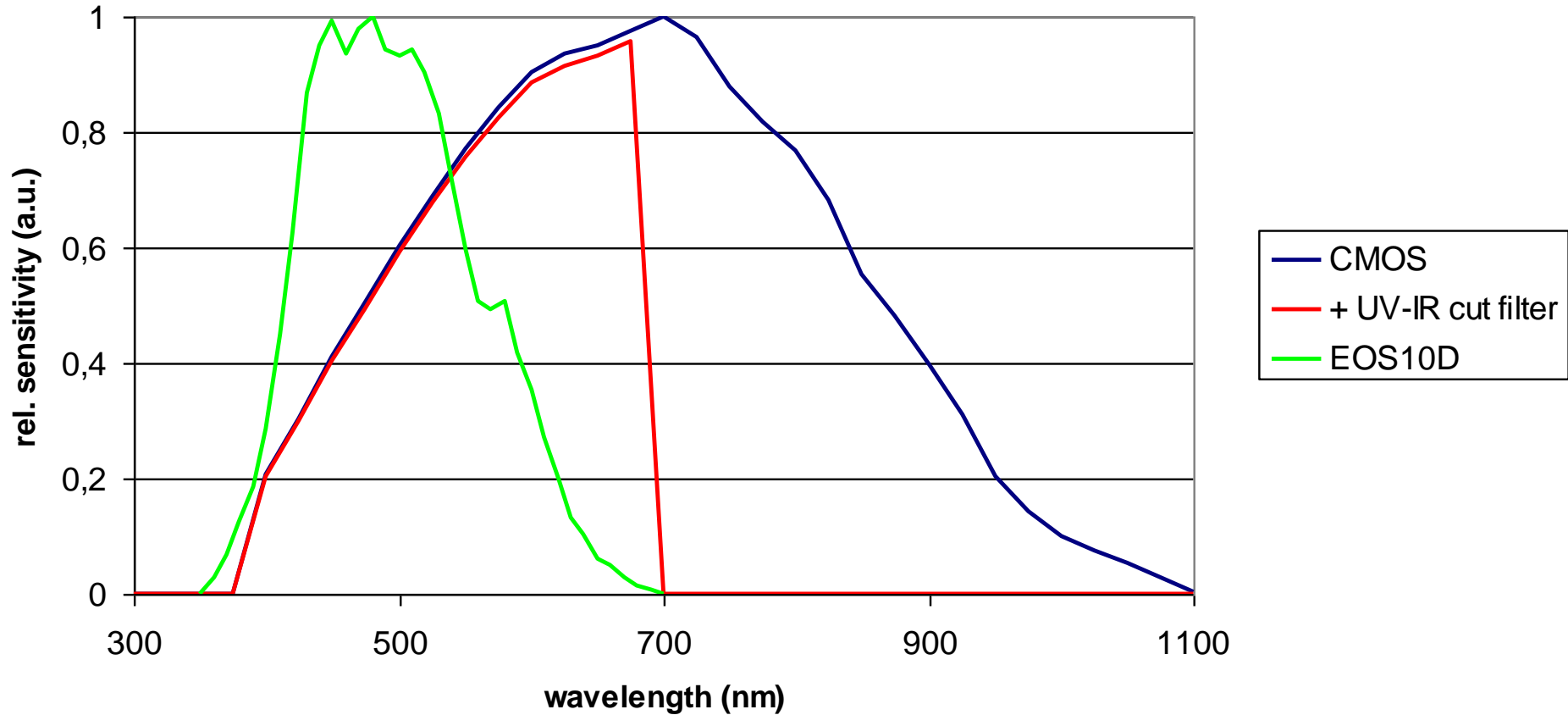


Figure 10. Contrast Index versus wavelength for KODAK Spectroscopic Plate, Type I-N.

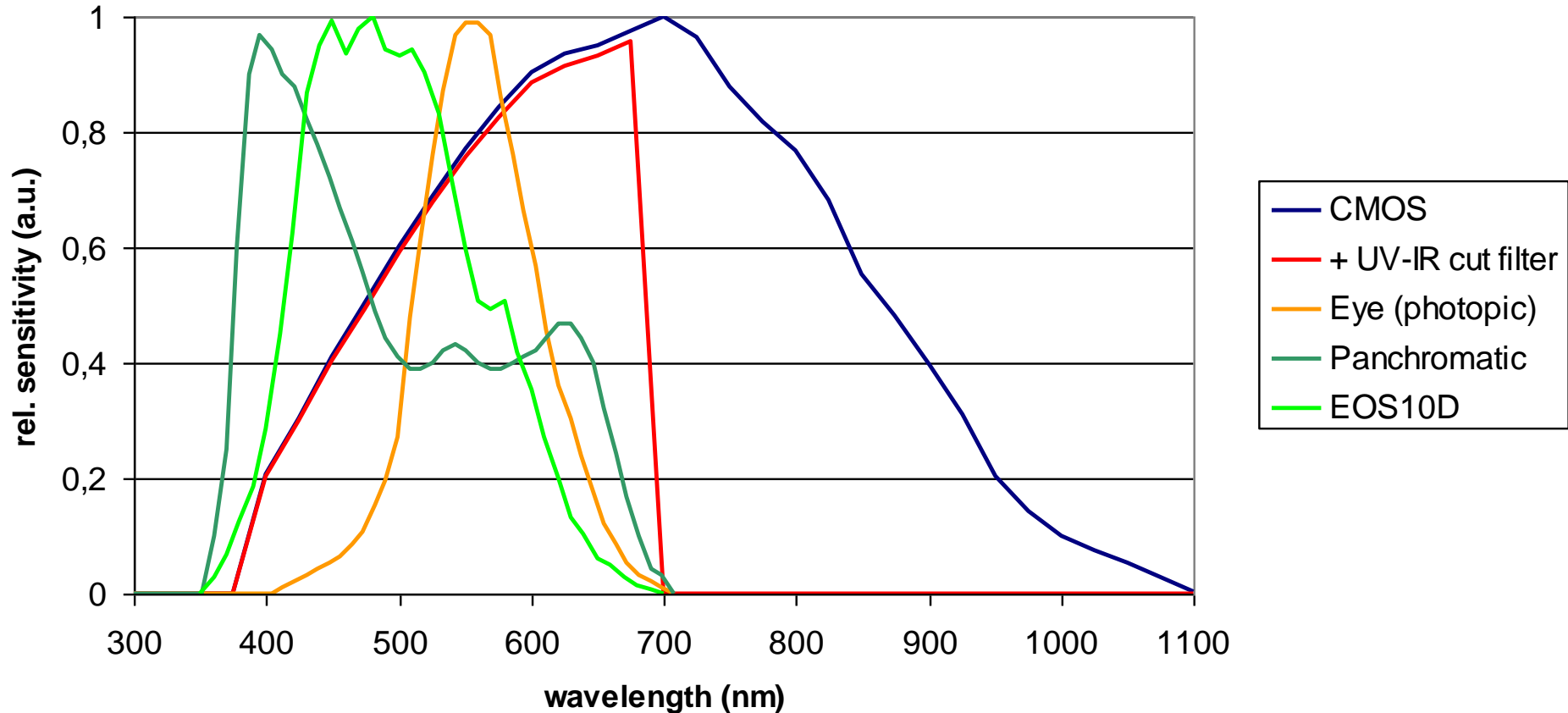
CCD-TV versus photographic magnitudes

CMOS relative spectral sensitivity



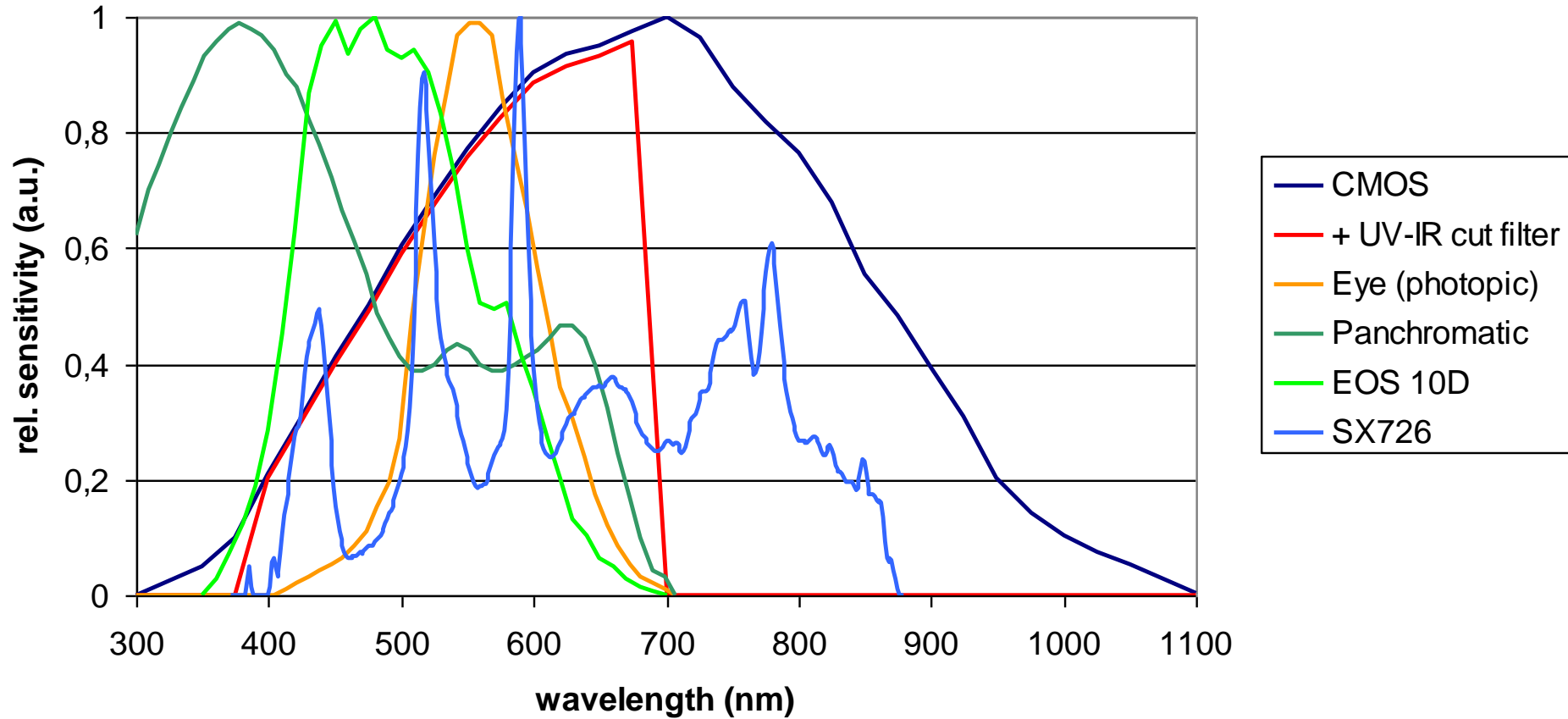
CCD-TV versus photographic magnitudes

CMOS spectral sensitivity - comparison with emulsions



An example: meteor spectrum from Vojaček et al

CMOS relative spectral sensitivity



An example - results

A typical sporadic (sx726) from Vojaček et al (2015) catalogue:

pan: -2^m5 (from Vojaček)

eye: -2^m1

cmos (full): -3^m6

cmos (VIS): -2^m8

EOS 10D: -2^m7

Conclusions

- spectral sensitivity of photographic emulsion is important in interpreting meteor magnitudes.
- it is often not known precisely.
- when comparing different detection systems the complete sensitivity function has to be determined for all systems in question.
- meteors have line spectra and that produces differences in perceived magnitudes.
- a great care should be taken when comparing modern (CMOS) meteor magnitudes with the ones obtained by photography, analogue camera tubes or image intensifiers.



Thank you for your attention. Questions?