

# 第3回長野県星空継続観察ミーティング



「光害の街明かり関係式の研究動向」

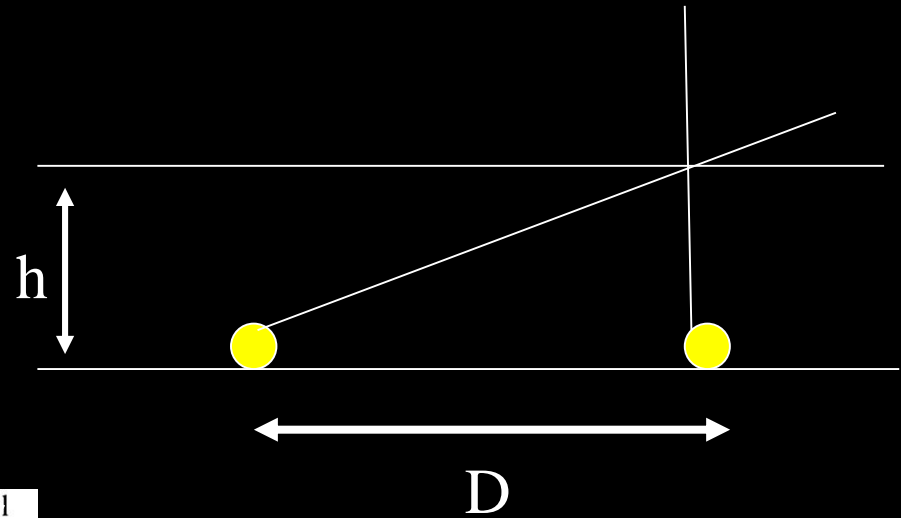
大西浩次

Walker MF.(1970, 1973)

Treanor PJ. (1973)

Berry RL(1976)

Garstang(1984,1986)



In a nutshell, our approach combines very simple Berry's model with high-resolution urbanization data, the Global Human Settlement Layer [8]. Berry's model is semi-empirical formula presented in Eq. (1):

$$B(D) = a\sqrt{P} \left( \frac{U}{D^2 + h^2} + \frac{V}{\sqrt{D^2 + h^2}} \right) e^{-k\sqrt{D^2 + h^2}}, \quad (1)$$

where:

**B** is a brightness at zenith in  $S_{10}$  units

**a** is a luminosity constant

**U, V** are constants determined in a semi-empirical way to fit observations

**D** is a distance from the light source to the observer

**h** is height of a thin layer from which light is scattered down towards the observer

**k** is absorption parameter.

**Table 1**

Five constants present in Berry's model as determined by Berry (1976), Netzel & Netzel (2016) and in this study.

Parameter	Berry (1976)	Netzel & Netzel (2016)	This analysis
a	50	2.5	2.37583
U [km <sup>2</sup> ]	2.59	2.55	5.96033
V [km]	0.08	0	0.02625
h [km]	2.4	1.3	1.13661
k [km <sup>-1</sup> ]	0.026	0.031	0.03875