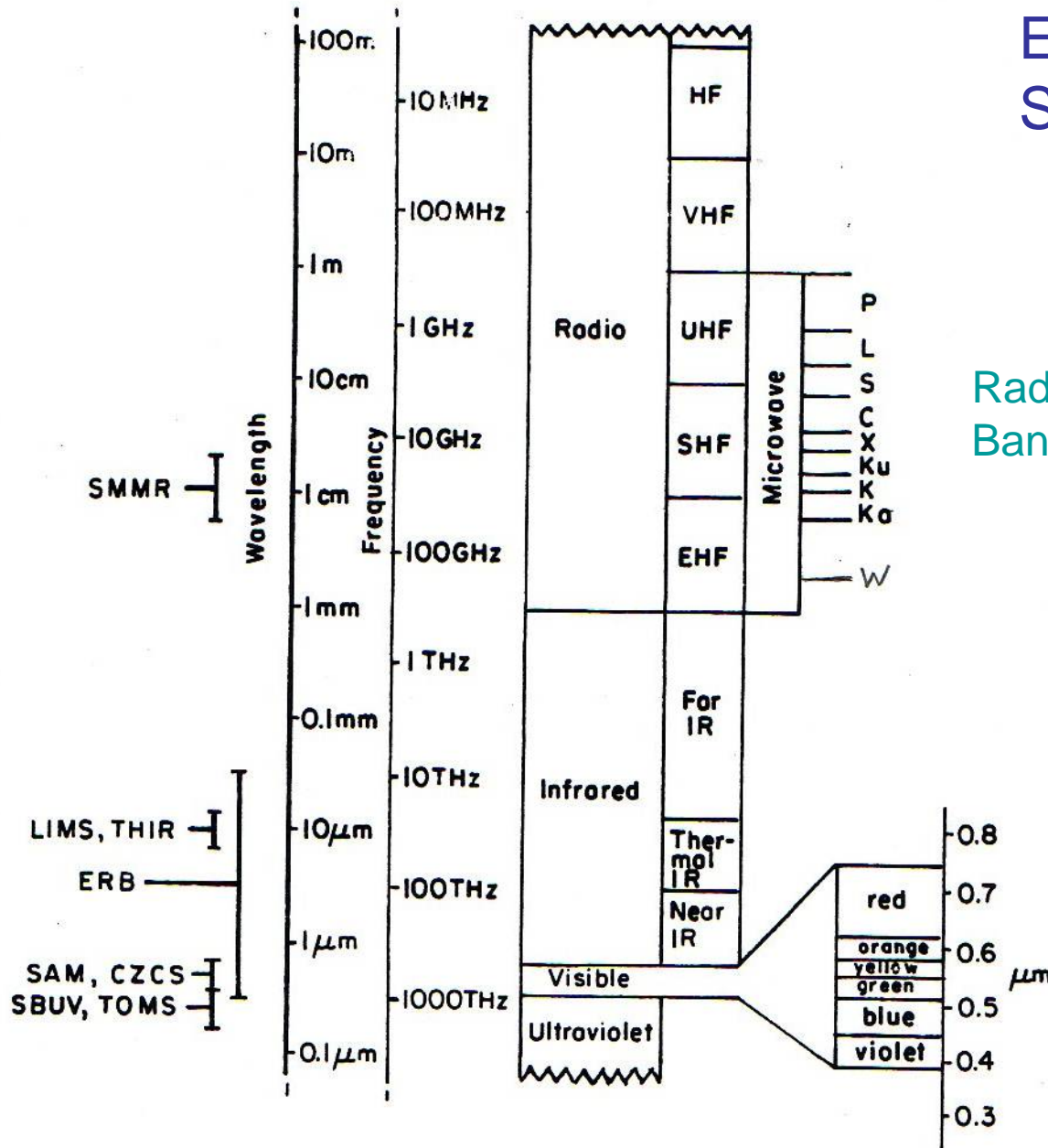


Electromagnetic Spectrum



Radar bands

Radar Band	Frequency (f)*	Wavelength (λ)*
L	1 – 2 GHz	15 – 30 cm
S	2 – 4 GHz	8 – 15 cm
C	4 – 8 GHz	4 – 8 cm
X	8 – 12 GHz	2.5 – 4 cm
K _u	12 – 18 GHz	1.7 – 2.5 cm
K	18 – 27 GHz	1.2 – 1.7 cm
K _a	27 – 40 GHz	0.75 – 1.2 cm
W	40 – 300 GHz	1 – 7.5 mm

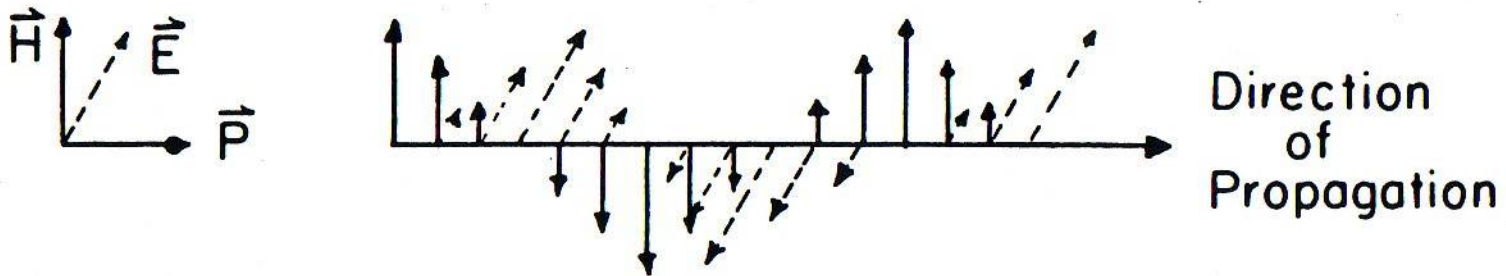
* Note: $\lambda f = c$

Adapted from Rinehart (2004)

Electromagnetic Propagation

Poynting Vector (\vec{P})
defines direction of
energy propagation:

$$\vec{P} = \vec{E} \times \vec{H}$$



2.4. Time variation in the electric- and magnetic-field components of an electro-
magnetic wave close to the antenna.

Battan (1973)

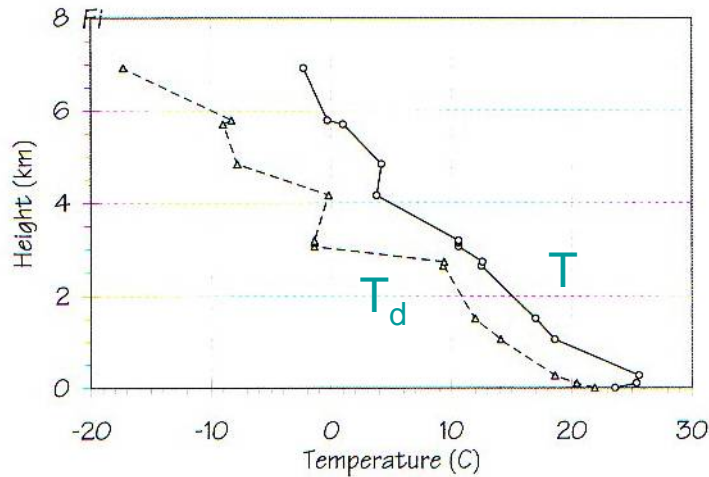


Figure 3.2 Sounding of temperature (right curve) and dew-point temperature (left curve) for Bangkok, Thailand, November 1996.

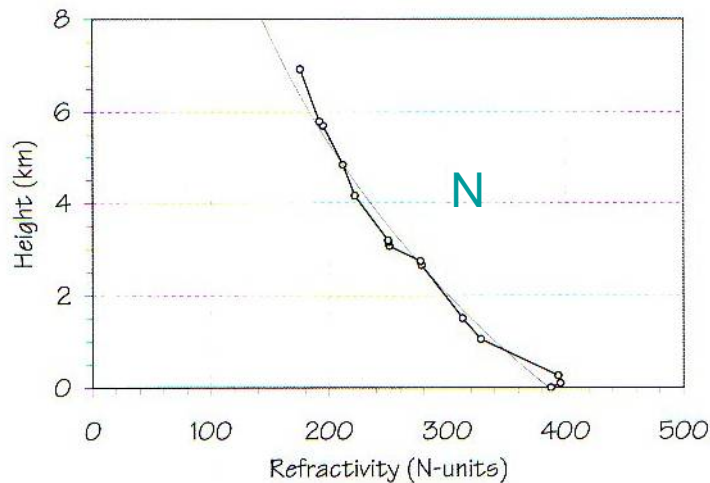


Figure 3.3 Refractivity N as a function of altitude for the sounding shown in Fig. 3.2. The thin curve is an exponential fit to the actual profile.

Rinehart (2004) example of the Refractivity (N) and the Gradient of Refractivity (dN/dH) with Height (H) from a sounding of temperature (T) and dewpoint (T_d)

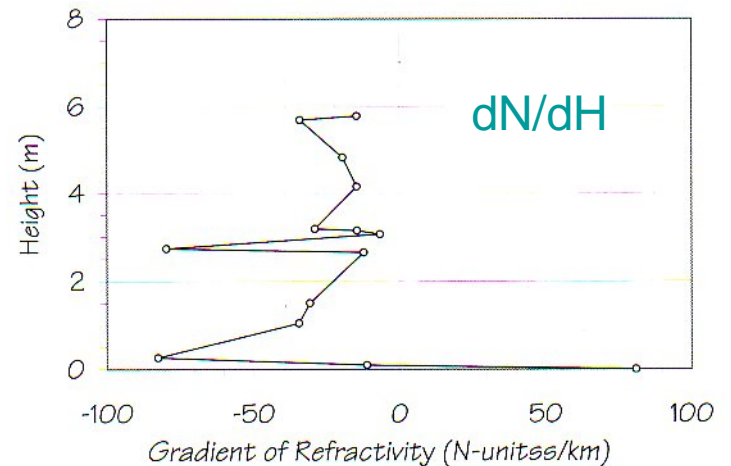


Figure 3.4 Gradient of refractivity as a function of altitude. "Standard" refraction corresponds to the vertical dashed line at -39 N-units/km. The curved smooth line is based on the exponential fit to the refractivity on Fig. 3.3.

Diagram demonstrating the Earth's curvature, standard refraction, and non-standard refraction.

Non-standard refraction

- Sub-refraction
- Super-refraction

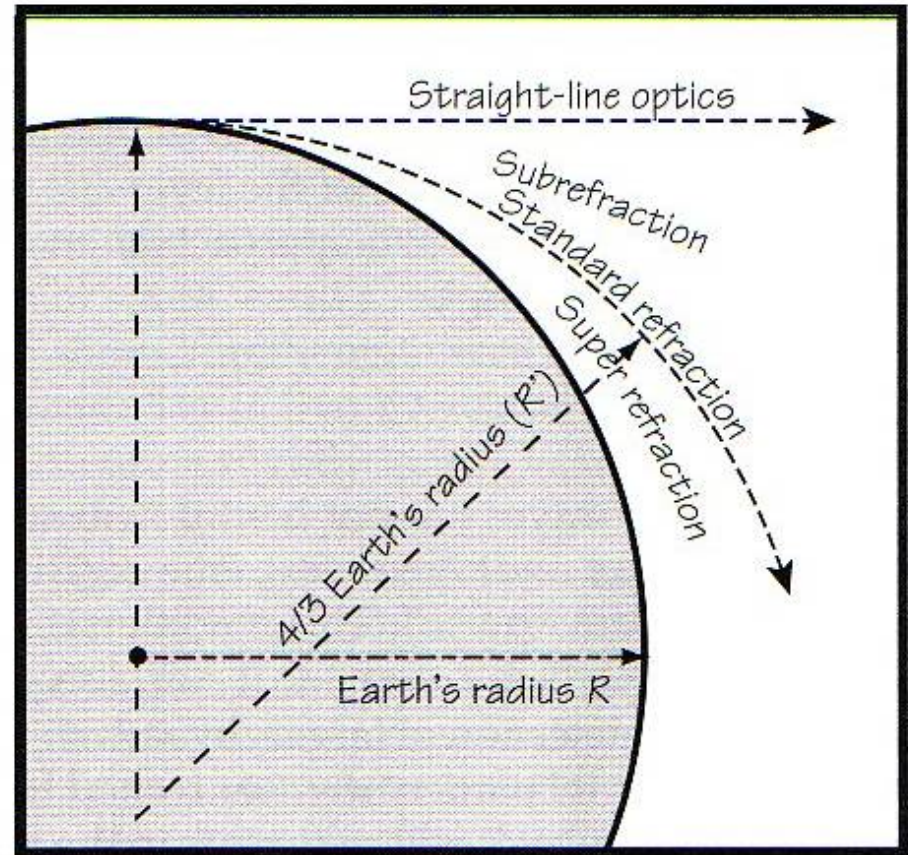


Figure 3.6 Earth's curvature showing the earth (gray circle), earth's radius, $4/3$ earth's radius, standard refraction, super refraction, subrefraction and straight-line optics. Subrefraction would also be above the straight-line optics line.

Rinehart (2004)

4/3^{rds} Earth's Radius Model

