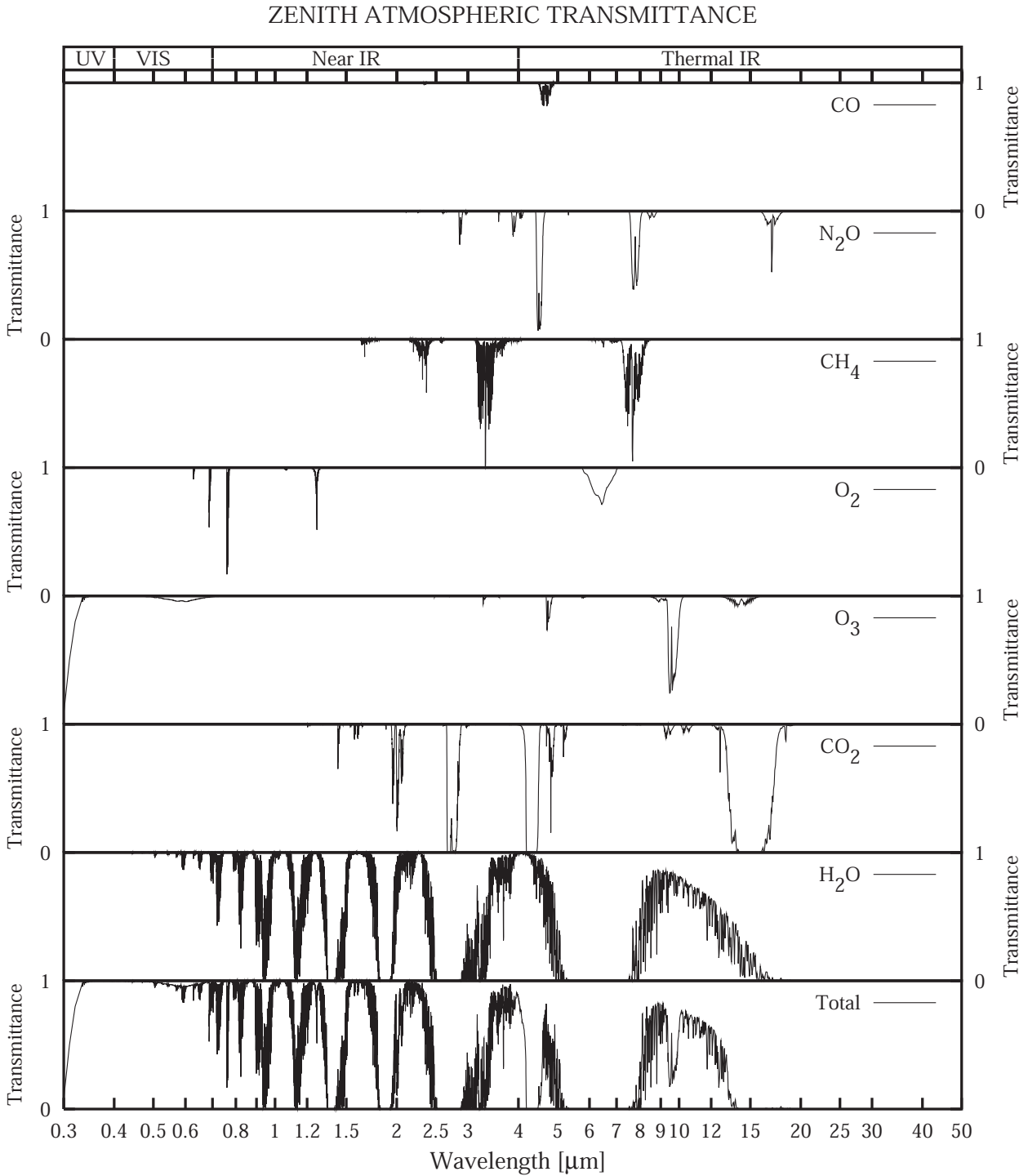
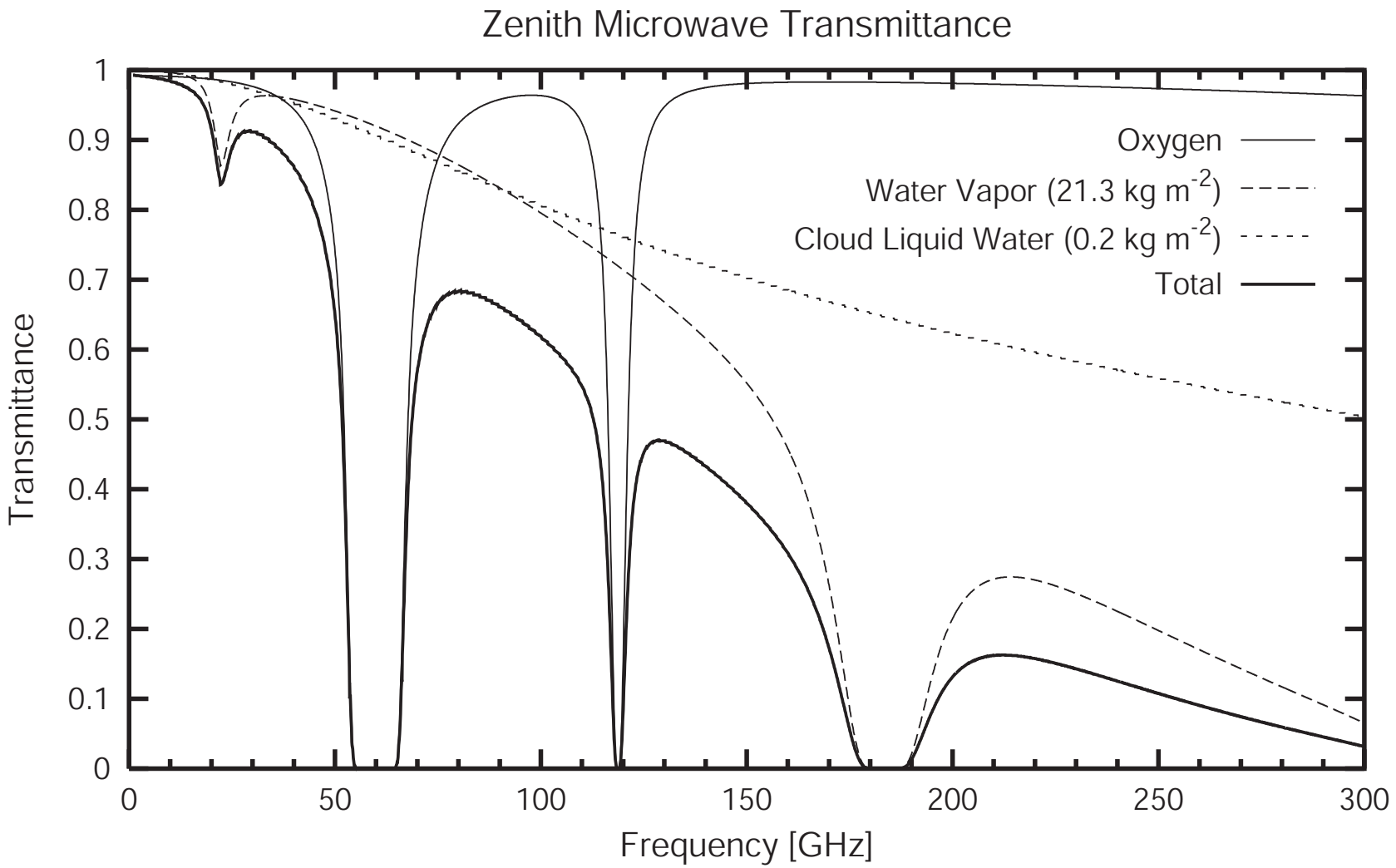
Region	Spectral Range	Fraction of solar output	Remarks
X-rays	$\lambda < 0.01\ \mu m$	$3 \bullet 10^{-6}$	Photoionizes all species; absorbed in upper atmosphere.
Extreme UV	$0.01 < \lambda < 0.1\ \mu m$	0.01%	Photoionizes O_2 and N_2 ; absorbed above 90 km
Far UV	$0.1 < \lambda < 0.2\ \mu m$	0.5%	Photodissociates O_2; absorbed above 50 km
UV-C	$0.2 < \lambda < 0.28\ \mu m$	1.3%	Photodissociates O_2 and O_3; absorbed above 30 km
UV-B	$0.28 < \lambda < 0.32\ \mu m$	6.2%	Mostly absorbed by O_3 in stratosphere; sunburn!
UV-A	$0.32 < \lambda < 0.4\ \mu m$	39%	Reaches surface
Visible	$0.4 < \lambda < 0.7\ \mu m$	52%	Atmosphere mostly transparent
Near IR	$0.7 < \lambda < 4\ \mu m$	0.9%	Partially absorbed, H_2O, some useful RS lines (methane, CO_2, O_2)
Thermal IR	$4 < \lambda < 50\ \mu m$	negligible	Absorbed & emitted by wv, co2, ozone, other trace gases
Far IR	$50\ \mu m < \lambda < 1\ mm$		Absorbed by water vapor
Microwave	$50\ \mu m < \lambda < 30\ cm$		Clouds & rain; semi transparent; o2 & h2o lines
Radio	$\lambda > 30\ cm$		


ZENITH ATMOSPHERIC TRANSMITTANCE
UV
VIS
Near IR
Thermal IR
CO
N_2O
CH_4
O_2
O_3
CO_2
H_2O
Total
Transmittance
1
0
0.3 0.4 0.5 0.6 0.8 1 1.2 1.5 2 2.5 3 4 5 6 7 8 9 10 12 15 20 25 30 40 50
Wavelength [μm]


Zenith Microwave Transmittance
Transmittance
Frequency [GHz]
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
50
100
150
200
250
300
Oxygen
Water Vapor (21.3 kg m-2)
Cloud Liquid Water (0.2 kg m-2)
Total

Updated Order

- Today – finish chapter 2 (not the sun part)
- Chapter 6 – Blackbody & thermal radiation
- “The Sun” – Stephens notes
- Then back to chap 4, 5, 7, 8… (maintain book order)