

Radiation and Stratospheric Chemistry

Question 1, refers to Figure 1

a) Explain what the blue line is, and which temperature it represents. What is the approximate value of this temperature in this case? (answer in 3 lines, 3 pts)

a. The blue line indicates the radiation emitted by the Earth's surface retrieved at the TOA. It represents the brightness temperature. T is approximately 290 K, i.e. 17 °C.

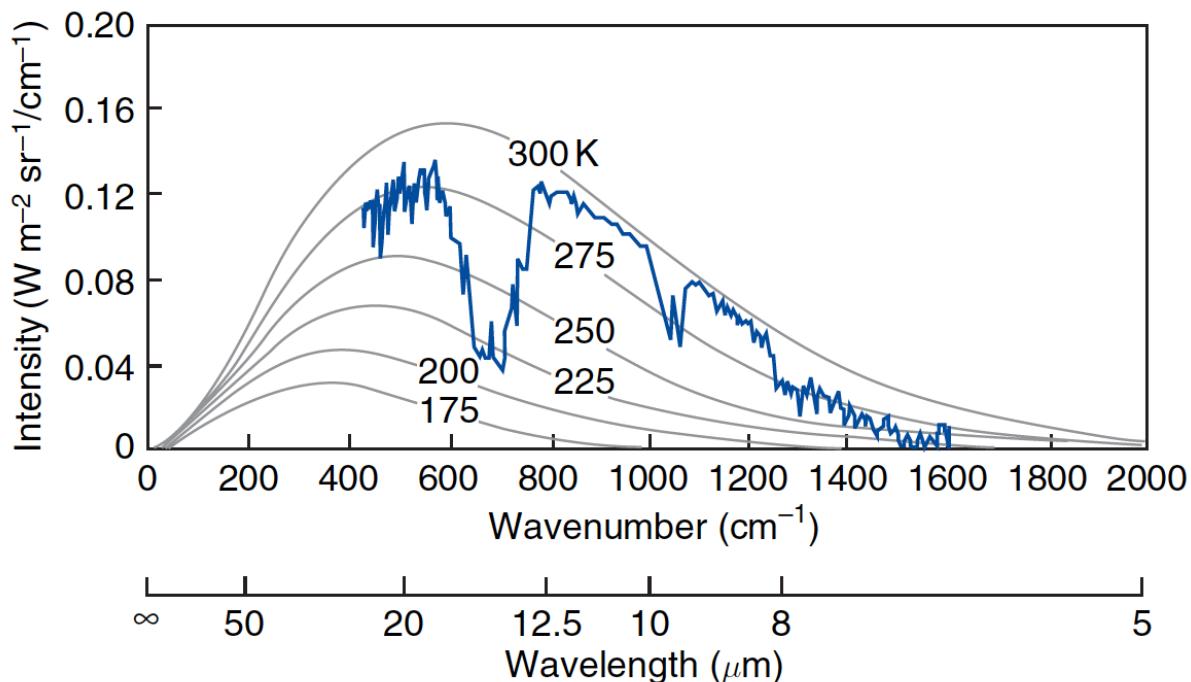
b) Indicate the approximate position of the atmospheric window (1 pt). (1 line, or mark it in the graph)

a. Roughly from 8 to 12 μm .

c) Explain what the “dips” around 700 and 1100 cm^{-1} are (2 pt). (3 lines)

a. The dips represent absorption bands from greenhouse gases. The bands centered on 700 cm^{-1} and 1100 cm^{-1} indicate the absorption of CO_2 and O_3 , respectively.

Figure 1



Question 2

In the stratosphere, ozone is built by photolysis of oxygen. Why does this not also work in the troposphere (1 pt)? (2 lines)

Answer: Photolysis of oxygen needs high energetic UV radiation. This part of the radiation spectrum is absorbed before it enters the troposphere.