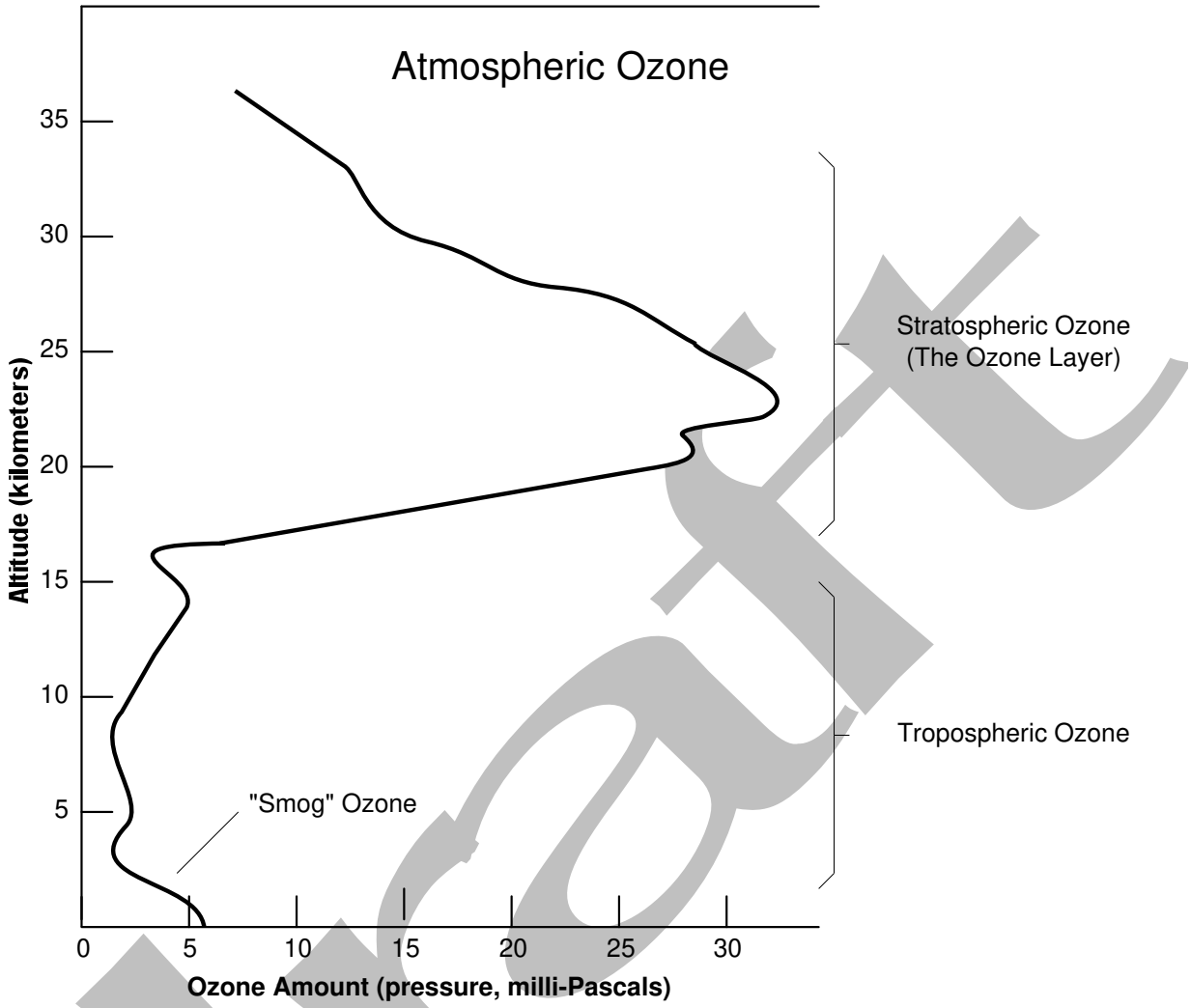

Fig. 1-1. Typical distribution of ozone in the troposphere and stratosphere (after a figure from NOAA Aeronomy Laboratory, 1996).

ozone in the troposphere is a pollutant and acts as a greenhouse gas, causing a warming of the same order of magnitude as that expected from the anticipated increase in CO_2 concentration [Fishman 1991]. The ozone concentration in this region is determined by the balance of ozone transport and exchange between the stratosphere and troposphere, and local ozone production due to both natural (lightning) and anthropogenic factors such as industrial pollution. The role played by tropospheric ozone in the overall ozone balance and in the depletion of stratospheric ozone is not well understood. Global ozone measurements in the UTLS would facilitate investigation of the effects of transport processes in this region on stratospheric ozone, and could indicate possible pollution events. Ozone's relatively weak absorption at visible wavelengths in the Chappuis bands lends itself to tangent path measurements in the UTLS region, below the peak of the ozone layer.

The NiteOwl experiment uses a self-calibrating stellar occultation technique. Stars as light sources offer many advantages for such measurements: ubiquity, spectral distribution, and collimated light. The ability of this technique to conduct measurements during the Arctic polar night is an important consideration as large areas of Canada cannot be monitored by other means (note the gap in TOMS data at high Northern latitudes in Figure 1-2).

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