

PRESENT STATUS OF THE OZONE LAYER

by

Volker W.J.H. Kirchhoff

Instituto de Pesquisas Espaciais - INPE
C.P. 515 - 12201 São José dos Campos, SP - Brazil

ABSTRACT

In recent years, the whole atmosphere, especially the troposphere and stratosphere, have suffered severe modifications in terms of their chemical constituents, because of the increasing interference caused by antropogenic practices. Measurements show that several long lived gases have their concentrations increasing in the troposphere over the last 10 years. Among these are methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and the CFCs. All these contribute to the Greenhouse effect, which can lead to a temperature increase of our planet, a highly undesired event. During the last century, the most important greenhouse gas was carbon dioxide (CO₂), being responsible for about 66% of the total Greenhouse effect. The rest, 34%, was contributed by the other gases mentioned above. Today, this priority is being reversed. The other gases, CO, O₃, N₂O, CH₄, and the CFCs, together, contribute more than 50% to the whole Greenhouse effect. The strongest immediate effect seems to occur in the stratosphere, where the ozone layer has the important role of absorbing damaging ultraviolet (UV) radiation. In this height region, around 30 km, ozone is being destroyed severely since about the 1970s. This effect can be analysed globally representative of the mid latitudes, (excluding the polar regions), where a destruction of about 2 to 5% of the ozone layer has occurred. Although these numbers appear small, it must be realized that, since the chemicals responsible for the O₃ destruction have long lifes in the atmosphere, this tendency for a decreasing ozone layer will continue for several years to come. It is important to realize further that, since the

radiation is attenuated following an exponential law, the decrease in O_3 corresponds to a much larger increase in the unwanted UV radiation. The destruction in the polar regions, especially in the Antarctic, in comparison to the previous figures, is dramatic (The Ozone hole). Each year in Spring, the austral ozone layer has its concentrations decreased by more than 100% in the last three years. This tendency of destruction is still increasing. The ozone hole in Antarctic was the deepest ever during the Spring of 1987.