



A new metric for the size and depth of the Antarctic ozone hole

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The extent of the seasonal ozone loss in the Antarctic ozone hole has traditionally been quantified by the ozone hole area and the ozone mass deficit. The ozone hole area is defined as the area of the region where total ozone is less than 220 DU. The ozone mass deficit is defined as the mass of ozone that has to be added in order to reach a total column of 220 DU in those areas where total ozone is inferior to this value.

Under certain circumstances these metrics can give a wrong impression of the degree of ozone loss. During several of the recent ozone hole seasons there has been transport of ozone rich air from middle latitudes at altitudes above 20 km and that has acted as a lid on top of the ozone depleted region below, typically between 14 and 20 km altitude. In several cases ozonesonde profiles show substantial ozone loss typical of an ozone hole situation, yet total ozone is well above the 220 DU threshold due to the dynamically enhanced amounts of ozone at higher altitudes.

The present paper presents an alternative metric to quantify the degree of ozone loss in the Antarctic ozone hole that is not affected by in-flux of ozone rich air at altitudes above 20 km. With such a metric one obtains a more correct comparison of the ozone holes of different years.