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Signatures of the Antarctic ozone loss saturation in the late 1980s

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The chemical ozone loss in the Antarctic due to increased halogen loading was first noticed in the late 1970s and early 1980s. Intense monitoring of the processes by various measurement clusters has been initiated since then, including ozone soundings at a number of Antarctic stations in each winter and spring. We examine the ozone measurements taken by the sondes from a group of stations in the continent to analyse the progress, saturation and anticipated decrease of the ozone depletion in the Antarctic. The analysis of the data reveals that, in agreement with available records, the ozone loss in the region intensified by the mid 1980s. The saturation of ozone loss has, however, shown to be started by 1987 in contrast to previously published results. The signatures of saturation are clearly evident at a range of lower stratospheric isentropic levels between 350 and 500 K in October. In September, the saturation is observed from 1991 onwards. The diagnosis is performed on a potential temperature equivalent latitude (EqL) surface to distinguish the dependency of loss saturation on EqL. The study shows that the saturation has taken place irrespective of EqL over the years in the range of 65-90 EqL covered by the ozone soundings; i.e. above the 65 degree EqL cut off used in this study. While the saturation of ozone depletion continues until now, the average ozone values inside the vortex show a clear levelling off after 1996. The regression of vortex averaged ozone against Equivalent Effective Stratospheric Chlorine for the 1997-2010 period corroborates the levelling off of ozone depletion. It also suggests that the complete recovery of ozone layer in the Antarctic is still a few decades away.