



## Recovery of the Antarctic Ozone Hole

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The Antarctic ozone hole develops each year and culminates by early Spring. Antarctic ozone values have been monitored since 1979 using satellite observations from the TOMS and OMI instruments. The severity of the hole has been assessed using the minimum total ozone value from the October monthly mean (depth of the hole), the average size during the September-October period, and the ozone mass deficit. Ozone is mainly destroyed by halogen catalytic cycles, and these losses are modulated by temperature variations in the collar of the polar lower stratospheric vortex. In this presentation, we show the relationships of halogens and temperature to both the size and depth of the hole. Because atmospheric halogen levels are responding to international agreements that limit or phase out production, the amount of halogens in the stratosphere should decrease over the next few decades. We use two methods to estimate ozone hole recovery. First, we use projections of halogen levels combined with age-of-air estimates in a parametric model. Second, we use a coupled chemistry climate model to assess recovery. We find that the ozone hole is recovering at an extremely slow rate and that large ozone holes will regularly recur over the next 2 decades. Furthermore, full recovery to 1980 levels will not occur until approximately 2068. We will also show some error estimates of these dates and the impact of climate change on the recovery.