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Trials and tribulations in creating long-term ozone record to detect anthropogenic change

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Routine measurement of ozone from space started with the launch of the BUV instrument on NASA's Nimbus-4 satellite in April 1970. In the 70s NASA also started a program to measure stratospheric ozone profile using sounding rockets. Initially, the focus of these measurements was to improve scientific understanding of the chemistry and transport of ozone in the stratosphere. This changed in the late 70s with the discovery of ozone-destroying potential of the CFCs, whose use was rapidly accelerating. It seemed fortuitous that the backscatter UV (BUV) technique developed by NASA was very well suited to monitor this change for it had high sensitivity to 3 hPa ozone where the fractional ozone change was predicted to be the largest. In addition, this technique provides accurate total column ozone that controls the biologically damaging UVB radiation reaching the surface. Increase in UVB became a serious public policy concern after the discovery of the Antarctic ozone hole in 1985. This led NOAA to start their own ozone monitoring program in the late 80s using the redesigned SBUV/2 instrument. However, the early optimism for the BUV technique was short-lived, for these instruments appeared to degrade rapidly in the harsh environment of space. Also there were several algorithmic issues in interpreting the satellite data, particularly in the lower stratosphere, a region that became important after the discovery of the ozone hole. Finally, while the quality of 3 hPa ozone data from satellite and ground-based instruments were coming under increased scrutiny NASA canceled the rocket program. In this talk I will trace the evolution of the quality of ozone data over the past 4 decades and discuss their potential for monitoring ozone recovery and effects of climate change and pollution.