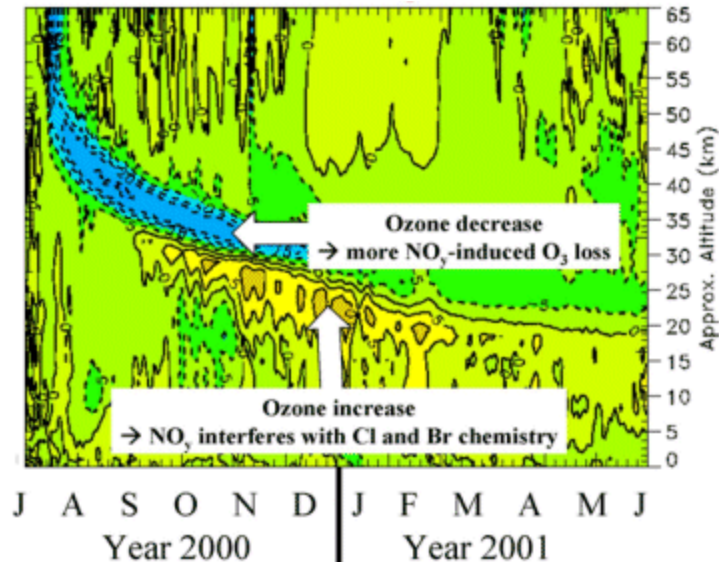




**NOXIOUS ACTIVITY:** Scientists attending the [Living With a Star workshop](#) in Boulder, Colorado, learned yesterday that solar storms can have long-lasting effects on Earth's ozone layer. Charles Jackman of the Goddard Space Flight Center reported that solar protons hitting Earth in July 2000 altered the chemistry of the upper atmosphere, resulting in "huge enhancements (>100%) in middle stratospheric NO<sub>x</sub>." (continued below)



NO<sub>x</sub> (pronounced "knocks") are nitrogen oxides such as NO or NO<sub>2</sub>. The presence of NO<sub>x</sub> can either boost or destroy ozone, depending on altitude, temperature and other variables. Jackman and colleagues analyzed what happened in July 2000 when powerful solar storms produced a surge of NO<sub>x</sub>. In the Southern Hemisphere, they found, ozone was both boosted (yellow in the diagram above) *and* destroyed (blue).

Researchers have long known that solar storms affect ozone. The surprise here is timescale: Ozone abundances were affected for nearly a year after the July 2000 storms. The ozone layer eventually returned to normal, but not until many months after solar activity subsided. Click [here](#) for more information.