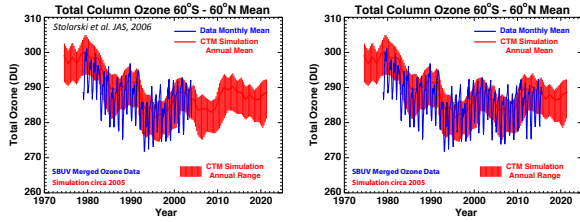


**How well have the projections made with our CTM in 2006 held up in the face of 10 more years of data?**

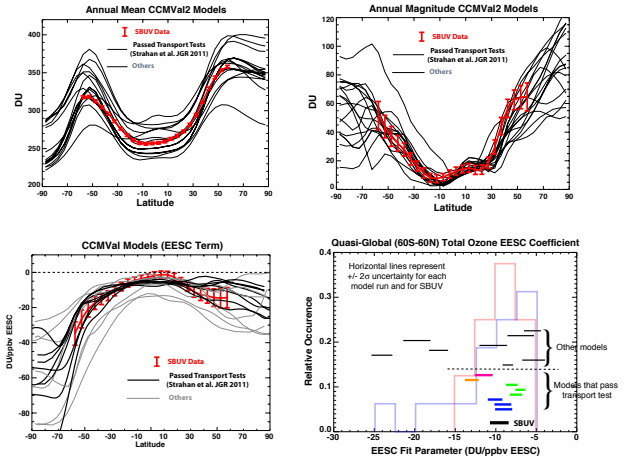


- Qualitatively they have held up very well
- Quantitatively there are many issues with the details of results from this and other models.

**Impact of the Montreal Protocol: Does Stratospheric Ozone Data Confirm Model Predictions?**

Richard S. Stolarski, Johns Hopkins University, Department of Earth and Planetary Sciences, Baltimore, MD 21218 USA  
 Anne R. Douglass and Susan E. Strahan, NASA Goddard Space Flight Center, Greenbelt, MD 20771 USA

**How well did the CCMVal2 models describe total ozone magnitude, seasonality, and sensitivity to chlorine?**

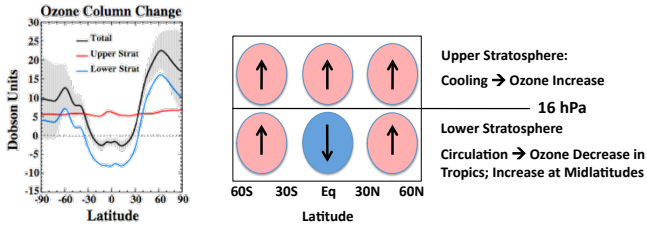


**Summary: CCMVal2 and Total Ozone**

- Match reasonable well with mean, seasonality, and sensitivity to chlorine as a function of latitude. Models passing transport tests generally do better. Probability distribution much narrower for quasi-global sensitivity to EESC.
- Quite a large variability among models and within ensemble members of given model at high latitudes.

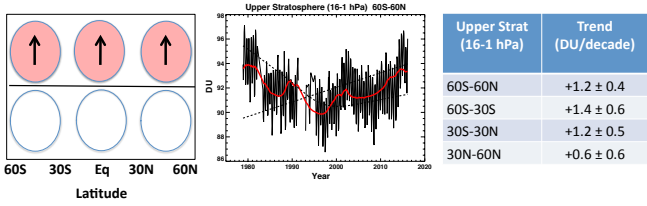
**Can we use the pattern of ozone change in the stratosphere to detect the model-predicted speedup of the BD Circulation?**

**Expected Pattern for GHG Impact on Ozone**

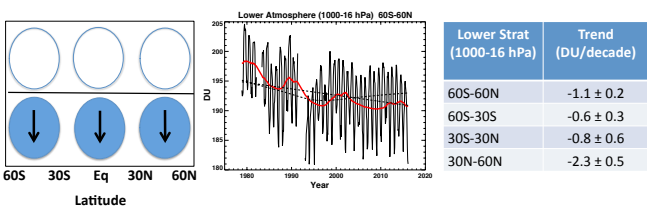


**What we see in SBUV Data**

**Upper Stratosphere (16-1 hPa)**



**Lower Stratosphere/Troposphere (1000-16 hPa)**



**Summary: Circulation Change Detection**

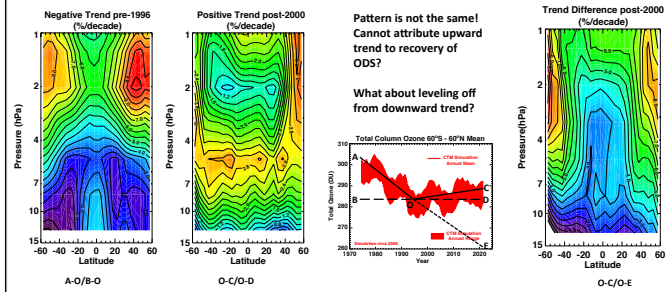
**What we expect** (Diagram with arrows: Up, Up, Up in top row; Up, Down, Up in bottom row)

**What we see** (Diagram with arrows: Up, Up, Up in top row; Down, Down, Down in bottom row)

- Upper stratospheric cooling shows positive ozone response as expected
- Lower stratospheric ozone does not show evidence of circulation speed-up

**Does the pattern of ozone trends since 2000 match the expectation from chlorine recovery?**

**SBUV trends in upper stratosphere vs latitude and pressure altitude**



**Summary: Recovery Pattern Detection**

- Trend pattern does not match expected pattern: expect something like reverse of downward trend pattern
- Difference between extended downward trend and actual measured trends has similar pattern to that expected (is this an artifact of extrapolating pre-2000 trend?)