

Acute O₃ Exposure and Plant Response

Relatively high concentration (e.g. 80-100 ppb)
for several hours (e.g. 6-8 hrs)

Symptoms of typical foliar injury
Likely, no yield loss, but subject to the
timing of stress



Chronic O₃ Exposure and Plant Response

Relatively low concentration (e.g. <40 ppb) throughout the growth season, with periodic, intermittent peaks or episodes for several hours on one or more successive days

With or without injury symptoms, but growth, yield and quality changes





Limitations in the Current Data Base in the US on Ambient Ozone and Crop Yield Effects

1. No real new or comprehensive data sets generated since the last review of the secondary NAAQS some 10 years ago.
2. Misdirected reliance on the presence of acute injure symptoms for establishing a chronic exposure secondary NAAQS.
3. Continued major reliance on univariate, chamber studies that have no resemblance to the real world.

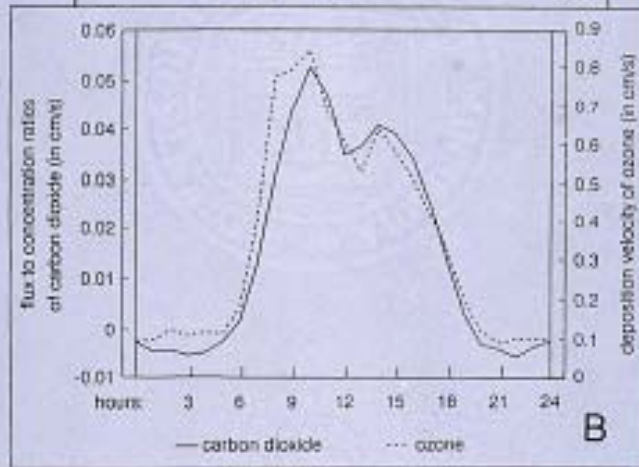
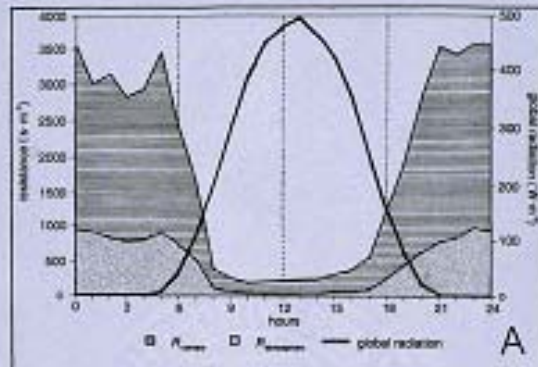
Limitations in the Current Data Base in the US on Ambient Ozone and Crop Yield Effects

4. Use of an exposure index that is not new and one that was considered by EPA in 1996, but not used during the review of the Secondary NAAQS at that time.
5. Heavy reliance on spatial modeling of both the characteristics of exposure to ozone and the crop response.
6. No validation of the model output results, with independent sets of data and consequently significant unexplained uncertainties.

One Current View of the Secondary O₃ NAAQS

The CASAC sincerely hopes that, in the next round of ozone NAAQS review, the Agency will be able to support a reasonable and scientifically-defensible cumulative form for the secondary standard .

(April 7, 2008. CASAC. Letter to the EPA Administrator)



Serious Research Needs for A Future Review of the Secondary O₃ NAAQS

1. EPA will need to fund research to substantiate the concern for the adverse regional scale yield effects of ambient ozone on the major crops in the US
2. Studies will need to be specifically designed to examine the validity and reliability of alternative exposure statistics for ambient ozone that have a biological meaning.
3. EPA will need to fund chamber-less field studies on crop response to ambient ozone, using accepted cropping practices in agronomy.
4. EPA will need to fund research where the impacts of ambient ozone can be segregated from the influence of other variables affecting major crop-specific yields based on actual field studies.
5. Item # 4 should be achieved in two steps:
 - a. Development of predictive methods based on real data.
 - b. Validation of the predictions using independent sets of data.



New Orleans—