Determine the Aerosol Scattering Index (ASI) at 674nm using SAGE climatology, \( \text{ASI(SAGE)} \).

The effect of ASD is complicated. \( \text{O}_3 \) error is always positive, and increases with decreasing \( \text{O}_3 \) or radiance, while \( \text{O}_3 \) error due to aerosols changes sign with height.

**Aerosol Correction Algorithm**

- Assume an aerosol size distribution (ASD).
- Compute aerosol cross-section and aerosol phase function using SAGE extinction profiles at one wavelength.
- Calculate ASI at 674nm using LP data, \( \text{ASI(LP)} \).
- Calculate ASI at 674nm using SAGE climatology, \( \text{ASI(SAGE)} \).
- Adjust SAGE climatology: \( \text{ASI}_{\text{SAGE}} = \text{ASI(SAGE)}/\text{ASI(SAGE)} \) when \( \text{ASI(LP)} > 0 \) or \( \text{ASI}_{\text{SAGE}}(z) = 0 \) when \( \text{ASI(LP)} < 0 \).
- Update aerosol size distribution based on normalized radiance residuals (NRRS) at 352,508 and 674nm.
- Retrieve ozone with the adjusted SAGE climatology.

**Evaluation of the Aerosol Correction**

- Aerosol correction on an orbital basis
  - Left figures show \% ozone errors with and without aerosol correction. Below figures show changes in 674nm ASI:
    - \( \text{NNR0} \): without aerosol correction;
    - \( \text{NRRS} \): with the adjusted SAGE correction.
- Ozone retrieval error can reach \% on ozone error (left panel) and 674nm radiance (right panel).

**Comparison with MLS Ozone Profile (daily mean)**

- \( \text{O}_3 \): without correction; \( \text{O}_3 \): with SAGE; \( \text{O}_3 \): with the adjusted SAGE; \( \text{O}_3 \): MLS \( \text{O}_3 \) profiles at 45S,55S & 40N.
- \( \text{O}_3 \): bias from MLS at 20 & 32km.

**Summary**

Aerosols have a detectable effect on OMPS/LP data. Our analysis shows that ignoring the aerosol contribution can produce an ozone density bias of up to 15% in the region of maximum aerosol extinction. The Aerosol Scattering Index (ASI), defined in the text, is used to evaluate the effect of aerosols on OMPS/LP radiances and to assess errors in ozone retrievals. An aerosol correction algorithm is then developed for ozone retrieval by scaling the SAGE climatology using the ratio \( \text{ASI}(\text{LP})/\text{ASI(SAGE)} \). The algorithm improvement is verified by comparison to MLS ozone profile. This work suggests that using the proposed aerosol correction algorithm would significantly reduce the residual data and improve the quality of the retrieved ozone concentration profile.