**INTRODUCTION**

- At present, the Dobson spectrophotometer and Brewer spectrophotometer adopted by WMO, are used to measure total column ozone. Having strong absorption ability in the wavelength range of Dobson observation, SO₂ can interfere with the total ozone observation.
- Using the WOUDC observational data and absorption cross sections of O₃ and SO₂, SO₂ absorption coefficients and the theoretical factor C have been calculated to analyze the Dobson total ozone error caused by SO₂, which can provide reference for the data correction in Kunming station.

**DATA & ALGORITHMS**

- Bass-Paur (1985) ozone absorption cross sections (O₃CS).
- The WOUDC observational data derived from Dobson and Brewer spectrophotometer at New Delhi (India) and Hohenpeissenberg (Germany).

- The Dobson total ozone data can be corrected by:
  \[ X' = X - C \cdot \delta \]
  where \( X' \) is corrected ozone amount; \( X \) is the apparent ozone amount; \( C \) is total SO₂.
  The SO₂ absorption coefficient \( \gamma(\lambda) \) has to be replaced by the slit function \( s(\lambda, \lambda_o) \) weighted effective absorption coefficient \( \gamma_i \):
  \[ \gamma_i = \frac{\int \gamma(\lambda) s(\lambda, \lambda_o) d\lambda}{\int s(\lambda, \lambda_o) d\lambda} \]
  the ozone air mass and SO₂ air mass can be calculated as follows:
  \[ n(\theta) = \frac{R + h_i}{[(R + h_i)^2 - (R + r)^2 \sin^2 \theta]^2} \]
  \[ \mu(\theta) = \frac{R + h_i}{[(R + h_i)^2 - (R + r)^2 \sin^2 \theta]^2} \]

**RESULTS**

- SO₂ absorption coefficients

  ![Fig.1 Cross section of SO₂ and O₃ and their ratio (ρ)](image1)

  ![Fig.2 the monochromatic absorption coefficient γ(λ) and the effective absorption coefficient γ₁ of SO₂](image2)

- Bias in Dobson total ozone due to SO₂

**CONCLUSIONS**

- SO₂ has strong absorption in the UV spectrum, our calculation of SO₂ absorption coefficient \( \Delta \gamma AD \) is 1.843.
- The presence of SO₂ will lead to Dobson ozone amount that are higher than the actual values. Influence factor C has obvious seasonal variation that reaches a maximum in winter and a minimum in summer.
- At New Delhi, the false part of total ozone reaches a maximum of 13.7%, while at Hohenpeissenberg, the false part concentrates within 2% because of little amount of SO₂.
- The relative difference between Dobson and Brewer data sets decreases by 1~3%, it shows that the precision of Dobson data improves after correction.

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