

REVIEW of

Observations of iodine monoxide over three summers at the Indian Antarctic bases, Bharati and Maitri, by Mahajan et al.

This MS presents ground-based measurements of Iodine Monoxide in Antarctica and compare that with satellite measurements. The authors also discuss the spatial and temporal variability of IO in terms of measurements at different Antarctic stations in different years or seasons. They have also made an effort to assess their analysis with published results. As these types of measurements are not performed often, and there are large uncertainties and differences between ground-based and satellite measurements, the analysis presented is a valuable addition to existing literature and database. However, some clarifications and a careful revision are needed before it can be recommended for a publication in ACP. Please find the specific comments below.

Main points:

1. Please write the significance of IO in the ozone depletion events, and discuss ozone as a source of emissions too. A balanced discussion is needed in this regard to emphasize the importance or relative importance of IO in Antarctica. Please include this in Introduction.
2. Why Neumayer shows 10 pptv, but Maitri 6 pptv? I thought both stations are close enough to show similar IO measurements. You also stated in the discussion that there are no significant inter-annual variability. Please discuss this.
3. You mentioned it is not possible to draw a conclusion about the origin of air masses. What would happen if you make 15-day back trajectory? Will that make any difference in your conclusions? Indeed, you need to consider the lifetime of IO in this case.
4. Write something positive in Conclusions. This is very short and the last sentence is a bit negative.

Minor points:

L 23-24: any indications for sources?

L27-28: the high bias is also there for other regions?

L 40: "long-term"

L45, 52: can you please provide a range of values measured

L55: "However, observations of IO have not been reported to date "

L58: ice is everywhere there, please specify the region

L65: please write the detection limit value

L66: The study done by Friess et al...

L75-76: "within and above the boundary layer"

L79: what are these golden days, and why?

L81-83: All measurements and models have problems and uncertainties. Rephrase this sentence. "However, models could not reproduce the measured profiles. There were also uncertainties associated with the *a priori* profiles used in the retrievals." Something like this.

L88: I would use "across the latitudes" than globe

L92: "across the regions, particularly in the Antarctic to validate..."

L167: "Therefore", instead of hence

L174: "during the study period"

L192: -5 °C and +5 °C

L195: the regions has or "experiences"

L202: both manual and radiance-based

L204: Neumayer is nearby; data are available for that station? You could also consider reanalysis data and extract for the station

L233; ", which were"

L236: In line 204, you mentioned that there were no meteorological observations

L248-249: "and hence..." Not needed as you have already stated the reason

L250; "that showed"

L250: "a valid flag"

L252: molec. cm⁻² and other places too

L265: Neumayer and Maitri are nearby stations. Don't you expect similar range of values at both stations? Is this 4 pptv difference justified?

L270: this is not discrepancy, but difference

L273: two "indeed" there; "snow pack is the primary source for ..."

L278: You stated earlier that these measurements were highly weighted by a wrong a priori information?

L285: "models could not"

L296: oxides of what?

L312: “, however, ”

L316: satellite measurements within 500 km? Is it comparable?

L319: predict?

L319-322: can you please split the sentence. Hard to comprehend

L322: values ...were

L325: this can be another reason for the differences. SCIA measurements are sensitive at these altitudes?

L326: a significant

L368: “regions”

L377: What is the lifetime of IO there? If you consider the short life time and 500 km averaged satellite data, the comparison is fair?

Figure 2: x-axis title reads “Davs” instead of days

Figure 3: The resolution is very poor

Figure 4: the dots of the legend can be little bigger to delineate the colours
