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Atmospheric Measurement Techniques Discussions

Interactive comment on "A novel rocket-based in-situ collection technique for mesospheric and stratospheric aerosol particles" *by* W. Reid et al.

R. Saunders

rws_brancaster@hotmail.com

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I was very interested to read about this novel recoverable probe approach for sampling particles from the lower and upper atmosphere. Congratulations on the subsequent successful launch and recovery.
The launch timing was particularly apt as it is almost exactly 50 years since sounding rockets were launched (August, 1962) in N. Sweden for the purpose of sampling particles from the upper atmosphere as described in Soberman et al., 'Techniques for rocket sampling of noctilucent cloud particles', Tellus, 16, 89-, 1964.

Having been involved at the post-capture analysis stage of the multi-group MAGIC

project (coordinated at MISU, Stockholm) which collected and returned mesospheric particles in 2005/6 via TEM grids using a 'fixed' carousel-pin system on a recoverable rocket, I eagerly anticipate future publication of the particle analysis.

I wish to bring a few points to the authors' attention;

(1) In the introduction (page 3, paragraph from line 13 onwards), there are some fairly recent citations with regard to in-situ particle measurements in the mesosphere. I would highlight a number of relevant publications from the 1960s, specifically of particle capture-return via different rocket-borne substrates (e.g. Soberman and Hemenway, JGR, 70, 4943-, 1965; Blanchard et al., JGR, 73, 6347-, 1968; Farlow, JGR, 73, 4363-, 1968; Farlow et al., JGR, 75, 6736-, 1970; Fechtig and Feuerstein, JGR, 75, 6751-, 1970), and suggest that these are deserving of citation in the paper to give a more complete historical context, but will also be of use for a comparison/contrast of sampled particle features.
(2) Similarly, there are a few published accounts (e.g. Bigg et al., Tellus, 22, 550-, 1970; Testa et al., Earth Planet. Sci. Lett., 98, 287-, 1990, and very recently, Della Corte et al., Space Sci. Rev., 169, 159-, 2012) of balloon-borne upper stratospheric particle sampling onto EM grids and filters which the authors may wish to consider citing and again, may be of use for comparison of imaged particle size/shape and analyzed composition from this region of the atmosphere. Incidentally, all three of these report sampling significantly above the 30 km 'ceiling' indicated on page 3, line 25.
(3) Regarding post-capture analysis, the authors state that SEM will be used for particle imaging and compositional analysis. This is fine for the larger particles which will have been captured in the stratosphere, but I suggest that TEM with ED X-ray analysis (as used in MAGIC) would be more suitable for the significantly smaller (< 20 nm) smoke particles sampled in the mesosphere. This technique would also allow for

electron diffraction analysis to gain more insights into particle structure and form.
(4) The ‘Plan, J.’ reference should read ‘Plane, J.’

N.B. For a technical overview of the MAGIC project, see the PDF attached as a supplementary file. Although aerosol was successfully sampled on the rocket flights, a subsequent definitive compositional identification of meteoric smoke particles was not possible.

Please also note the supplement to this comment:
http://www.atmos-meas-tech-discuss.net/5/C2929/2012/amtd-5-C2929-2012-supplement.pdf

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