APS Workshop

Summary of the AMT Article

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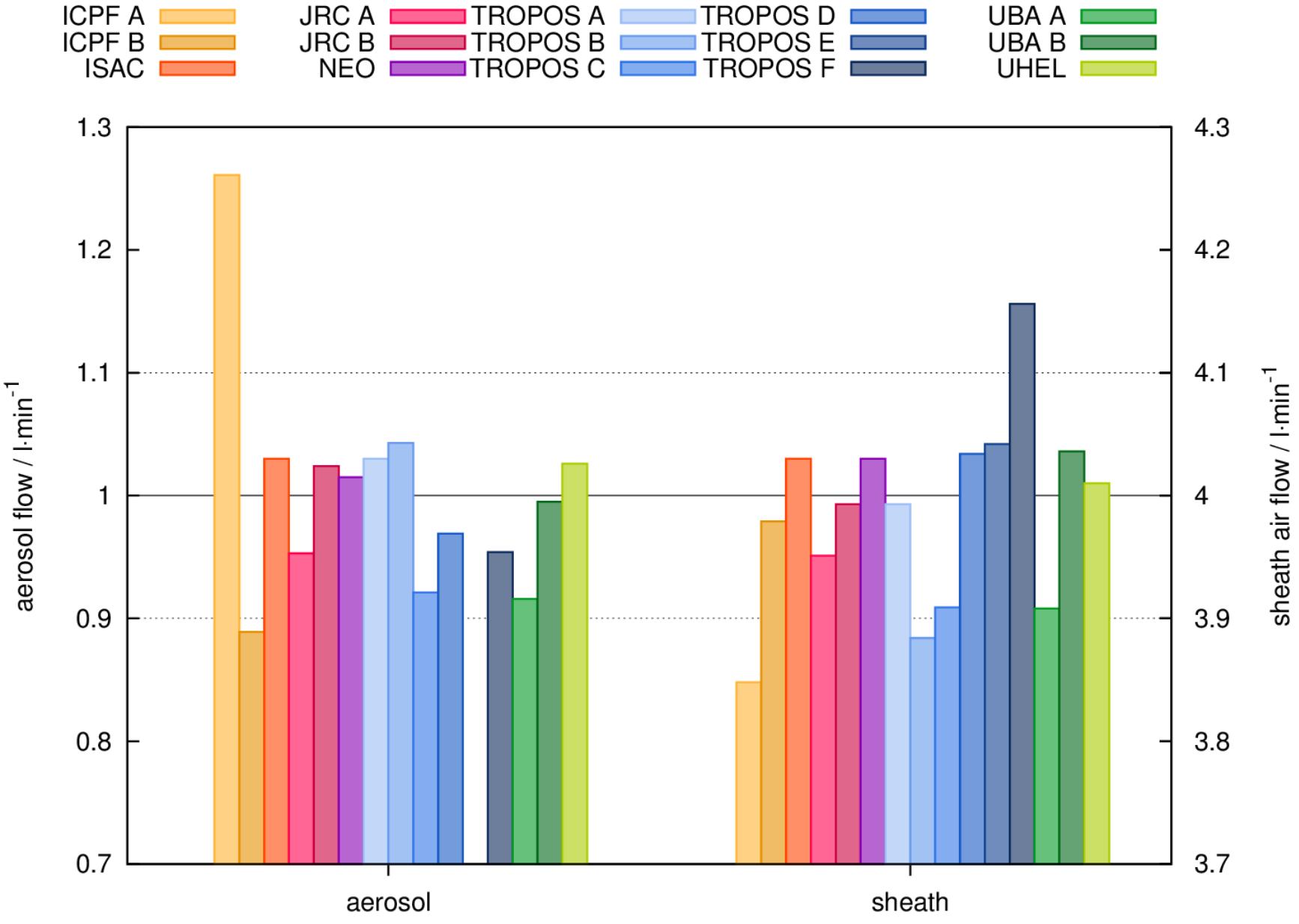
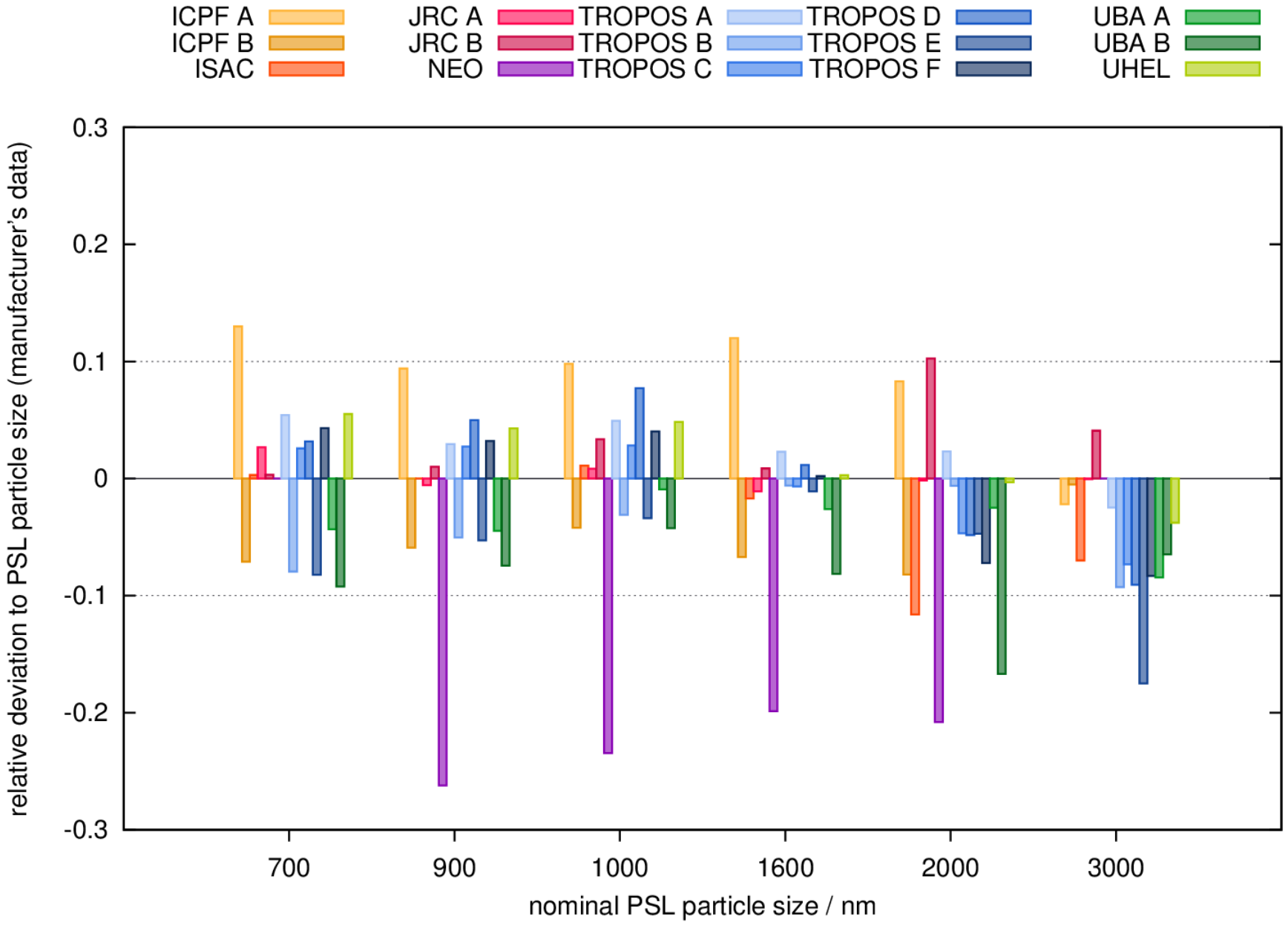
Member of Leibniz Association

TROPOS
Leibniz Institute for Tropospheric Research

Results of the APS Workshop Sept.- Oct. 2014

- Two set of instruments → different weeks
- One “reference” instrument
- Flow check & calibration
- PSL particle size check → no adjustment
- Ambient intercomparisons
- Ammonium sulfate intercomparisons
- The results are sent for publication to AMT


ICPF A
ICPF B
ISAC
JRC A
JRC B
NEO
TROPOS A
TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
1.3
1.2
1.1
1
0.9
0.8
0.7
aerosol flow / l·min-1
4.3
4.2
4.1
4
3.9
3.8
3.7
sheath air flow / l·min-1
aerosol
sheath


ICPF A
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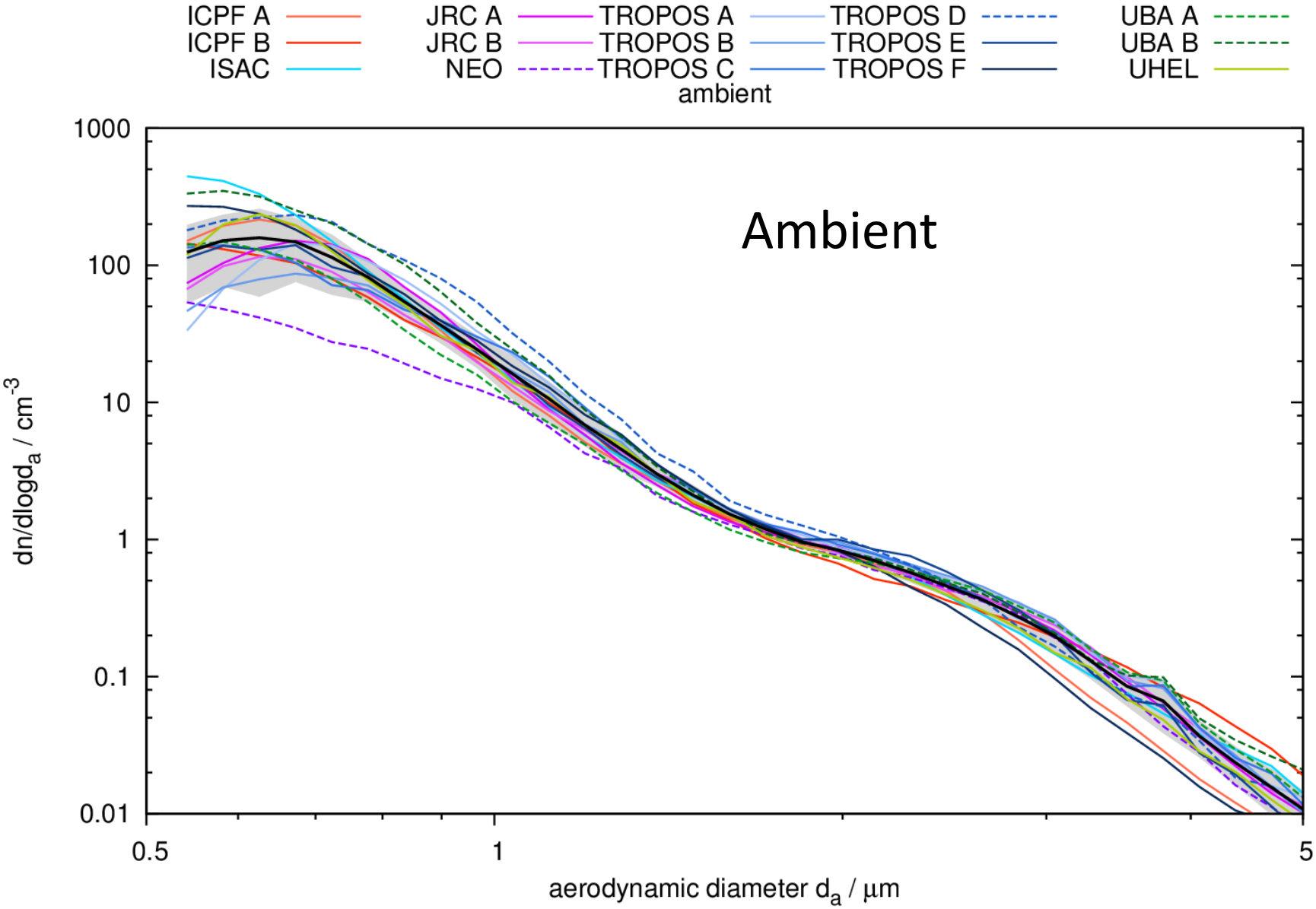
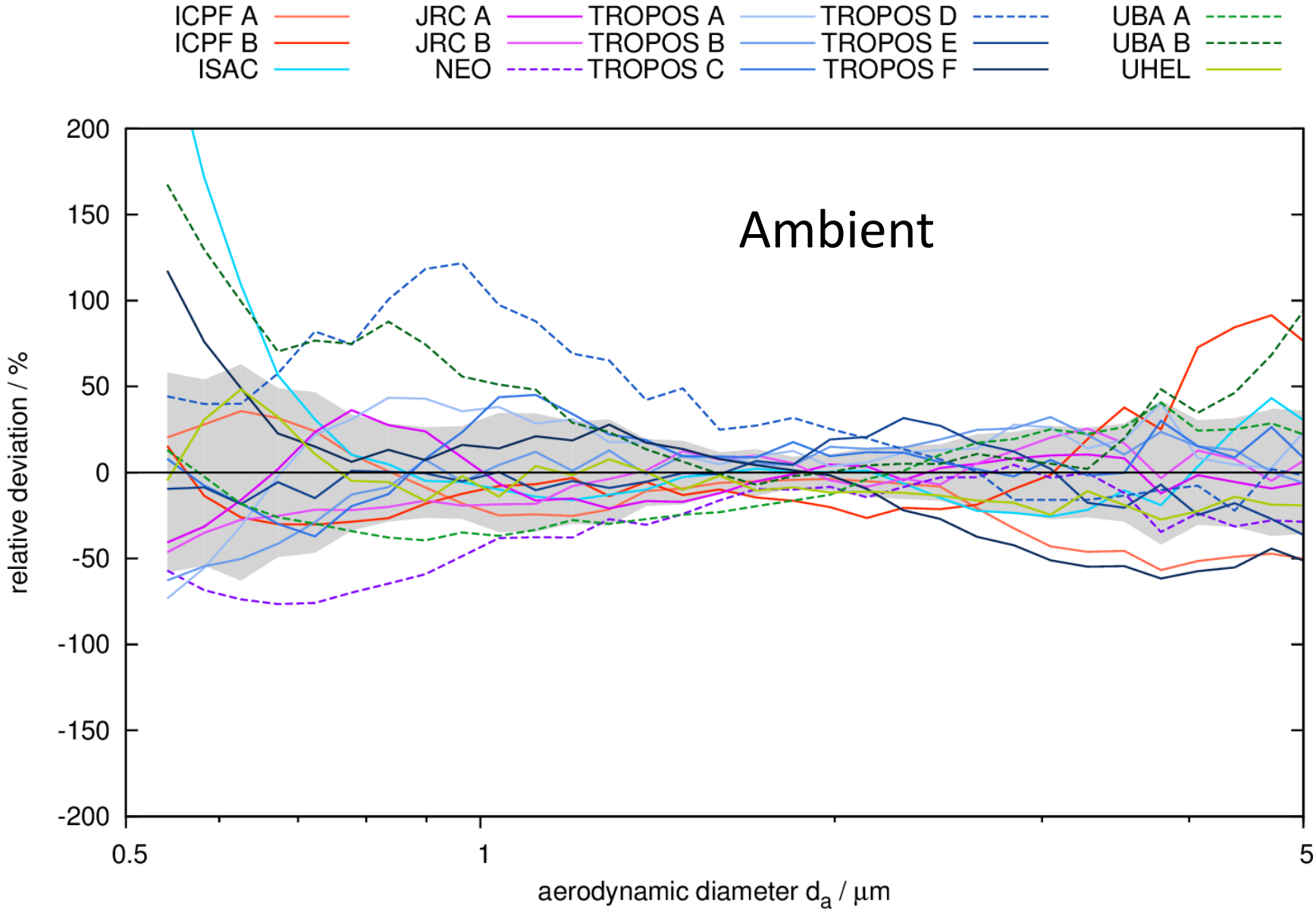
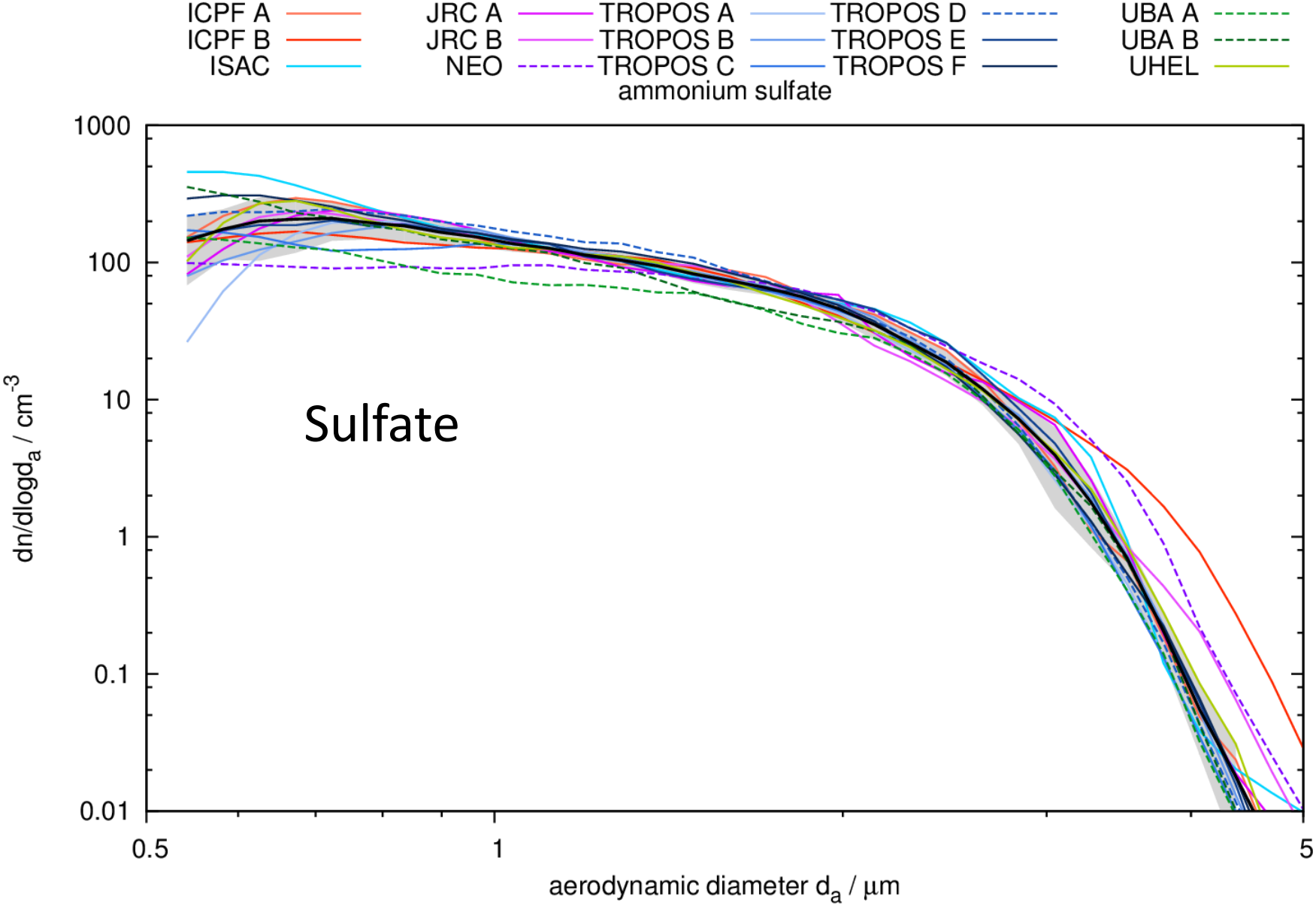
TROPOS A
TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
relative deviation to PSL particle size (manufacturer's data)
700
900
1000
1600
2000
3000
nominal PSL particle size / nm


ICPF A
ICPF B
ISAC
JRC A
JRC B
NEO
TROPOS A
TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
ambient
Ambient
1000
100
10
1
0.1
0.01
dn/dlogd$_a$ / cm^{-3}
0.5
1
5
aerodynamic diameter d$_a$ / µm


ICPF A
ICPF B
ISAC
JRC A
JRC B
NEO
TROPOS A
TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
Ambient
relative deviation / %
200
150
100
50
0
-50
-100
-150
-200
0.5
1
5
aerodynamic diameter d_a / µm


ICPF A
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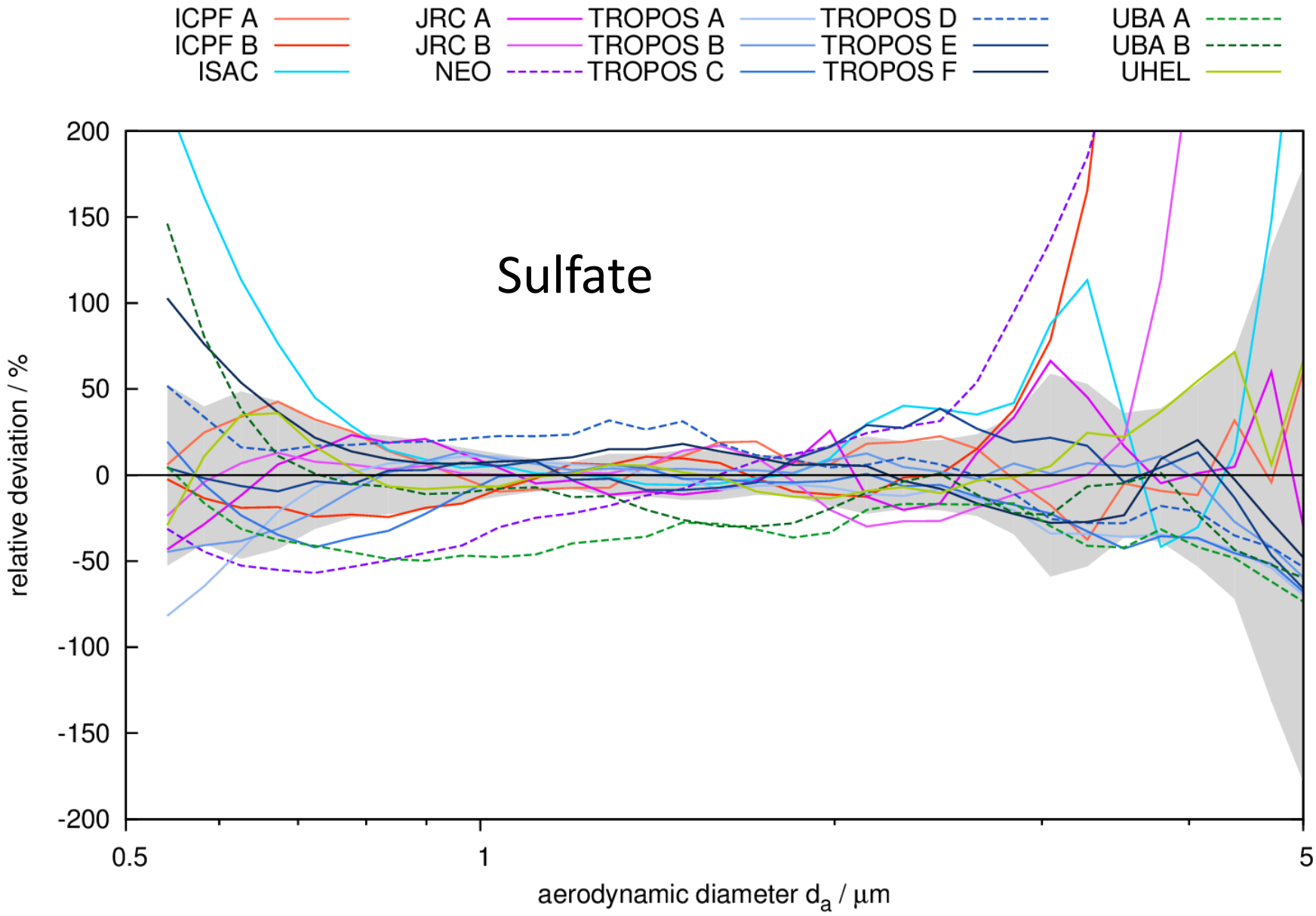
JRC B
NEO
TROPOS A
TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
ammonium sulfate
Sulfate
1000
100
10
1
0.1
0.01
0.5
1
5
dn/dlogd$_a$ / cm^{-3}
aerodynamic diameter d$_a$ / µm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TROPOS B
TROPOS C
TROPOS D
TROPOS E
TROPOS F
UBA A
UBA B
UHEL
Sulfate
relative deviation / %
200
150
100
50
0
-50
-100
-150
-200
0.5
1
5
aerodynamic diameter d_a / µm

Conclusions & Recommendations

- The mean deviation for the particle size accuracy can be given by 10 %.
- The particle size range 0.5-0.9 µm has large unit-to-unit variability up to 60%.
- The variability for the particle size range of 0.9–3 µm is about 10–20 %.
- Quality checks for flow rates and particle size accuracy should be a standard procedure.
- After a readjustment of the flow rates, a TOF re-calibration might be needed.
- A traceable reference method is needed for number concentrations in the particle size range from 0.5 to 3 µm.