Why Do We Want to Consider Abandoning Bass & Paur Ozone Cross Sections??

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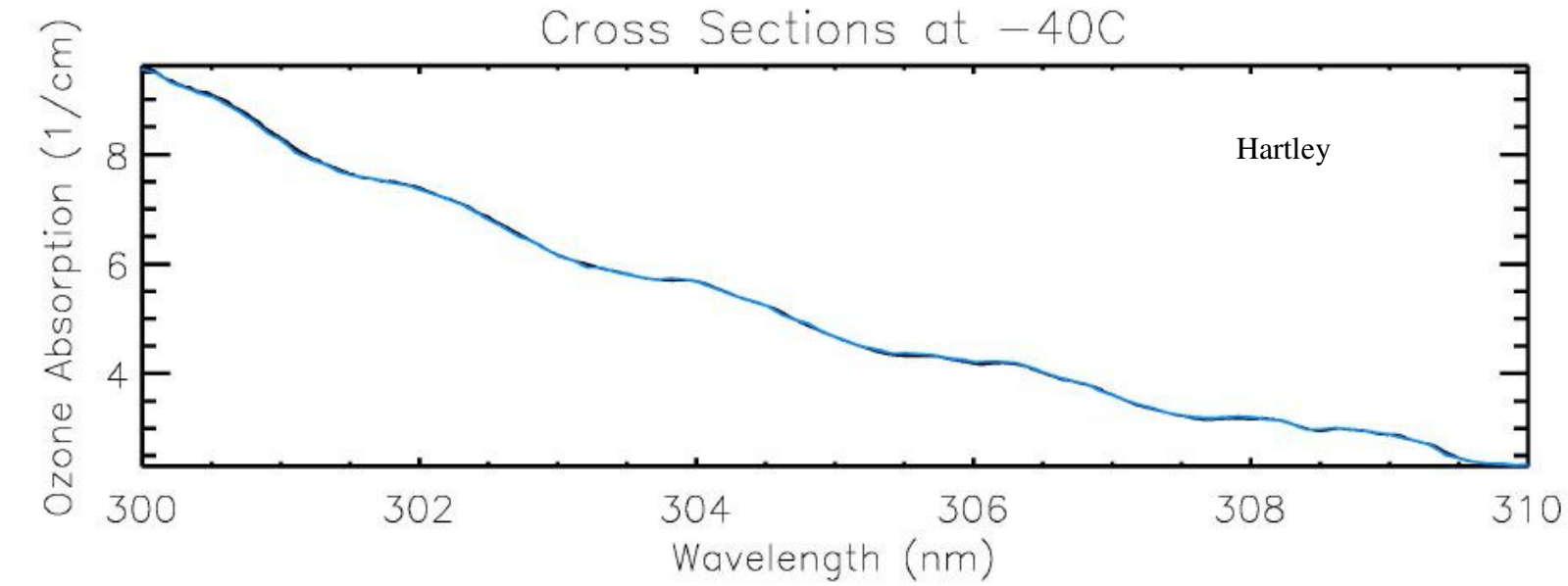
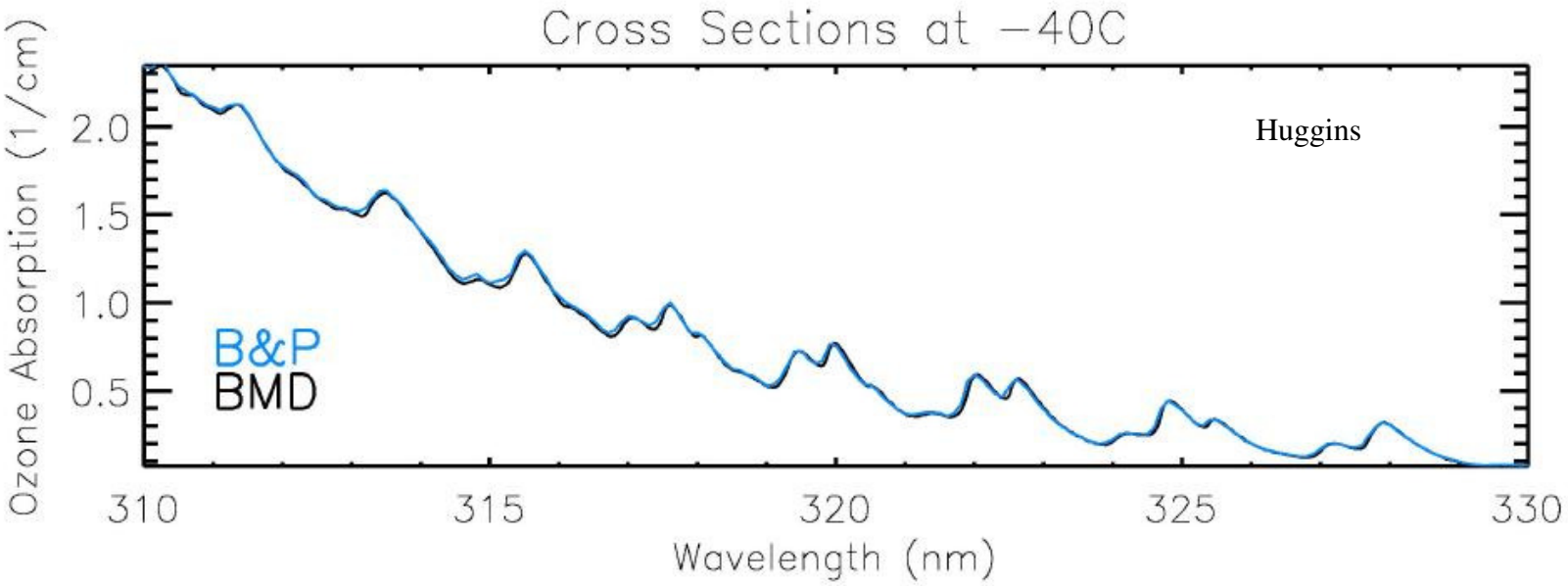
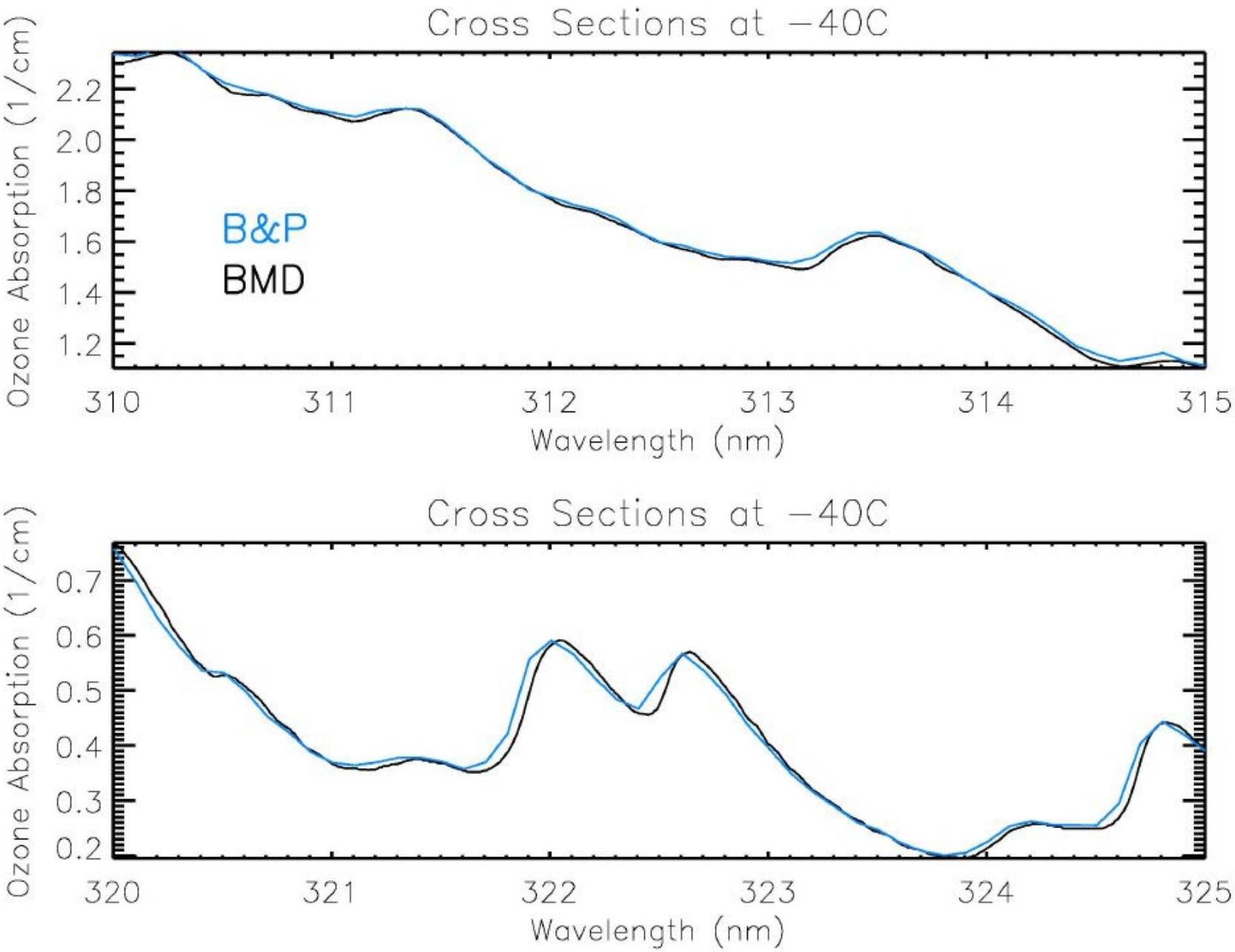
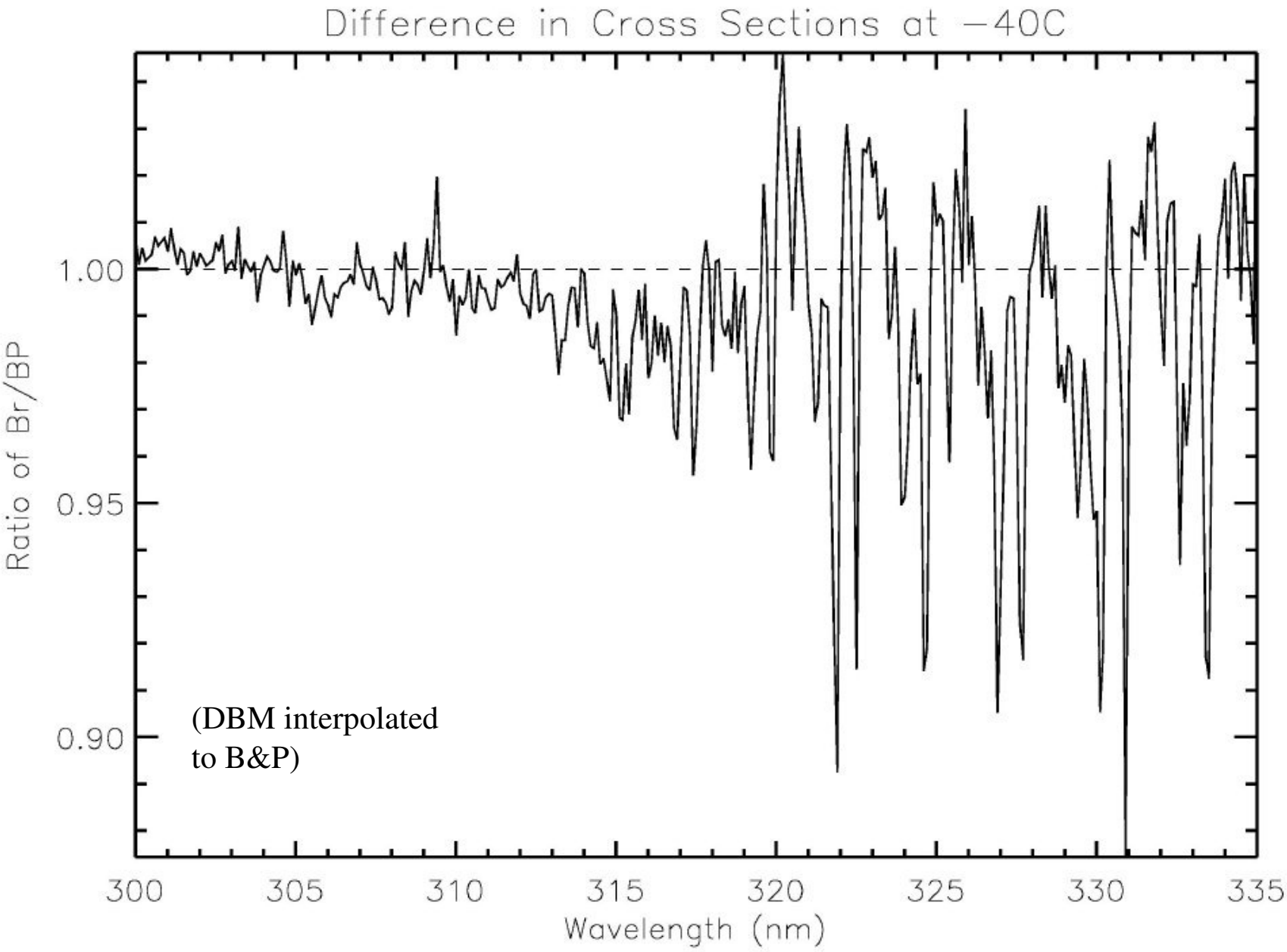
Reasons #1 & 2

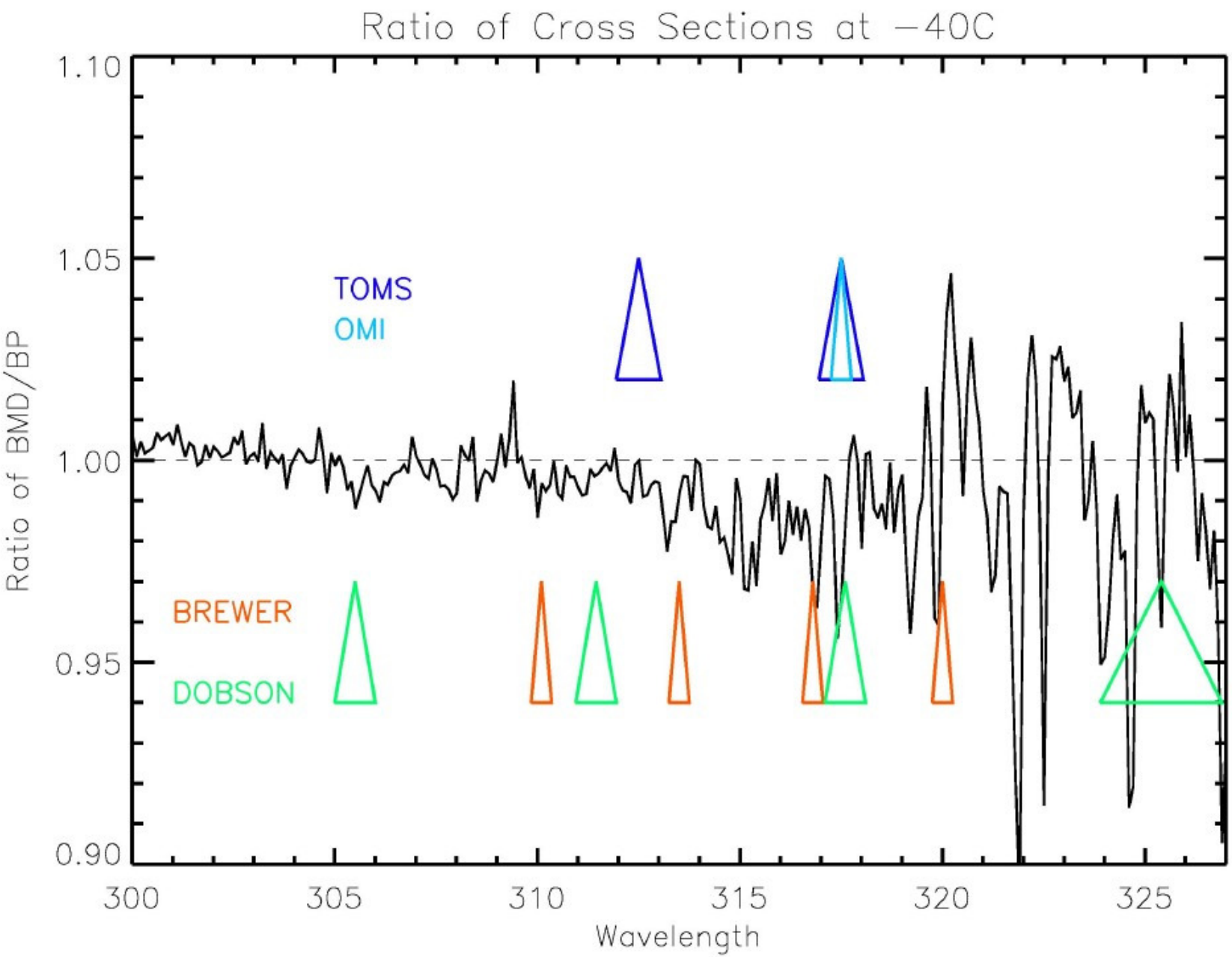
- Higher Resolution
  - -0.01nm vs 0.1nm
  - -Important for narrow band or spectral instruments
- Extended wavelength range
  - -DBM range=195-345nm vs 245-340nm
  - -B&P was extended to 342.7 by SBUV team
  - -B&P data quality uncertain above 330nm


Cross Sections at −40C
Ozone Absorption (1/cm)
8
6
4
300
302
304
306
308
310
Wavelength (nm)
Hartley


Cross Sections at −40C
Ozone Absorption (1/cm)
2.0
1.5
1.0
0.5
B&P
BMD
310
315
320
325
330
Wavelength (nm)
Huggins


Cross Sections at −40C
Ozone Absorption (1/cm)
2.2
2.0
1.8
1.6
1.4
1.2
B&P
BMD
310
311
312
313
314
315
Wavelength (nm)
Cross Sections at −40C
Ozone Absorption (1/cm)
0.7
0.6
0.5
0.4
0.3
0.2
320
321
322
323
324
325
Wavelength (nm)

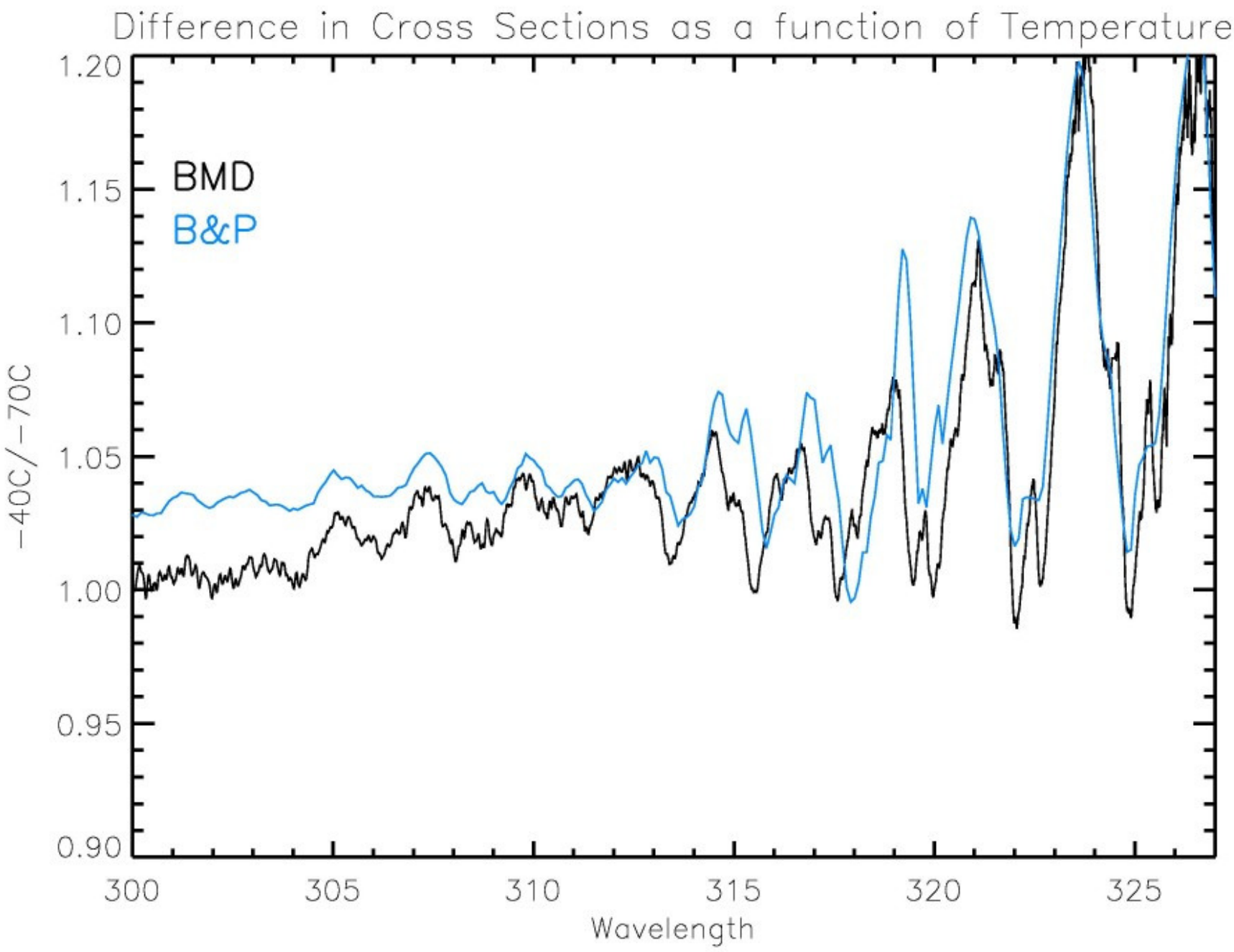

Difference in Cross Sections at −40C
Ratio of Br/BP
1.00
0.95
0.90
(DBM interpolated
to B&P)
300
305
310
315
320
325
330
335
Wavelength (nm)

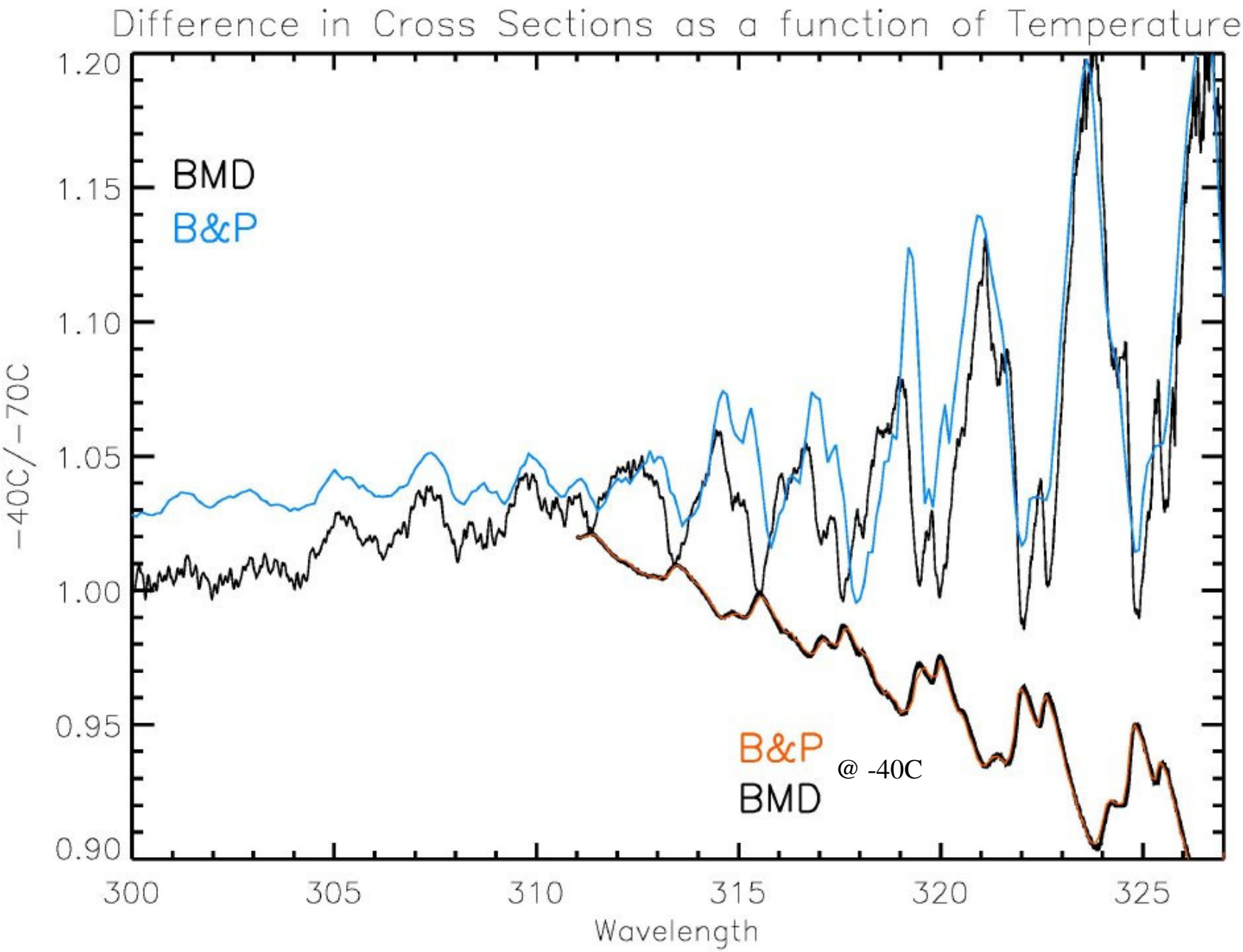

Ratio of Cross Sections at −40C
1.10
1.05
1.00
0.95
0.90
Ratio of BMD/BP
TOMS
OMI
BREWER
DOBSON
300
305
310
315
320
325
Wavelength

Reason #3

- B&P has temperature dependence error

- Important for retrievals that use varying ozone weighted temperatures (primarily satellite retrievals at the present time).


Difference in Cross Sections as a function of Temperature
BMD
B&P
−40C/−70C
1.20
1.15
1.10
1.05
1.00
0.95
0.90
300
305
310
315
320
325
Wavelength

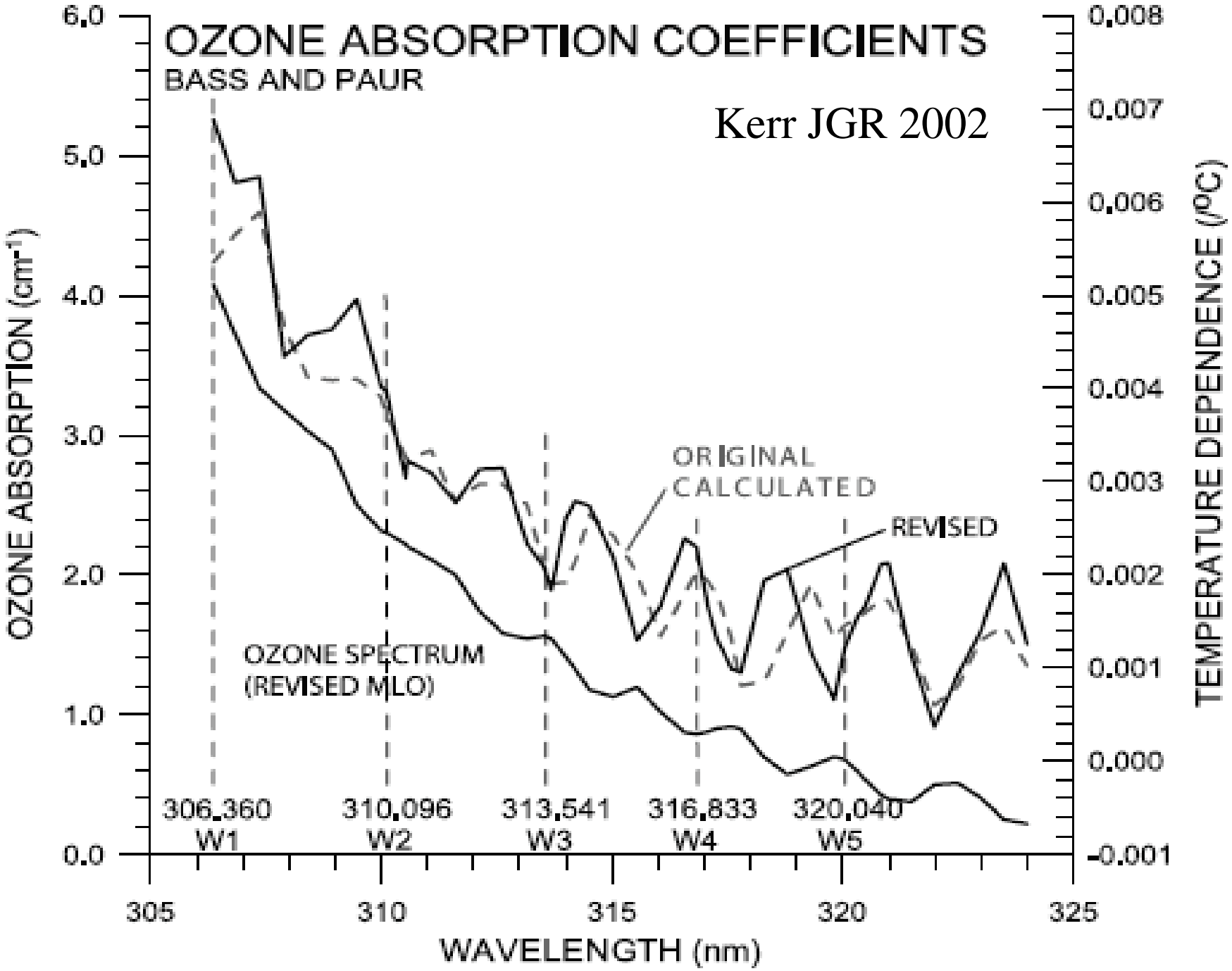

Difference in Cross Sections as a function of Temperature
1.20
1.15
1.10
1.05
1.00
0.95
0.90
−40C/−70C
BMD
B&P
B&P
BMD
@ -40C
300
305
310
315
320
325
Wavelength

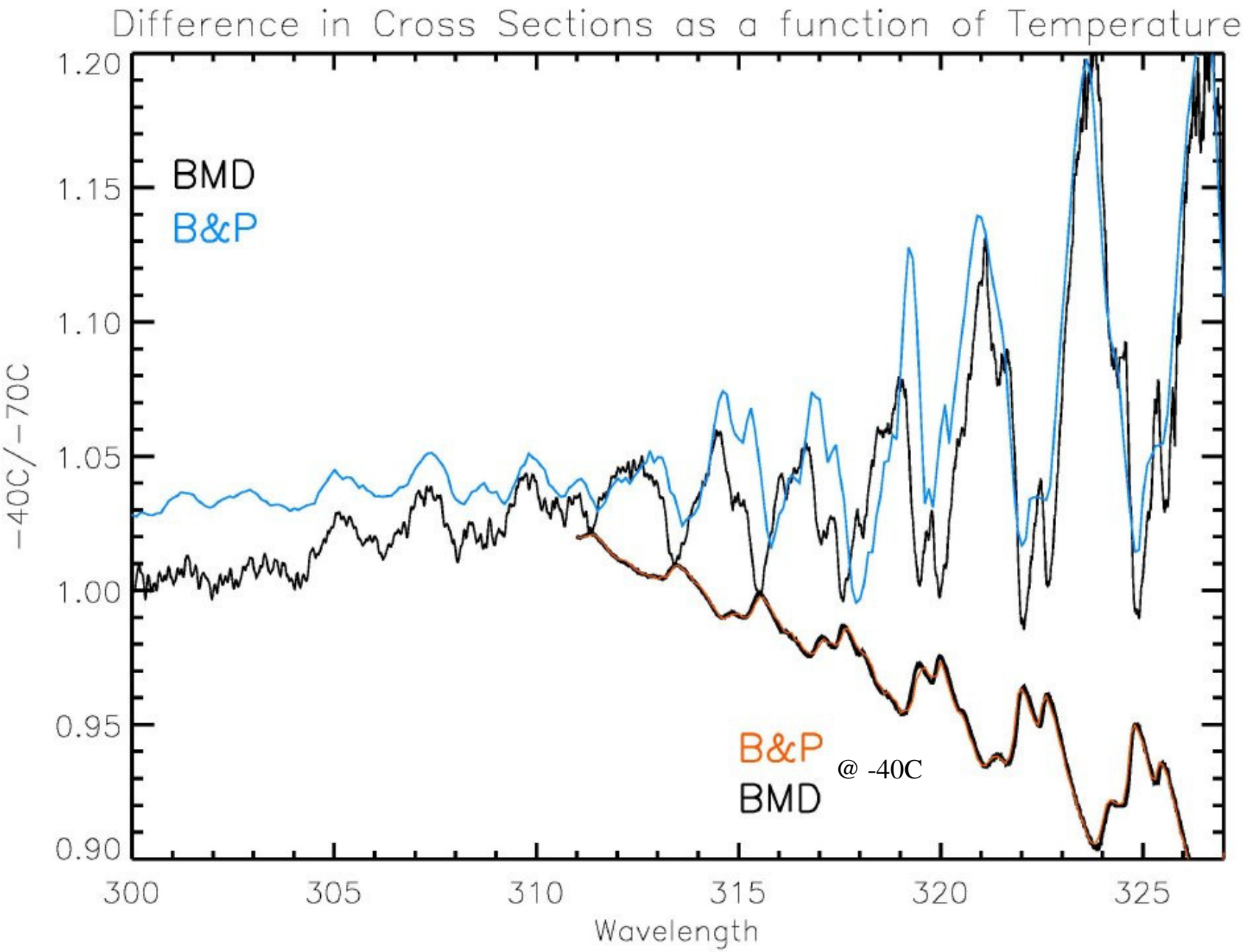
Reason #4 Lower Residuals

- Satellite results show much “cleaner” residuals
- Infers a better understanding of the atmosphere
- No time- topic for more detailed discussion tomorrow

Reason #5: Adjusted B&P

- Some instruments are using "adjusted" Bass & Paur
- Dobson: 0.05% adjustment (temperature dep @253.7nm)
- Dobson: B pair= 1.3% empirical adjustment
- Dobson: D pair= 2.0% empirical adjustment
- Dobson A Long (325.0nm) –can't reproduce published results
- TOMS: No adjustments
- Brewer: Jim Kerr knew something was not right….


OZONE ABSORPTION COEFFICIENTS
BASS AND PAUR
Kerr JGR 2002
OZONE ABSORPTION (cm-1)
TEMPERATURE DEPENDENCE (/°C)
WAVELENGTH (nm)
ORIGINAL CALCULATED
REVISED
OZONE SPECTRUM (REVISED MLO)
306.360 W1
310.096 W2
313.541 W3
316.833 W4
320.040 W5
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
-0.001
305
310
315
320
325


Difference in Cross Sections as a function of Temperature
1.20
1.15
1.10
1.05
1.00
0.95
0.90
−40C/−70C
BMD
B&P
B&P
BMD
@ -40C
300
305
310
315
320
325
Wavelength

Summary:The 5 Reasons

- Higher Resolution
  - -0.01nm vs 0.1nm
  - -Important for narrow band or spectral instruments
- Extended wavelength range
  - -195-345nm vs 245-343nm

B&P has temperature dependence error

Important for retrievals that use varying ozone weighted temperatures

- Lower satellite residuals (topic for tomorrow)
- Some instruments are using “adjusted” Bass & Paur
  - -TOMS, Dobson, Brewer using different cross sections
  - - Will things get better with the new cross sections???