# GEISA/IASI EVALUATION AND UPDATES UNDERWAY

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http://ara.lmd.polytechnique.fr/registration
with : *registerme* as user name
No password required or E-Mail address
Then name and password for access will be provided

http://ara.lmd.polytechnique.fr/ftpgeisa
For access to GEISA/IASI data

# GEISA/IASI-2001

# INDIVIDUAL SPECTRAL LINES

# SUB-DATABASE

# The GEISA-97/01 SPECTROSCOPIC DATABANK
## (IASI Database selection)

| Molecules | Code | Isotopes | # transitions |
|---|---|---|---|
| **H2O** | 1 | 161-162-171-181-182 | **13279** |
| **CO2** | 2 | 626-627-628-636-637-638-728-828-838 | **50375** |
| **O3** | 3 | 666-668-686-667-676 | **151775** |
| **N2O** | 4 | 446-447-448-456-546 | **18938** |
| **CO** | 5 | 26- 36- 28- 27- 38- 37 | **3674** |
| **CH4** | 6 | 211-311 ***+CH3D*** | **121282** |
| **O2** | 7 | 66- 67- 68 | **435** |
| **NO** | 8 | 46- 48- 56 | **26083** |
| **SO2** | 9 | 626-646 | **22301** |
| **NO2** | 10 | 646 | **68252** |
| *NH3* | *11* | *411-511* | *11152* |
| *PH3* | *12* | *131* | *4635* |
| **HNO3** | 13 | 146 | **152586** |
| *OH* | *14* | *61- 62- 81* | *41786* |
| *HF* | *15* | *19* | *107* |
| *HCl* | *16* | *15-17* | *533* |
| *HBR* | *17* | *11-19* | *576* |
| *HI* | *18* | *17* | *237* |
| *ClO* | *19* | *56-76* | *7230* |
| **OCS** | 20 | 622-624-632-623-822-634-722 | **19768** |
| *H2CO* | *21* | *126-128-136* | *2702* |
| *C2H6* | *22* | *226-236* | *14981* |
| *CH3D* | *CH4 Isotope* | | |
| **C2H2** | 24 | 221-231 | **1409** |
| *C2H4* | *25* | *211-311* | *12978* |
| *GeH4* | *26* | *411* | *824* |
| *HCN* | *27* | *124-125-134* | *2575* |
| *C3H8* | *28* | *221* | *9019* |
| *C2N2* | *29* | *224* | *2577* |
| *C4H2* | *30* | *211* | *1405* |
| *HC3N* | *31* | *124* | *2027* |
| *HOCl* | *32* | *165-167* | *15565* |
| **N2** | 33 | 44 | **117** |
| *CH3Cl* | *34* | *215-217* | *9355* |
| *H2O2* | *35* | *166* | *100781* |
| *H2S* | *36* | *121-141-131* | *20788* |
| *HCOOH* | *37* | *261* | *3388* |
| *COF2* | *38* | *269* | *54866* |
| *SF6* | *9* | *29* | *11520* |
| *C3H4* | *40* | *341* | *3390* |
| *HO2* | *41* | *166* | *26963* |
| *CLONO2* | *42* | *564-764* | *32199* |

Spectral range: 600 – 3000 **cm$^{-1}$** Total 650,274

# GEISA/IASI-2001 INDIVIDUAL SPECTRAL LINES SUB-DATABASE

# OZONE REFERENCES

## GEISA/IASI-01 Version:


N. Jacquinet-Husson, E. Arié, J. Ballard, A. Barbe, L.R. Brown, B. Bonnet, C. Camy-Peyret, J.P. Champion, A. Chédin, A. Chursin, C. Clerbaux, G. Duxbury, J.M. Flaud, N. Fourrié, A. Fayt, G. Graner, R. Gamache, A. Goldman, Vl. Golovko, G. Guelachvilli, J.M. Hartmann, J.C. Hillico, G. Lefèvre, O.V. Naumenko, V. Nemtchinov, D.A. Newnham, A. Nikitin, J. Orphal, A. Perrin, D.C. Reuter, L. Rosenmann, L.S. Rothman, N.A. Scott, J. Selby, L.N. Sinitsa, J.M. Sirota, A.M. Smith, K.M. Smith, Vl.G. Tyuterev, R.H. Tipping, S. Urban, P. Varanasi, M. Weber
"The 1997 spectroscopic GEISA databank"
JQSRT, 62, pp 205-254, 1999

Jacquinet-Husson N., et al.
Wagner G., Birk M., Schreier F., Flaud J.M.
Spectroscopic database for ozone in the fundamental spectral regions
J. of Geosphys. Res., 2002, Vol. 107, NO. D22, 4626


## GEISA/IASI –03 Version underway:

( Additional or complementary references)


Flaud J.M., Camy-Peyret C., Rinsland C.P., Smith M.A.H., Malathy-Devi V.

Line parameters for $^{16}O_3$ bands in the 7-µm region.

J. Mol. Spectrosc. 1989, 134 : 106-112.

Barbe A., Chichery A., Tyuterev Vl. G., Tashkun S., Mikhailenko S.

The $2\nu_2$ and $3\nu_2$-$\nu_2$ bands of ozone.

Spectrochimica. 1998, Part 54 : 1935-1945.

http://ozone.univ-reims.fr and http://ozone.iao.ru

Mikhailenko S., Barbe A., and Tyuterev Vl.G.

Extended analysis of line positions and intensities of ozone bands in the 2900 – 3200 $cm^{-1}$ region.

J. Mol. Spectrosc. 2002, 215 : 29-

De Backer-Barilly, M-R, Barbe, A, Tyuterev, VlG,

Infrared spectrum of $^{16}O^{18}O^{16}O$ in the 5micron range : Positions, intensities,

and atmospheric applications

Atmospheric and Oceanic Optics, v.16, (2003) (in press).

J.-M. Flaud, C. Camy-Peyret, A.N'Gom, V.Malathy Devi, C.P.Rinsland, M.A.H.Smith,
The $\nu_2$ bands of $^{16}O^{18}O^{16}O$ and $^{16}O^{16}O^{18}O$ : Line positions and intensities,
J. Mol. Spectrosc., v.133, pp.217-223 (1989)

J.M.Flaud, C.Camy-Peyret, V.Malathy Devi, C.P.Rinsland, M.A.H.Smith,
The $\nu_1$ and $\nu_3$ bands of $^{16}O_3$ : Line positions and intensities,
J. Mol. Spectrosc., v.124, pp.209-217 (1987)

J.M.Flaud, C.Camy-Peyret, C.P.Rinsland, M.A.H.Smith, V.Malathy Devi,
Line parameters for $^{16}O_3$ bands in the 7.5 micron region,
J. Mol. Spectrosc., v.134, pp.106-112 (1989)

A.Barbe, J.J.Plateaux, S.Bouazza, O.N.Sulakshina, S.N.Mikhailenko,
V.Tyuterev, S.A.Tashkun,
Experimental and theoretical study of absolute intensities of ozone spectral lines in the range 1850-2300 cm-1,
J. Quant. Spectrosc. Radiat. Transfer., v.52, pp.341-355 (1994);

A.Barbe, O.N.Sulakshina, J.J.Plateaux, A.Hamdouni, S.Bouazza,
High-resolution infrared spectra of ozone in the 2300-2600 cm-1 region,
J. Mol. Spectrosc., v.170, pp.244-250 (1995)

V.Malathy Devi, J.M.Flaud, C.Camy-Peyret, C.P.Rinsland, M.A.H.Smith,
Line positions and intensities for the $\nu_1+\nu_2$ and $\nu_2+\nu_3$ bands of $^{16}O_3$,
J. Mol. Spectrosc., v.125, pp.174-183 (1987)

**J. M. Flaud, Private Communication, September 2002**

**DLR, Private Communication, January 2003**

**GSMA, Private Communication, February,2003o**

# OZONE DATA FOR GEISA/IASI-03 UPDATE

| File Id. | # lines | Nu Min. ($cm^{-1}$) | Nu Max. ($cm^{-1}$) | Isotope(s) |
|---|---|---|---|---|
| GSMA-1 | 2599 | 1311.1009 | 1525.9574 | 666 |
| Nonad | 22565 | 2597.4417 | 3391.6092 | 666 |
| nonad-001 | 22724 | 1617.0595 | 2309.7865 | 666 |
| nonad-010 | 10914 | 1882.1424 | 2536.5030 | 666 |
| 686_triade | 14698 | 1823.1289 | 2259.8960 | 686 |
| (1) O3-HU.666_flaud_230902 | 14165 | 928.19770 | 1272.42190 | 666 |
| (2) o3_dlr_3fev03 | 79374 | 600.179300 | 1231.881510 | 666, 668, 686 |

(1) Referred to as: “Flaud”
(2) Referred to as “DLR” or “DLRnew”

# OZONE UPDATE FILES EVALUATION

- **Air-broadened line Halfwidth differences (in percent):**

$$Hwdif = \{HW_{Flaud} - HW_{DLR} / ((HW_{Flaud} + HW_{DLR})/2)\} \times 100$$

$$Hwdif = \{HW_{DLRnew} - HW_{DLRold} / ((HW_{DLRnew} + HW_{DLRold})/2)\} \times 100$$

- **Impact of relative Intensities on air broadened line Halfwith differences (in percent):**

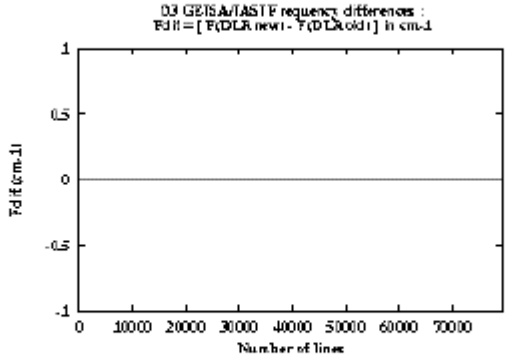
$$Iimp = \{[HW_{Flaud} - HW_{DLR} / ((HW_{Flaud} + HW_{DLR})/2)] \mathbf{x} (I_{Flaud} + I_{DLR}/2)/IMAX\} \mathbf{x} 100$$

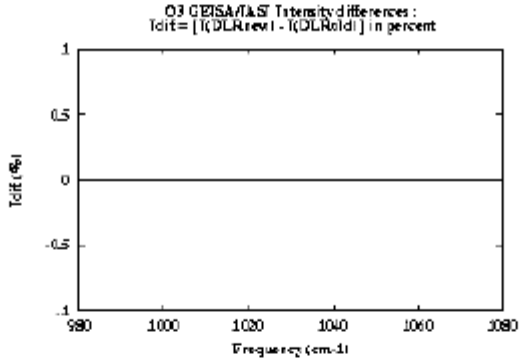
$$IMAX = (IMAX_{Flaud} + IMAX_{DLR}/2) = 8.83 \text{ E-}21$$

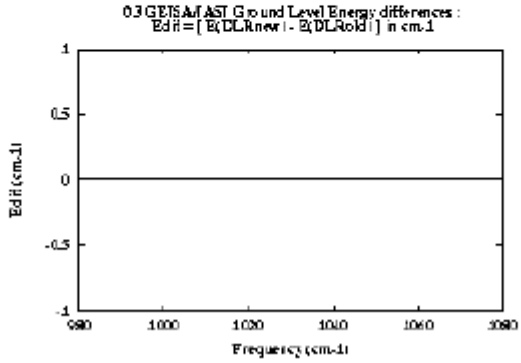
- **Intensities Differences (in percent)**

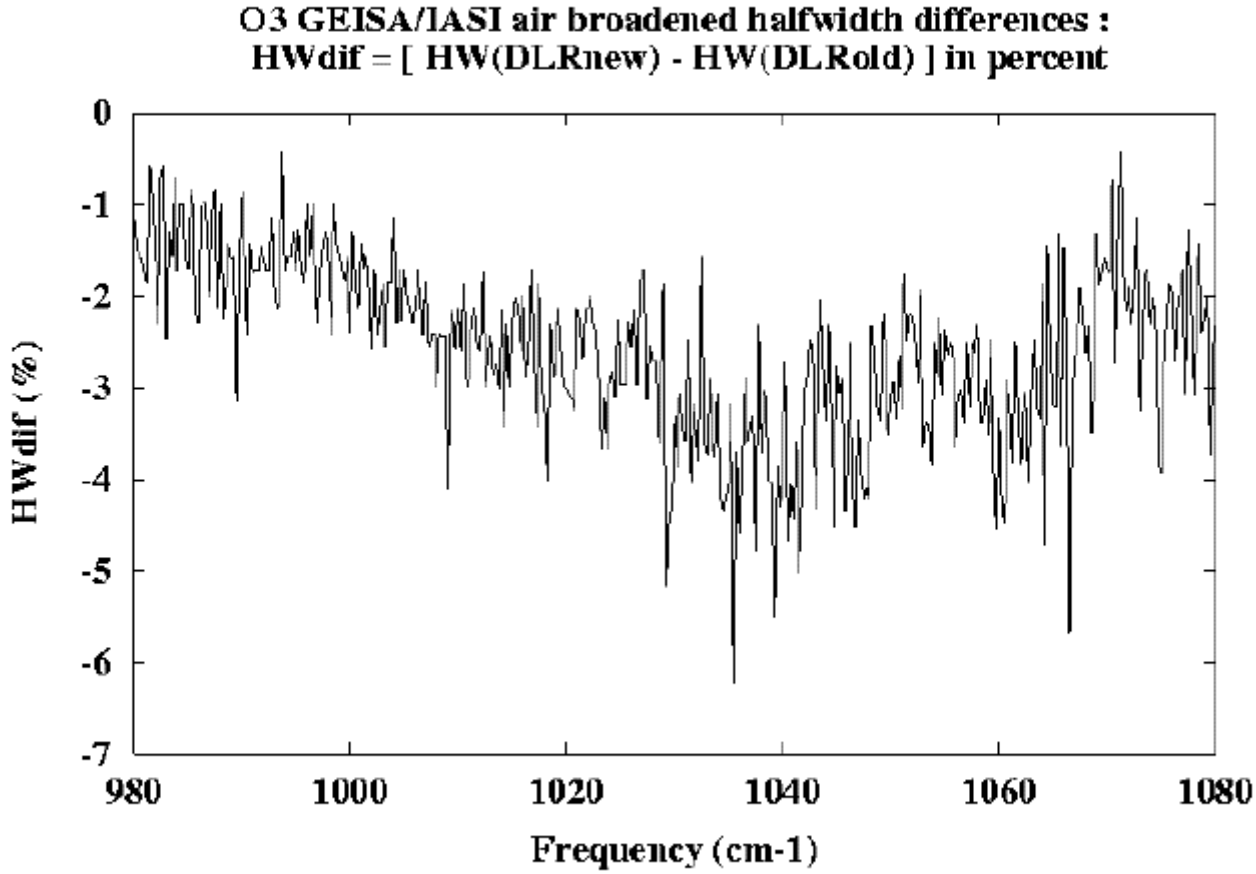
$$Idif = [(I_{DLRnew} - I_{DLRold}) / (I_{DLRnew} + I_{DLRold})/2] \mathbf{x} 100$$

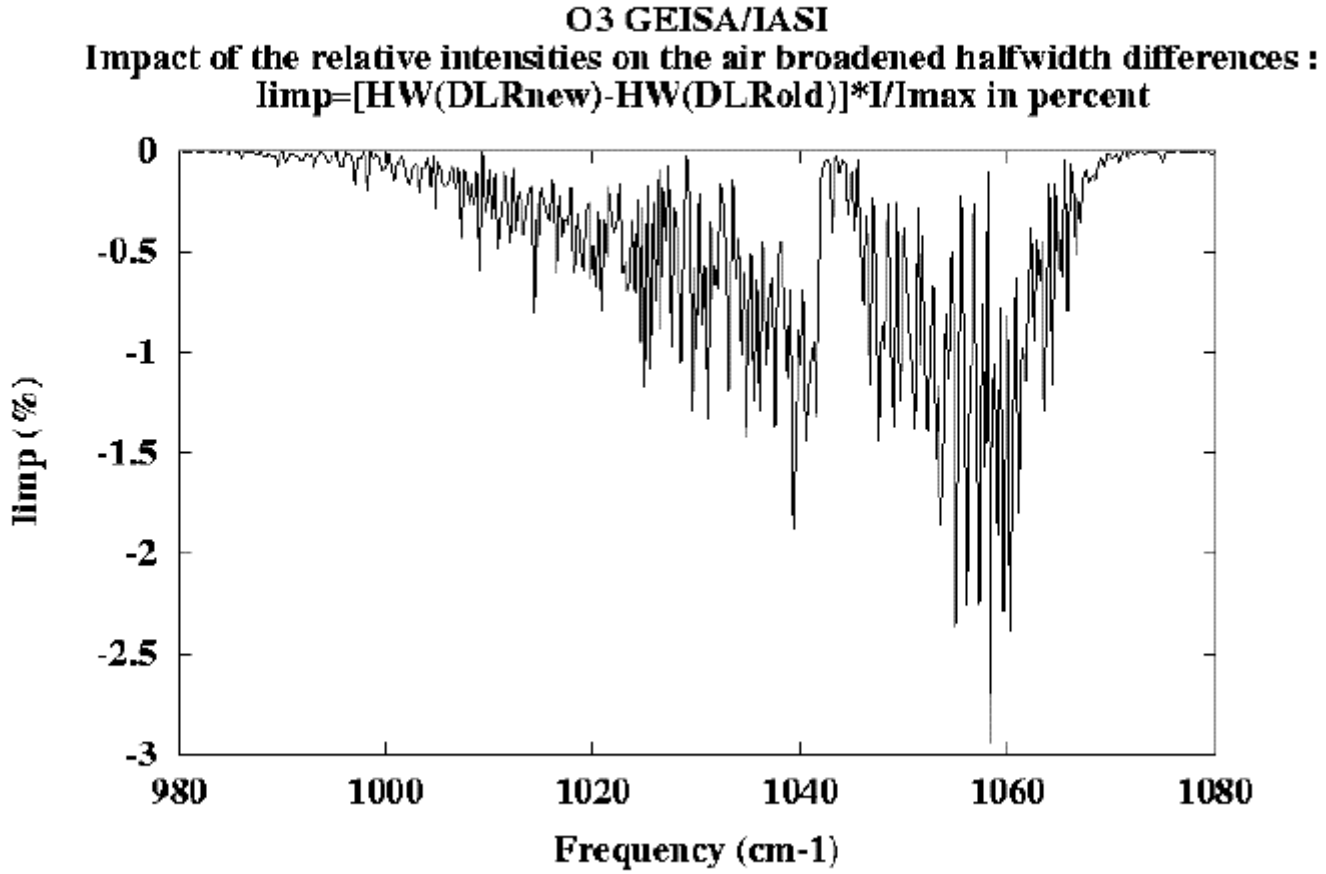
$$IMAX = 3.1367 \text{ E-}21$$

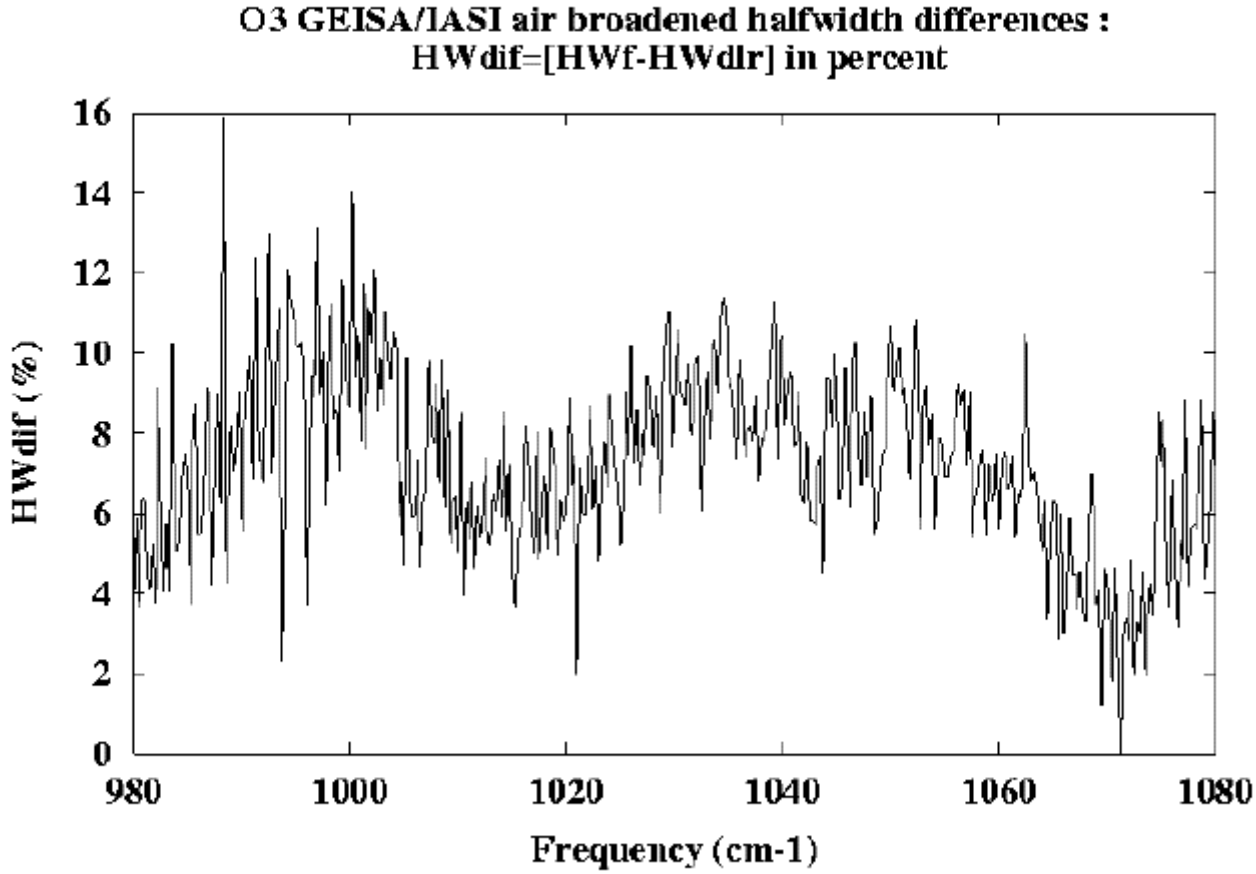

O3 GETSA/TAST Frequency differences :
Fdiff = [ F(DLR new) - F(DLR old) ] in cm-1
Fdiff (cm-1)
1
0.5
0
-0.5
-1
0
10000
20000
30000
40000
50000
60000
70000
Number of lines

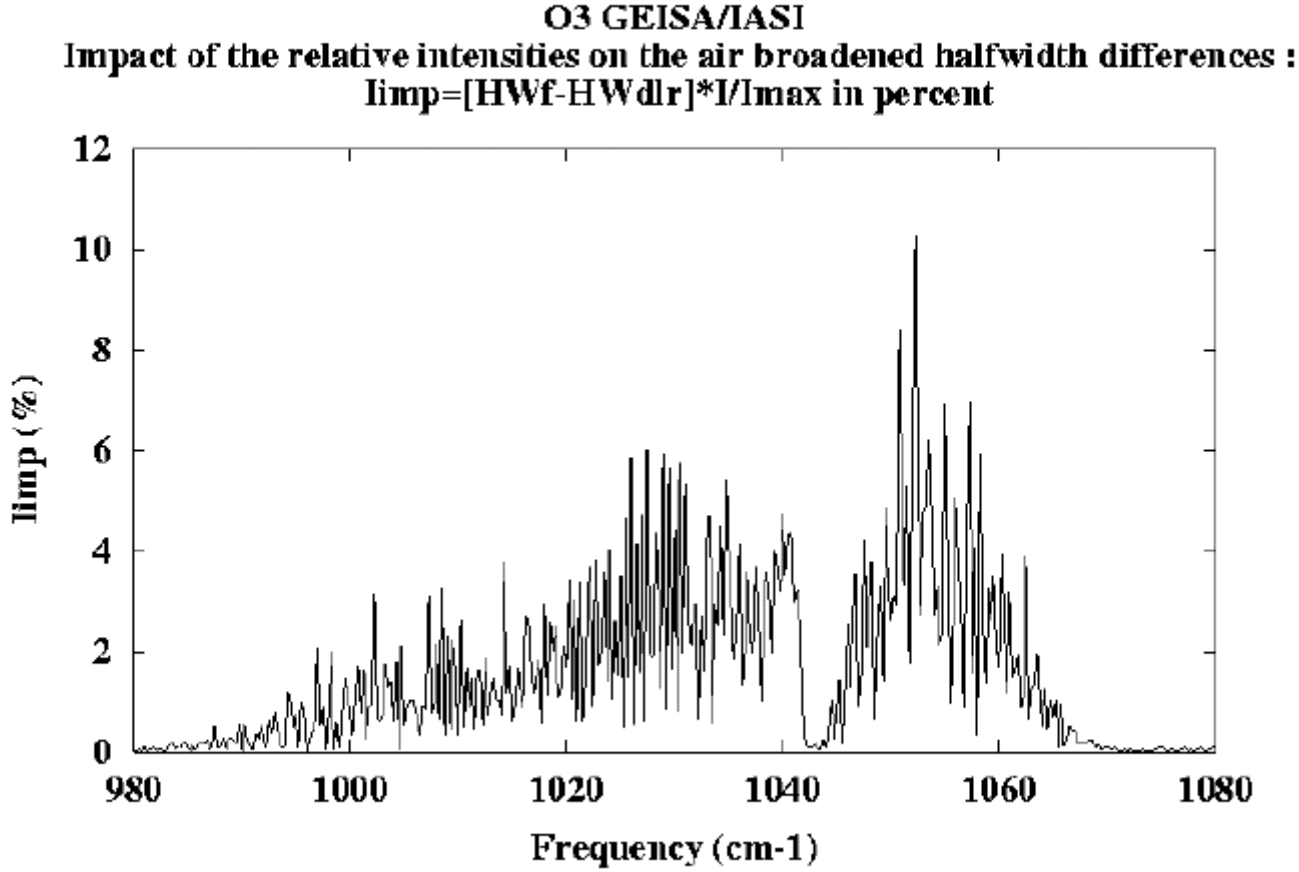

O3 GETSA/TAST Intensity differences :
Idiff = [ I(DLR new) - I(DLR old) ] in percent
Idiff (%)
1
0.5
0
-0.5
-1
980
1000
1020
1040
1060
1080
Frequency (cm-1)

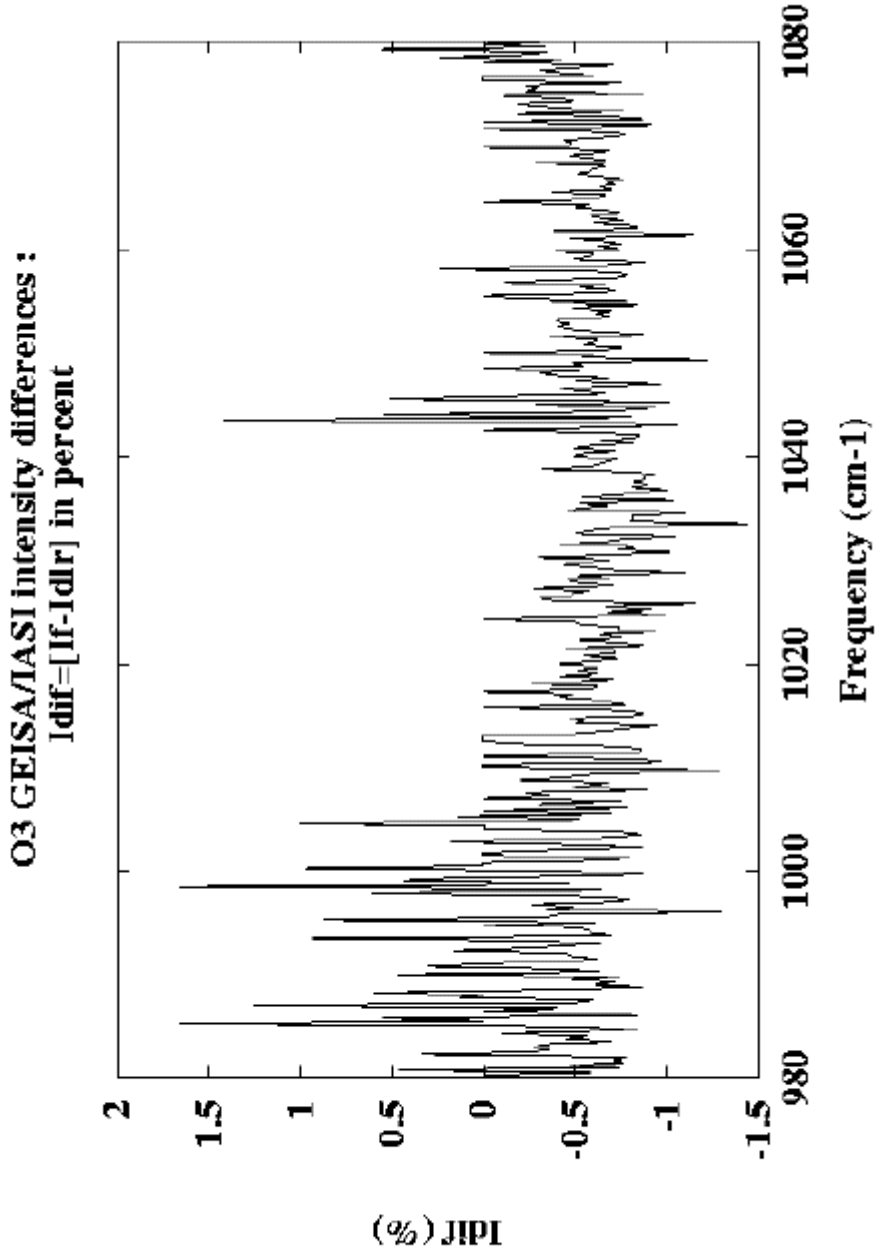

O3 GETSA/TAST Ground Level Energy differences :
Ediff = [ E(DLR new) - E(DLR old) ] in cm-1
Ediff (cm-1)
1
0.5
0
-0.5
-1
980
1000
1020
1040
1060
1080
Frequency (cm-1)


O3 GEISA/IASI air broadened halfwidth differences :
HWdif = [ HW(DLRnew) - HW(DLRold) ] in percent
HWdif ( % )
0
-1
-2
-3
-4
-5
-6
-7
980
1000
1020
1040
1060
1080
Frequency (cm-1)


O3 GEISA/IASI
Impact of the relative intensities on the air broadened halfwidth differences :
Iimp=[HW(DLRnew)-HW(DLRold)]*I/Imax in percent
0
-0.5
-1
-1.5
-2
-2.5
-3
Iimp ( %)
980
1000
1020
1040
1060
1080
Frequency (cm-1)


O3 GEISA/IASI air broadened halfwidth differences :
HWdif=[HWf-HWdlr] in percent
HWdif (%)
16
14
12
10
8
6
4
2
0
980
1000
1020
1040
1060
1080
Frequency (cm-1)


O3 GEISA/IASI
Impact of the relative intensities on the air broadened halfwidth differences :
Iimp=[HWf-HWdlr]*I/Imax in percent
Iimp ( %)
Frequency (cm-1)
0
2
4
6
8
10
12
980
1000
1020
1040
1060
1080


O3 GEISA/IASI intensity differences :
Idif=[If-Idr] in percent
Idif (%)
2
1.5
1
0.5
0
-0.5
-1
-1.5
980
1000
1020
1040
1060
1080
Frequency (cm-1)