

Auxiliary Codes

Pre-Process Offline

- Prepare WACCM to reference
- Prepare OPUS data list
- Prepare local housekeeping
- Prepare NCEP zptw
- Prepare HITRAN hbin file
- Prepare ils data
- Prepare isotope data
- Prepare sfit4.cti file

- OPUS to t15asc
 - ckopus
 - pspec
- Refmaker
 - Modify reference.prf, current zpt

- Calculate error covariance, each retrieval

- Prepare site metadata
- Consolidate retrieval + error covariance data
- Prepare input for idlcr8hdf
- Run idlcr8hdf

pspec.f90

input file

```
# pspec.input
# Latitude of Observation [+N, 90 - -90]
76.516
# Longitude of Observation[+E, 0 - 360]
283.484
# Altitude of Observation [masl]
225.0
# filter bands and regions for calculating SNR
7
f1 4038.727 4038.871
f2 3381.155 3381.536
f3 2924.866 2925.100
f4 2526.228 2526.618
f5 1985.260 1985.510
f6 1139.075 1139.168
f8 907.854 907.977
# number of binary spectr to read
1
# bnr spectra file name
temp.bnr.00
# bandpass (wlo, whi), resolution OPD [cm-1], radius of earth, zero fill factor, ratioflag
6396.1 1 1
# ratio file name (bnr format) if ratioflag eq 1, skip if 0
./ratio.8
temp.bnr.00
6396.1 1 0
```

HINTS

- *The t15 could be one block and multiple windows will still be extracted.*
- *Pspec will loop over multiple spectral files*
- *Add your own snr windows.*

Pspec can ratio the solar spectrum with a bnr formatted low resolution file

$$B_{\oplus}^{filter_i}(\nu) = \frac{S_{\odot}^{filter_i}(\nu)}{R(\nu)}$$

If the ratio file is the Solar bb normalized filter band the filter envelope shape along with the solar BB curve are removed.

$$R(\nu) = \frac{B_{6000^{\circ}} \cdot S_{glowbar}^{filter_i}}{B_{1200^{\circ}}(\nu)}$$

```

37.26100  6385.44500   40.03800   254.76000   402.3
      2011    6   23   16   24   11
06/23/2011 16:24:11UT Z:37.261 A:284.29 D:0101.7 R:0.0035 P:BX F:01.9139mr
4881.897500000000000  4888.102500000000000  2.50000000000000005E-003  2483
0.315438E+00
0.293434E+00
0.285126E+00
0.271612E+00
0.240477E+00

```

KEY:

SZA° radius_of_earth [km] latitude [°N] longitude [°E] SNR
 YYYY MM DD HH MM SS
 arbitrary ascii comment, 80 characters
 start_wn end_wn point_spacing Npoints
 spectra values...

- ✓ *Any number of blocks are ok*
- ✓ *All blocks with spectra within sfit4.ctl band limits will be fit*
- ✓ *Spectra will be truncated to sfit4.ctl band limits*

ckopus.c

process opus files

\$./ckopus -?

usage: ckopus -wXXX -nXXX -eXXX -tNNN -s -Ssss -[S|L|B|P|R] -[R|F]ssss file1 file2 ...

where:

- w is west longitude defaults to 0.00 [decimal degrees]
- n is north latitude defaults to 0.00 [decimal degrees]
- e is elevation defaults to 0.00 [meters]
- t is time offset defaults to 0 [seconds]
- u is UTC time offset defaults to 0 [hours]
- s swap bytes on opus read defaults to No Swap
- S set lat lon & alt for [TAB | FLO | MLO | KPK | PKF | MSA | SGP | TMK]
- C short listing of file contents
- L long listing of file contents
- B list file blocks
- P list time stamps
- M make Linefit microwindow files
- R write 'C' bnr for type [TRAN | SGN2 | IFG2 | EMIS | IFGM | PHAS | SNGC] ex. -RSNGC
- F write FORTRAN bnr for type [TRAN | SGN2 | IFG2 | EMIS | IFGM | PHAS | SNGC] ex. -FEM
- D one line param list for database to stdout
- H print database header to stdout

Filename	Site	SBlock	TOffs	TStamp	Date	Time	SNR	N_Lat	W_Lon
s3ifmb1c.0	TAB	SNGC	0	230603	06/23/2009	23:06:03	289.6	76.52	68.77

Alt	Sazm	SZen	ROE	Dur	Reso	Apd	FOV	LWN	HWN
225.0	102.61	68.91	6398.2928	101.72	0.0035	BX	2.2727	2400.003	3149.999

Flt	MaxY	MinY	GFW	GBW
3	3.877e+00	-3.604e-02	1	0

Preparation

Batch

