bandpass calibration problem

I flagged channels 150 to 250 for BR station due to RFI

problem: POSSM plots look weird for baselines NOT involving BR station

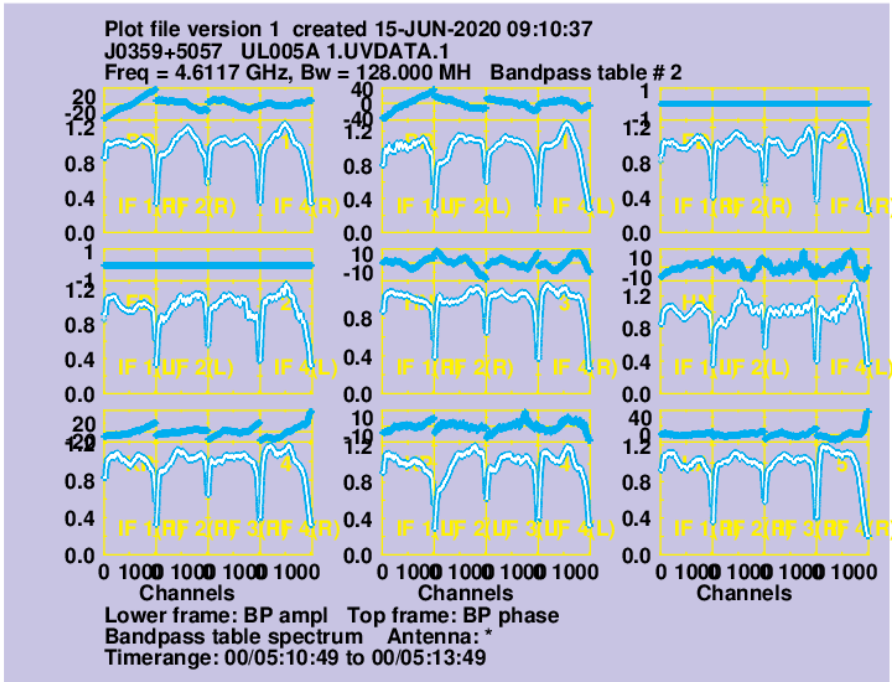
Used settings for BPASS

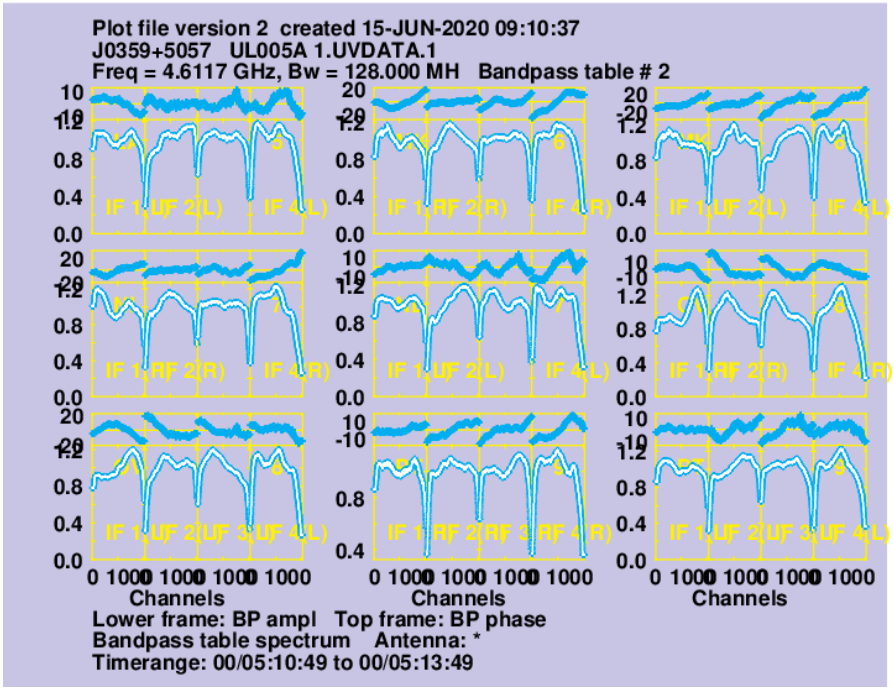
- 'inname': UL005A_1
- inclass': UVDATA
- inseq': 1.0,
- indisk': 1.0
- 'calsour': ['J0359+5057', '']
- 'qual': -1.0
- 'calcode': ',
- 'uvrange': [0.0, 0.0]
- timerang': [0.0, 5.0, 10.0, 49.0, 0.0, 5.0, 13.0, 49.0]
- 'selband': -1.0'selfreq': -1.0'freqid': -1.0'subarray': 0.0
- 'antennas': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'in2name': '''in2class': '''in2seq': 0.0'in2disk': 0.0'invers': 0.0
- 'ncomp': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'flux': 0.0'nmaps': 0.0'cmethod': '''cmodel': '''smodel': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'docalib': 1.0'gainuse': 6.0'dopol': -1.0'pdver': 0.0'blver': -1.0'flagver': 14.0'doband': -1.0'bpver': -1.0
- 'solint': 0.0'soltype': ',
- 'refant': 2.0
- 'outvers': 2.0
- 'smooth': [0.0, 0.0, 0.0]
- 'antwt': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'weightit': 0.0'minamper': 0.0'minphser': 0.0'minanten': 0.0'bpassprm': [0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 6.0, 0.0]
- 'ichansel': [[0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0]]
- 'doscale': 0.0'specindx': 0.0'specurve': [0.0, 0.0, 0.0]
- 'in3name': '''in3class': '''in3seq': 0.0'in3disk': 0.0'baddisk': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]

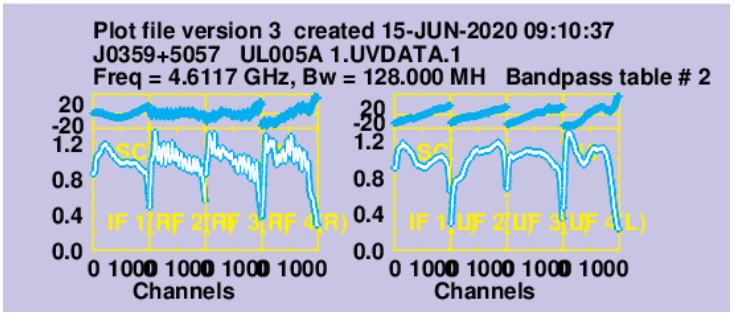
BPASS message

- BPASS1: Task BPASS (release of 31DEC20) begins
- BPASS1: Bandpass power (amp & phase) will be normalized
- BPASS1: Weights in solution will be channel-dependent
- BPASS1: Array name in AN table is VLBA
- BPASS1: Will assume this is data from the VLBA correlator
- BPASS1: and that it is all fringe-rotated to Earth Centre
- BPASS1: Will remove effects of that fringe-rotation
- BPASS1: to provide consistent bandpass calibration
- BPASS1: If incorrect, abort and change array name keyword
- BPASS1: UVGET: Using flag table version 14 to edit data
- BPASS1: Selecting, editing and calibrating the data with CL vers 6
- BPASS1: BPCOPY: copied 16191 vis records for bandpass fitting
- BPASS1: Dividing data by source flux densities
- BPASS1: TOO LITTLE DATA FOR SPECTRAL FIT OR SINGULAR
- BPASS1: Determining solutionsBPASS1: Writing BP table 2
- BPASS1: Time= 0/ 05 12 19 IFs= 1 - 4 Chann= 1 - 1024 Polzn=ALL
- BPASS1: BASOLV: 41 flagged channels in IF 1
- BPASS1: BASOLV: 41 flagged channels in IF 1
- BPASS1: BASOLV: 21 flagged channels in IF 2
- BPASS1: BASOLV: 21 flagged channels in IF 2
- BPASS1: BASOLV: 21 flagged channels in IF 3
- BPASS1: BASOLV: 21 flagged channels in IF 3
- BPASS1: BASOLV: 41 flagged channels in IF 4
- BPASS1: BASOLV: 41 flagged channels in IF 4
- BPASS1: QINIT: did a GET of 5120 Kwords, OFF 5984269619259
- BPASS1: BASOLV WARNING: SPECTRAL INDEX FOR SOURCE 12 ZERO
- BPASS1: BPSOL: wrote 10 records to the BP table
- BPASS1: Appears to have ended successfully
- BPASS1: kg176 31DEC20 TST: Cpu= 11.3 Real= 61 IO= 9791

Resulting BP table looks normal for all stations

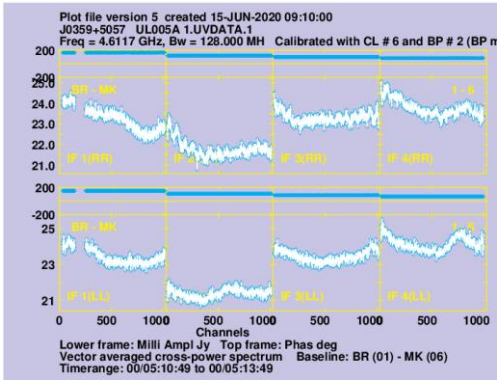




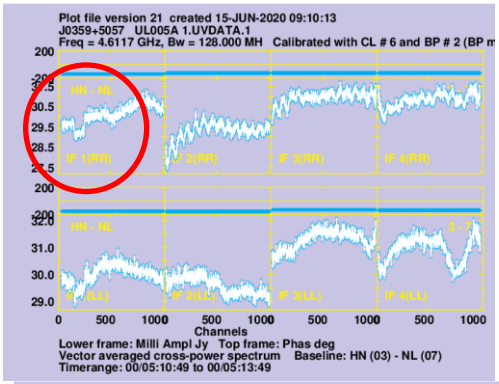


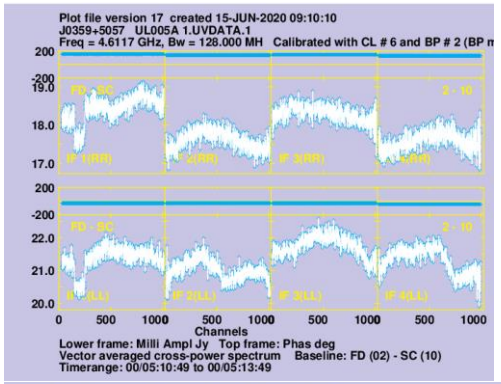
resulting corrected possm plots look strange for baselines NOT involving BR station

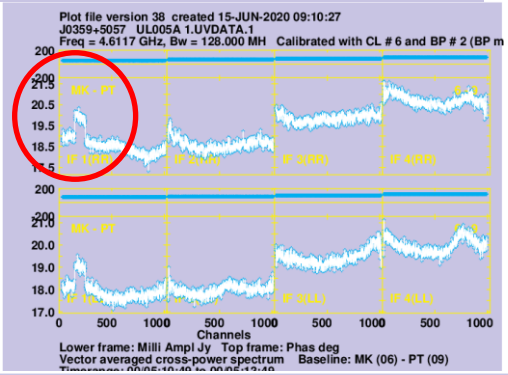
BR baselines show gap for flagged channels …

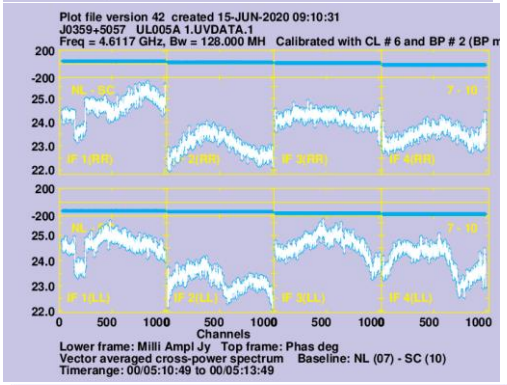


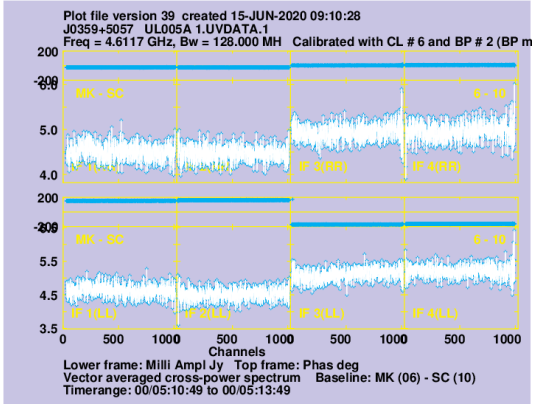
… but the other plots not imvolving BR station have an offset for those channels.

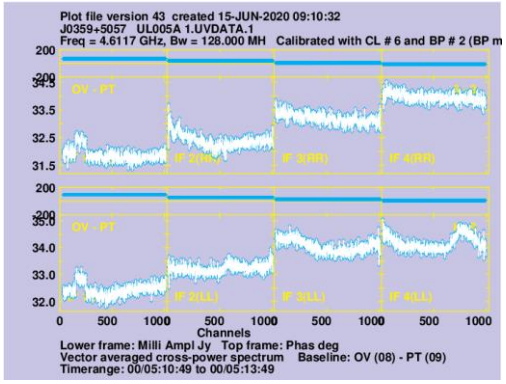


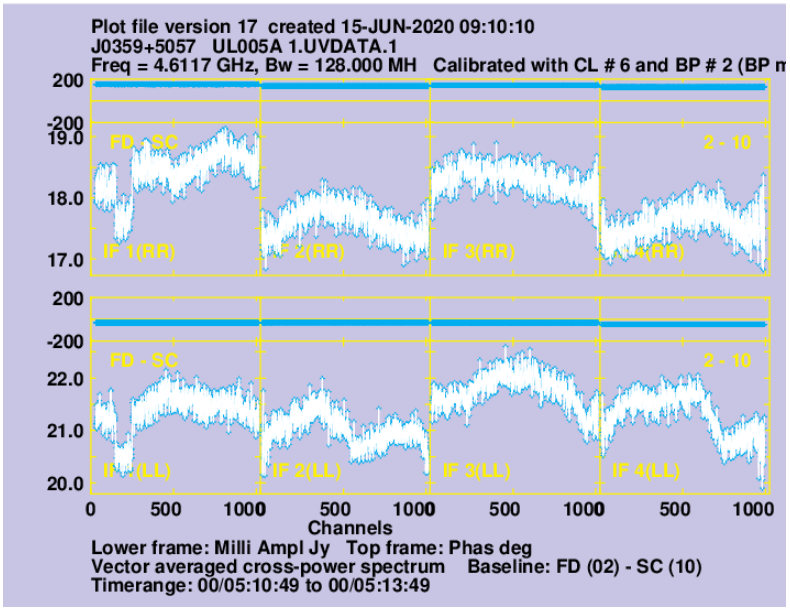






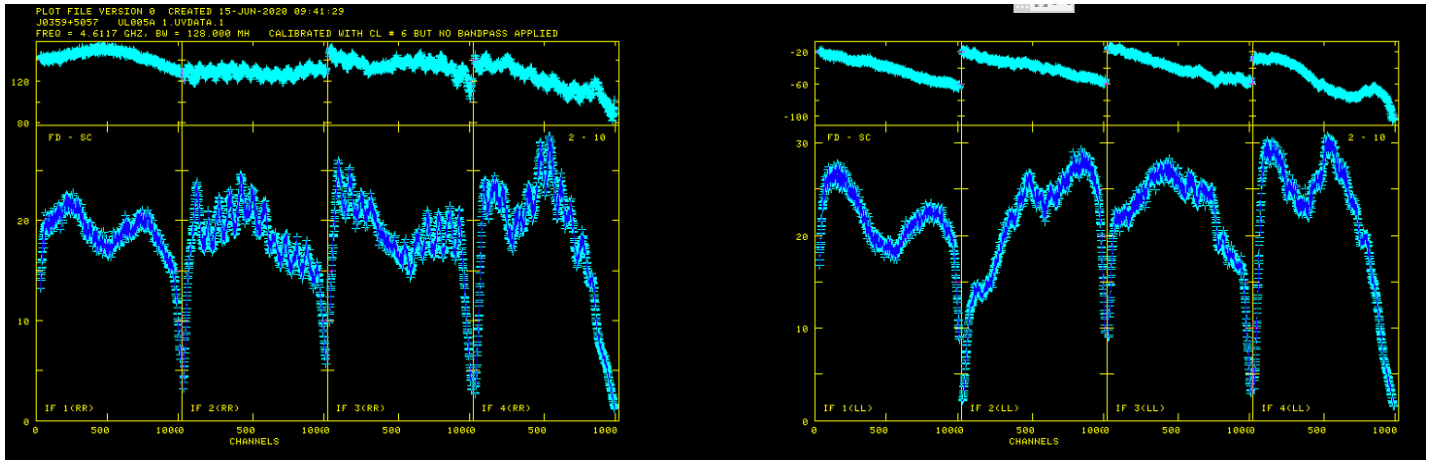






with BP table applied

Without BP table applied



Used settings for POSSM

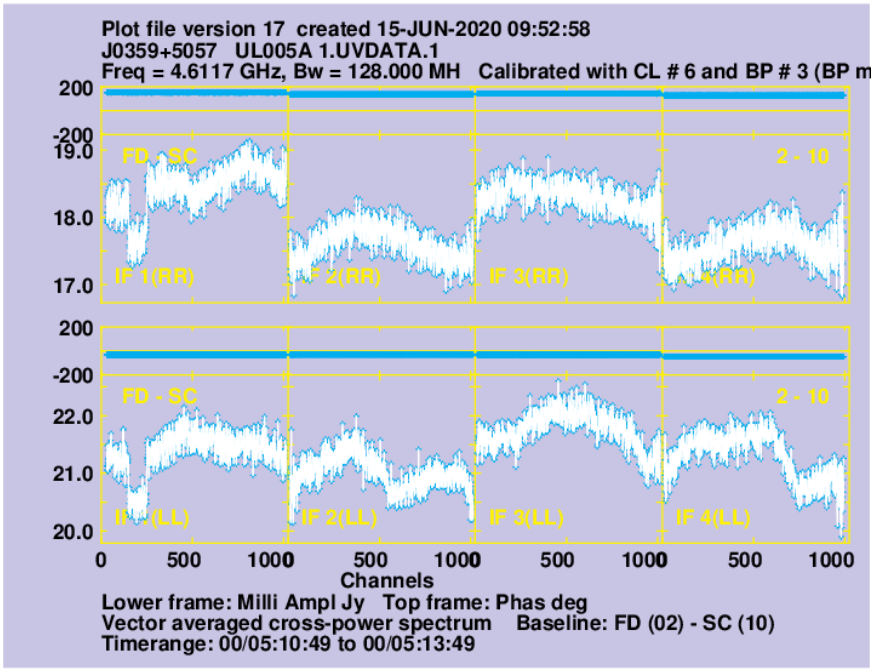
```
>inp
AIPS 1: POSSM     Task to plot total and cross-power spectra.
AIPS 1: Adverbs     Values                Comments
AIPS 1: ------------------------------------------------------------
AIPS 1: USERID        0                   User number - ignored
AIPS 1: INNAME     'UL005A_1'             Input UV file name (name)
AIPS 1: INCLASS    'UVDATA'               Input UV file name (class)
AIPS 1: INSEQ         1                   Input UV file name (seq. #)
AIPS 1: INDISK        1                   Input UV file disk unit #
AIPS 1: SOURCES    'J0359+5057'           Source list
AIPS 1:            *rest ' '
AIPS 1: QUAL          -1                  Source qualifier -1=>all
AIPS 1: CALCODE    ' '                    Calibrator code '    '=>all
AIPS 1: SELBAND       -1                  Bandwidth to select (kHz)
AIPS 1: SELFREQ       -1                  Frequency to select (MHz)
AIPS 1: FREQID        -1                  Freq. ID to select.
AIPS 1: UVRANGE       0          0        UV range to be plotted
AIPS 1: TIMERANG   *all 0                 Time range to be plotted
AIPS 1: STOKES     'HALF'                 Stokes type(s) to select.
AIPS 1: BIF           1                   Lowest IF number 0=>all
AIPS 1: EIF           4                   Highest IF number 0=>all
AIPS 1: BCHAN         1                   Lowest channel number 0=>all
AIPS 1: ECHAN         0                   Highest channel number 0=>all
AIPS 1: SUBARRAY      0                   Subarray, 0=>1
AIPS 1: ANTENNAS      2          2        Antennas to select
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
#
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1:               2          2           2          2
AIPS 1: BASELINE   *all 0                 Baselines with ANTENNAS
AIPS 1: DOCALIB       1                   > 0 calibrate data & weights
AIPS 1:                                   > 99 do NOT calibrate weights
AIPS 1: GAINUSE       6                   CL (or SN) table to apply
AIPS 1: DOPOL        -1                   If >0 correct polarization.
AIPS 1: PDVER         0                   PD table to apply (DOPOL>0)
AIPS 1: BLVER        -1                   BL table to apply.
AIPS 1: FLAGVER      14                   Flag table version
AIPS 1: DOBAND        1                   If >0 apply bandpass cal.
AIPS 1:                                   Method used depends on value
AIPS 1:                                   of DOBAND (see HELP file).
AIPS 1: BPVER         2                   Bandpass table version
AIPS 1: SMOOTH     *all 0                 Smoothing function. SEE
AIPS 1:                                   POSSM HELP SPECIAL VALUES
```

```
AIPS 1: BPVER         2                   Bandpass table version
AIPS 1: SMOOTH     *all 0                 Smoothing function. SEE
AIPS 1:                                   POSSM HELP SPECIAL VALUES
AIPS 1: SHIFT         0          0        Position shift:
AIPS 1:                                   RA, Dec (arcsec)
AIPS 1:                                   0 => no shift
AIPS 1: APARM         1          0        Control information:
AIPS 1:               0          0        1: < 0 => scalar average
AIPS 1:            -180        180           >= 0 => vector average
AIPS 1:               0          0        2: = 0 => self-scale
AIPS 1:               1          0           > 0 => fixed scale
AIPS 1:                                      (use APARM(3-6))
AIPS 1:                                   3: min. amplitude
AIPS 1:                                   4: max. amplitude
AIPS 1:                                   5: min. phase (degrees)
AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
#
AIPS 1:                                   6: max. phase
AIPS 1:                                   7: x-axis labelling
AIPS 1:                                      = 0 = > in channels.
AIPS 1:                                      = 1 = > in Hz (or secs
AIPS 1:                                          if corr. fn)
AIPS 1:                                      = 2 = > in m/s
AIPS 1:                                   8: = 0 => plot cross power
AIPS 1:                                      = 1 => plot total power
AIPS 1:                                      = 2 => plot BP table
AIPS 1:                                             version BPVER
AIPS 1:                                      = 3 => plot ACF
AIPS 1:                                      = 4 => plot XCF
AIPS 1:                                      = 5 => plot BD table
AIPS 1:                                             version BPVER
AIPS 1:                                      = 6 => plot PD table
AIPS 1:                                             version BPVER
AIPS 1:                                      = 7 => plot CP table
AIPS 1:                                             version BPVER
AIPS 1:                                      = 8 => plot CP table / I
AIPS 1:                                             version BPVER
AIPS 1:                                      = 9 => plot PC table
AIPS 1:                                             version BPVER
AIPS 1:                                      = 10 => plot PP table
AIPS 1:                                             version BPVER
AIPS 1:                                   9: > 0 => plot several IF's
AIPS 1:                                      and/or polarizations
AIPS 1:                                      together as though one
AIPS 1:                                      long spectrum (see HELP)
AIPS 1:                                   10: > 0 => reverse direction
AIPS 1:                                      of plotted spectrum, so
AIPS 1:                                      velocity increases to
AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
#
AIPS 1:                                      right.
AIPS 1: CODETYPE   'A&P'                  'A&P ', 'AMP ', 'PHAS',
AIPS 1:                                   'R&I ', 'REAL', 'IMAG'
AIPS 1:                                   'LA&P', 'LAMP'
```

```
AIPS 1:                                   other => 'A&P '
AIPS 1: POLPLOT    ' '                    Option to display various
AIPS 1:                                   combinations of polzns to
AIPS 1:                                   plot: see help for allowed
AIPS 1:                                   values; other = don't use
AIPS 1:                                   this option.
AIPS 1: SOLINT        0.5                 If SOLINT > 0 then it enables
AIPS 1:                                   the user to make multiple
AIPS 1:                                   plots per pass of POSSM.
AIPS 1:                                   It defines the averaging time
AIPS 1:                                   for each individual plot.
AIPS 1:                                   Task will start at TIMERANG
AIPS 1:                                   and make a plot for every
AIPS 1:                                   SOLINT minutes. If SOLINT
AIPS 1:                                   = -1 will do the same but
AIPS 1:                                   will do scan averages if NX
AIPS 1:                                   table is present.
AIPS 1: NPLOTS        4                   Number of plots per page
AIPS 1: BPARM      *all 0                 More control information:
AIPS 1:                                   1: If = 1 divide by 'channel
AIPS 1:                                      0' before plotting data.
AIPS 1:                                      0 => do not divide.
AIPS 1:                                   2: Start chn. of 'channel 0'
AIPS 1:                                      (0 => determined by POSSM)
AIPS 1:                                   3: Stop chn. of 'channel 0'
AIPS 1:                                      (0 => determined by POSSM)
AIPS 1:                                   4: ignore spectrum when ampl.
AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
#
AIPS 1:                                      channel 0 < BPARM(4) Jy
AIPS 1:                                   5: scale LOG10 plots by B(5)
AIPS 1:                                   6-9: unused
AIPS 1:                                   10: =1 => don't write header
AIPS 1:                                   info when writing to outfile
AIPS 1:                                   useful for appending several
AIPS 1:                                   spectra into a single outfile
AIPS 1:                                   [see EXPLAIN POSSM]
AIPS 1: OUTTEXT    ' '
AIPS 1:                                   Filename in which to write
AIPS 1:                                   spectrum. Default = ' ' =
AIPS 1:                                   do not write spectrum. The
AIPS 1:                                   file is written only if
AIPS 1:                                   NPLOTS = 0
AIPS 1: LTYPE         3                   Type of labeling: 1 border,
AIPS 1:                                   2 no ticks, 3 - 6 standard,
AIPS 1:                                   7 - 10 only tick labels
AIPS 1:                                   <0 -> no date/time
AIPS 1: FACTOR        0                   Scale plus signs by FACTOR
AIPS 1: XYRATIO       0                   XY plot ratio: 0 -> 1.636
AIPS 1: BADDISK    *all 0                 Disks to avoid for scratch
AIPS 1: DOTV          1                   > 0 Do plot on the TV, else
AIPS 1:                                   make a plot file
AIPS 1: GRCHAN        0                   Graphics channel 0 => 1.
>
```

Using only channels 31 to 149 and 251 to 1014 (non-flagged channels) for IF 1 for bandpass normalization

- BPASS output still same
- -> resulting BP table does not look different
- Possm plots look same



Used settings for BPASS

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- inclass': UVDATA
- inseq': 1.0,
- indisk': 1.0
- 'calsour': ['J0359+5057', '']
- 'qual': -1.0
- 'calcode': ',
- 'uvrange': [0.0, 0.0]
- timerang': [0.0, 5.0, 10.0, 49.0, 0.0, 5.0, 13.0, 49.0]
- 'selband': -1.0'selfreq': -1.0'freqid': -1.0'subarray': 0.0
- 'antennas': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'in2name': '''in2class': '''in2seq': 0.0'in2disk': 0.0'invers': 0.0
- 'ncomp': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'flux': 0.0'nmaps': 0.0'cmethod': '''cmodel': '''smodel': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'docalib': 1.0'gainuse': 6.0'dopol': -1.0'pdver': 0.0'blver': -1.0'flagver': 14.0'doband': -1.0'bpver': -1.0
- 'solint': 0.0'soltype': ',
- 'refant': 2.0
- 'outvers': 3.0
- 'smooth': [0.0, 0.0, 0.0]
- 'antwt': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
- 'weightit': 0.0'minamper': 0.0'minphser': 0.0'minanten': 0.0'bpassprm': [0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 6.0, 0.0]
- 'ichansel': [[31.0, 149.0, 1.0, 1.0], [251.0, 1014.0, 1.0, 1.0], [11.0, 1014.0, 1.0, 2.0], [11.0, 1014.0, 1.0, 3.0], [11.0, 994.0, 1.0, 4.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0], [0.0, 0.0, 0.0, 0.0]]
- 'doscale': 0.0'specindx': 0.0'specurve': [0.0, 0.0, 0.0]
- 'in3name': '''in3class': '''in3seq': 0.0'in3disk': 0.0'baddisk': [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]