PAON4 analysis : calibration & RFI

R. Ansari, J.-E. Campagne, O. Perdereau

Laboratoire de l'Accélérateur Linéaire

IN2P3-CNRS, Université de Paris-Sud 11 et Université de Paris-Saclay

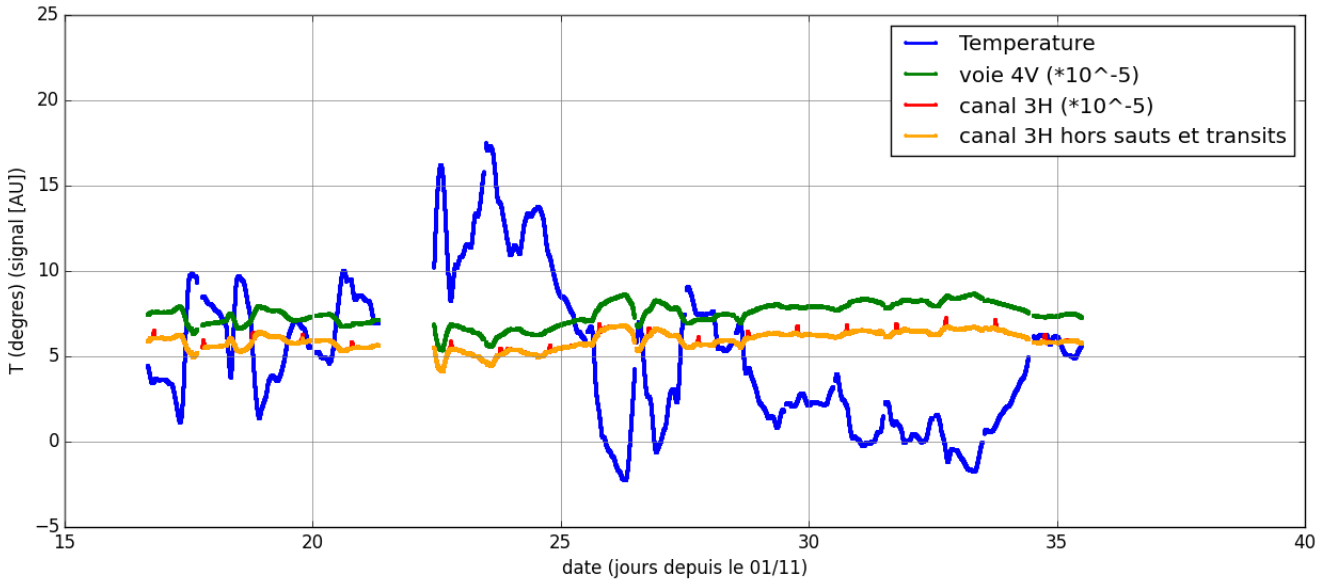
12 dec. 2017

Gain correction with 4V

- antenna 4 V channel connected to 50 Ohms end-cap
- Other channels assumed to be noise dominated outside source (CasA) transits
- Fair correlation between their (median) power and the (median) 4V power ⇒ gain measurement

$$g_X = \alpha S_{4V} + \beta$$

- next : add a undirectional antenna + a dedicated end-cap'ed channel

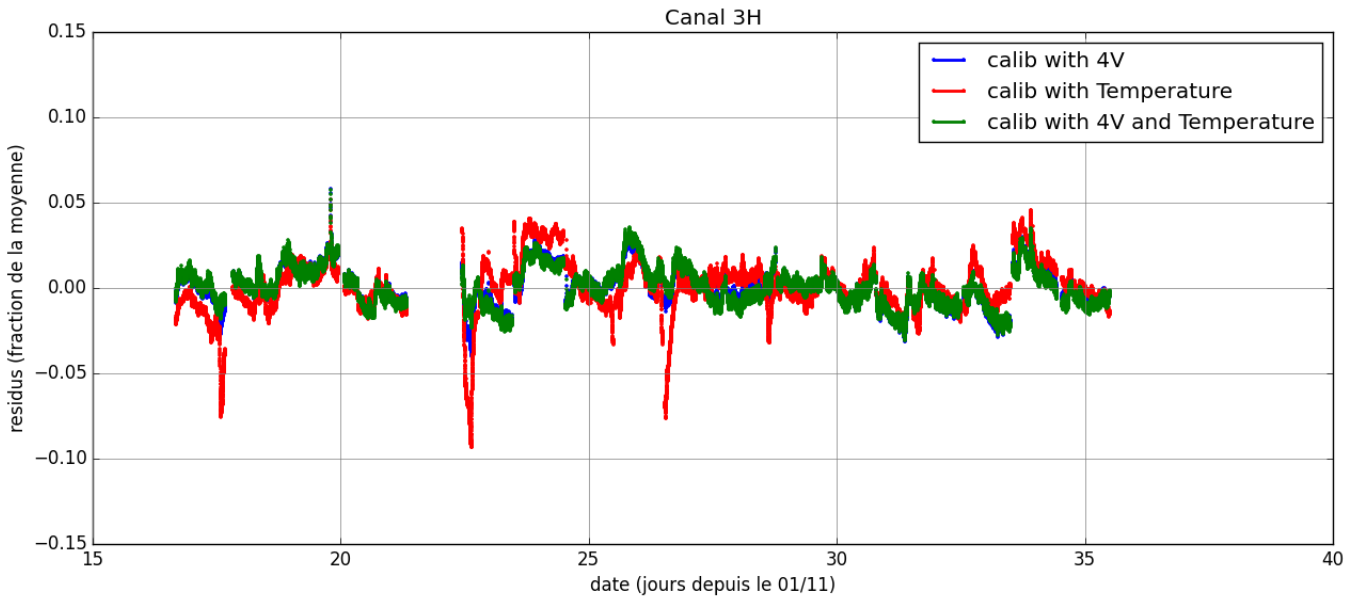


Gain correction with 4V

- antenna 4 V channel connected to 50 Ohms end-cap
- Other channels assumed to be noise dominated outside source (CasA) transits
- Fair correlation between their (median) power and the (median) 4V power ⇒ gain measurement

$$g_X = \alpha S_{4V} + \beta$$

- next : add a undirectional antenna + a dedicated end-cap'ed channel

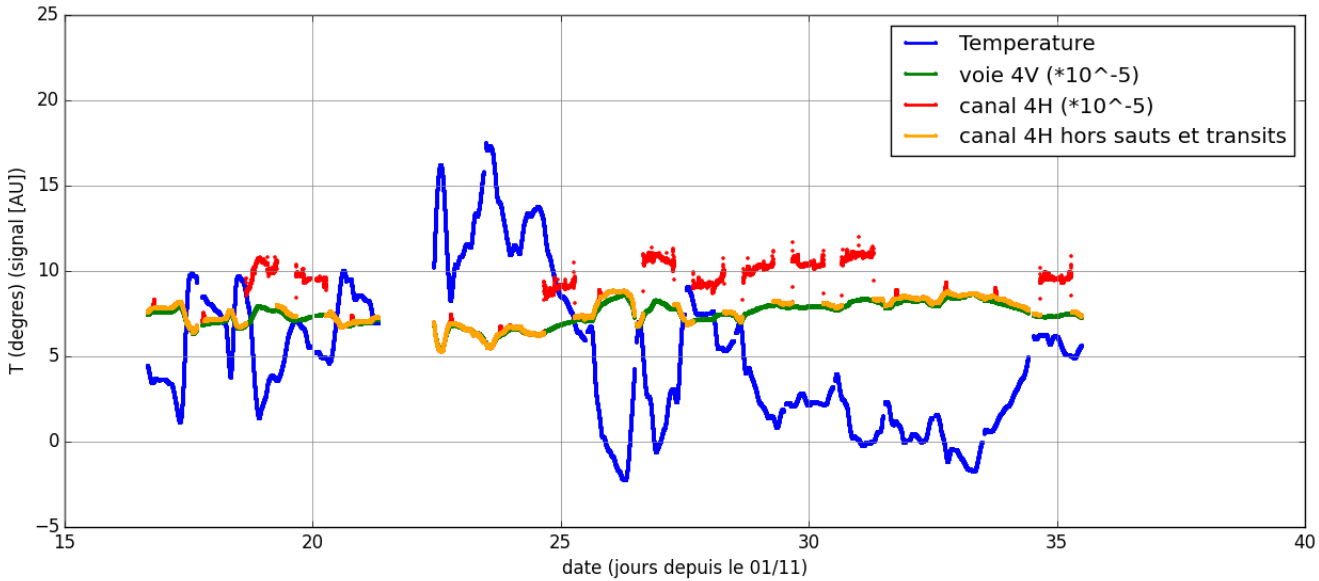


Gain correction with 4V

- antenna 4 V channel connected to 50 Ohms end-cap
- Other channels assumed to be noise dominated outside source (CasA) transits
- Fair correlation between their (median) power and the (median) 4V power ⇒ gain measurement

$$g_X = \alpha S_{4V} + \beta$$

- next : add a undirectional antenna + a dedicated end-cap'ed channel

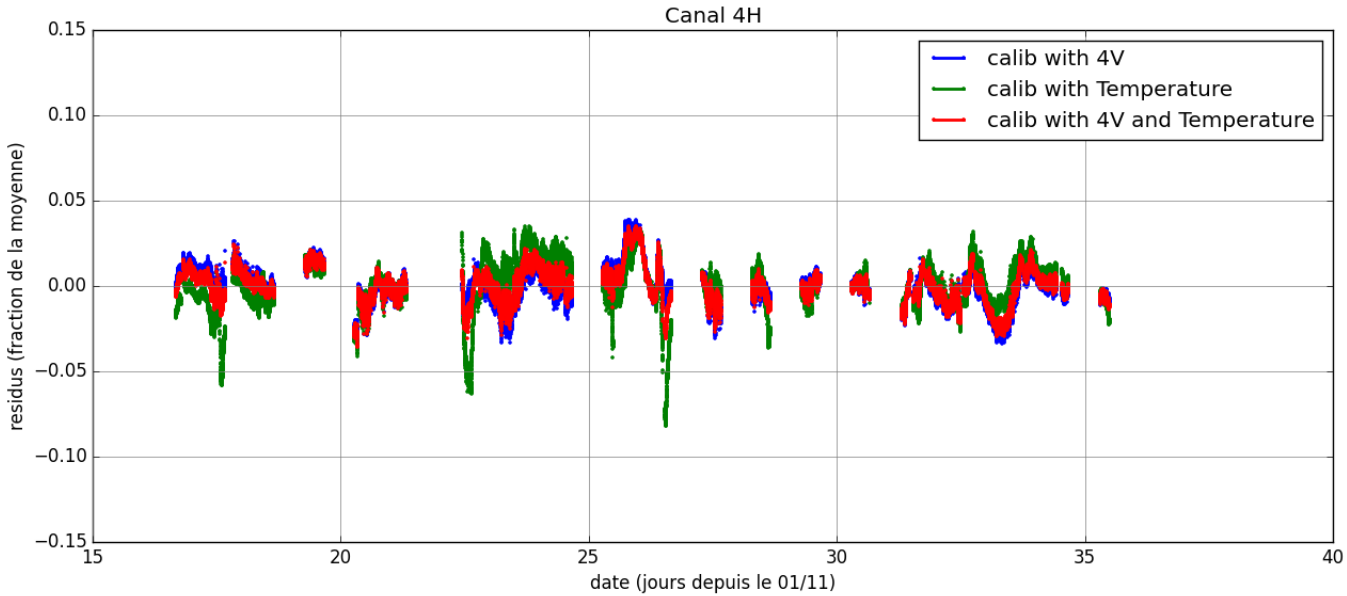


Gain correction with 4V

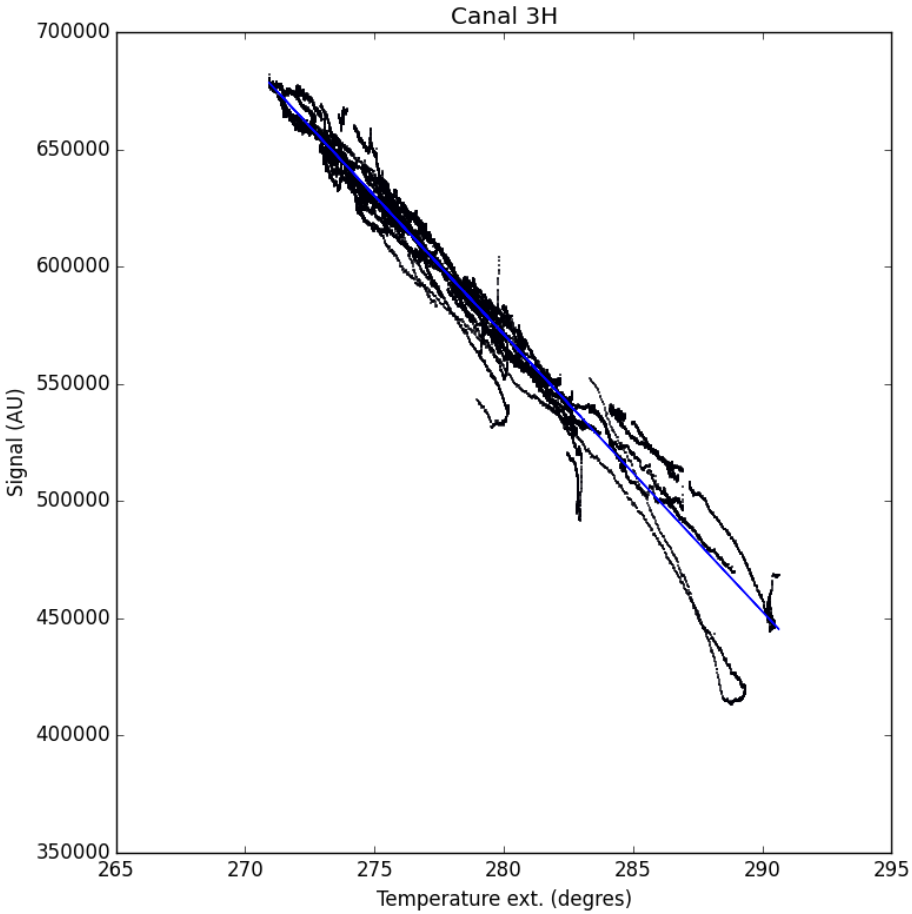
- antenna 4 V channel connected to 50 Ohms end-cap
- Other channels assumed to be noise dominated outside source (CasA) transits
- Fair correlation between their (median) power and the (median) 4V power ⇒ gain measurement

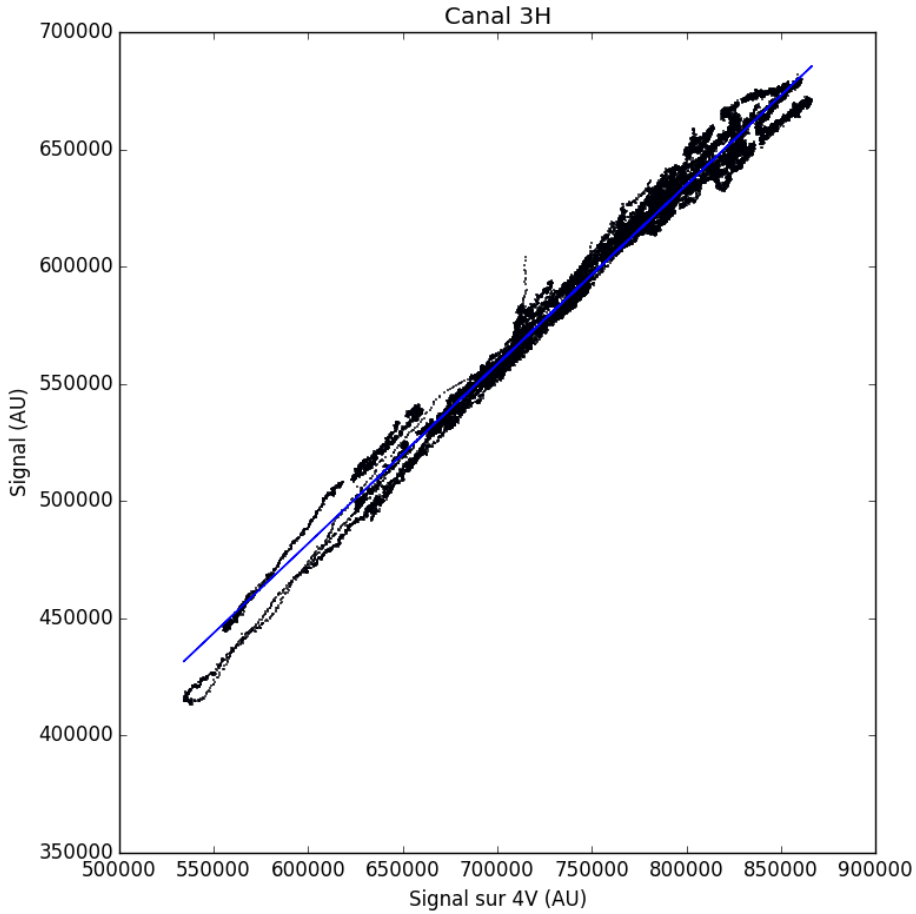
$$g_X = \alpha S_{4V} + \beta$$

- next : add a undirectional antenna + a dedicated end-cap'ed channel

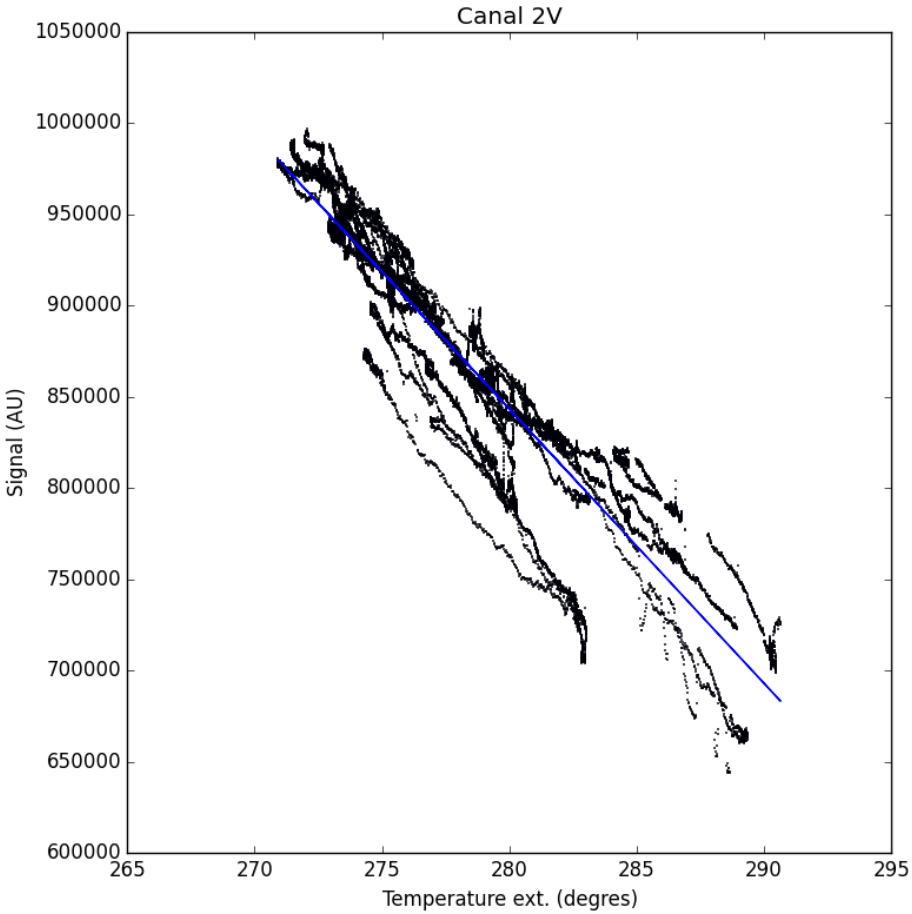


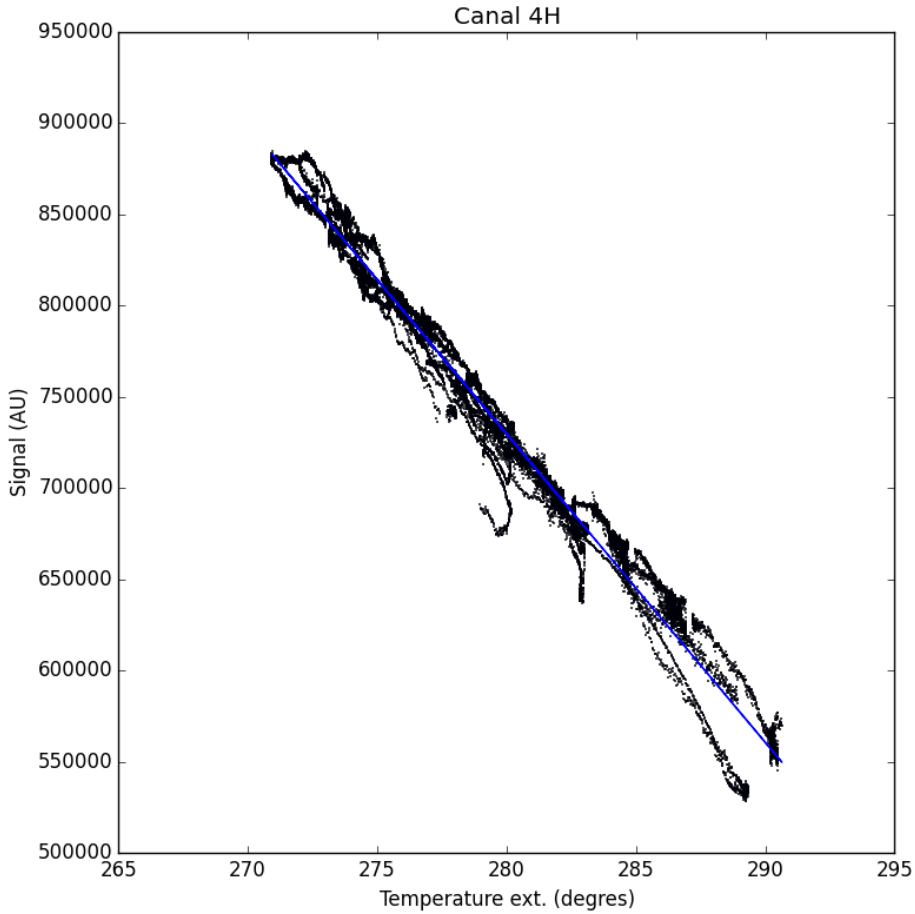
Corelations with temperature & 4V



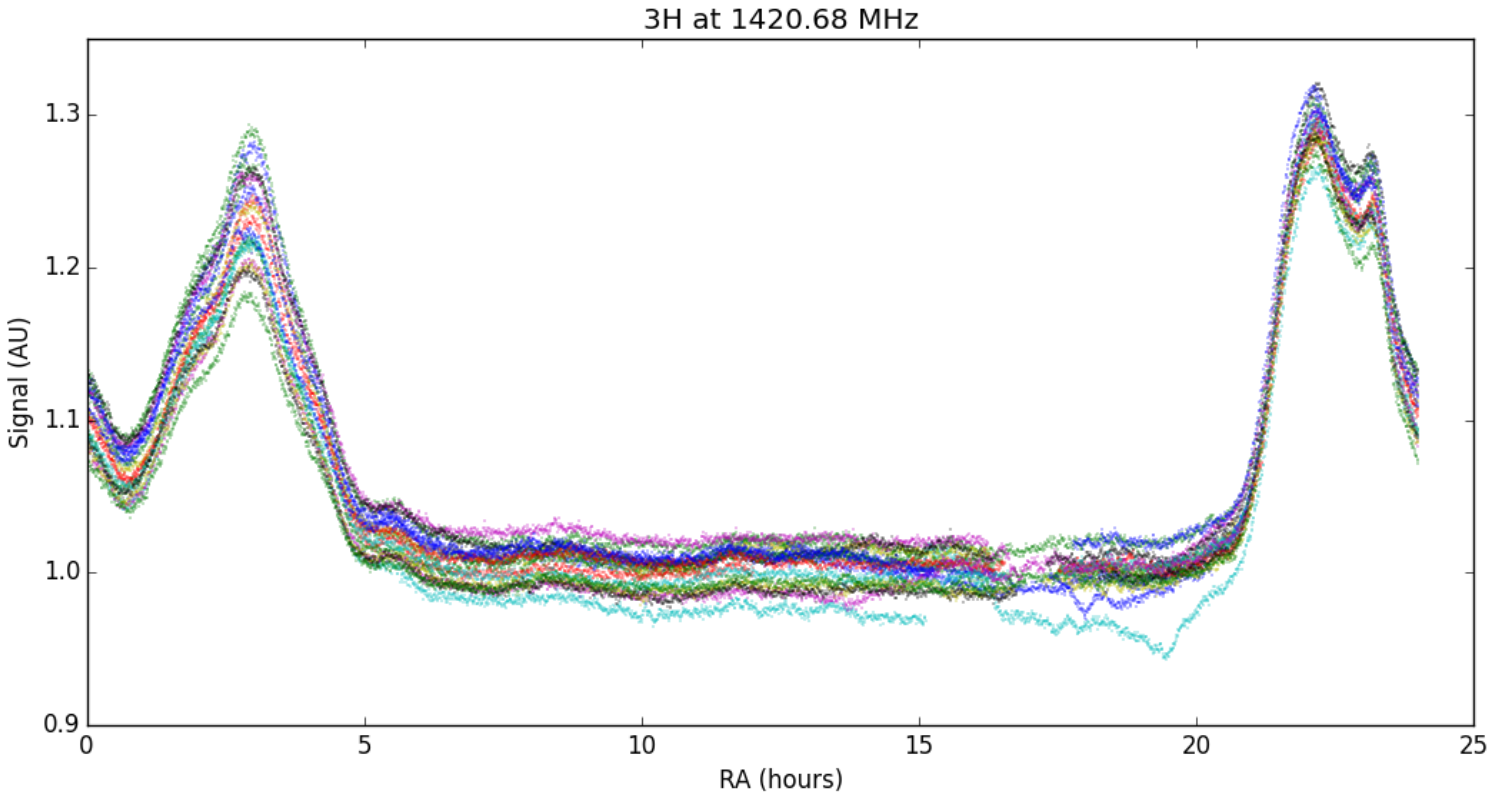


Corelations with temperature & 4V





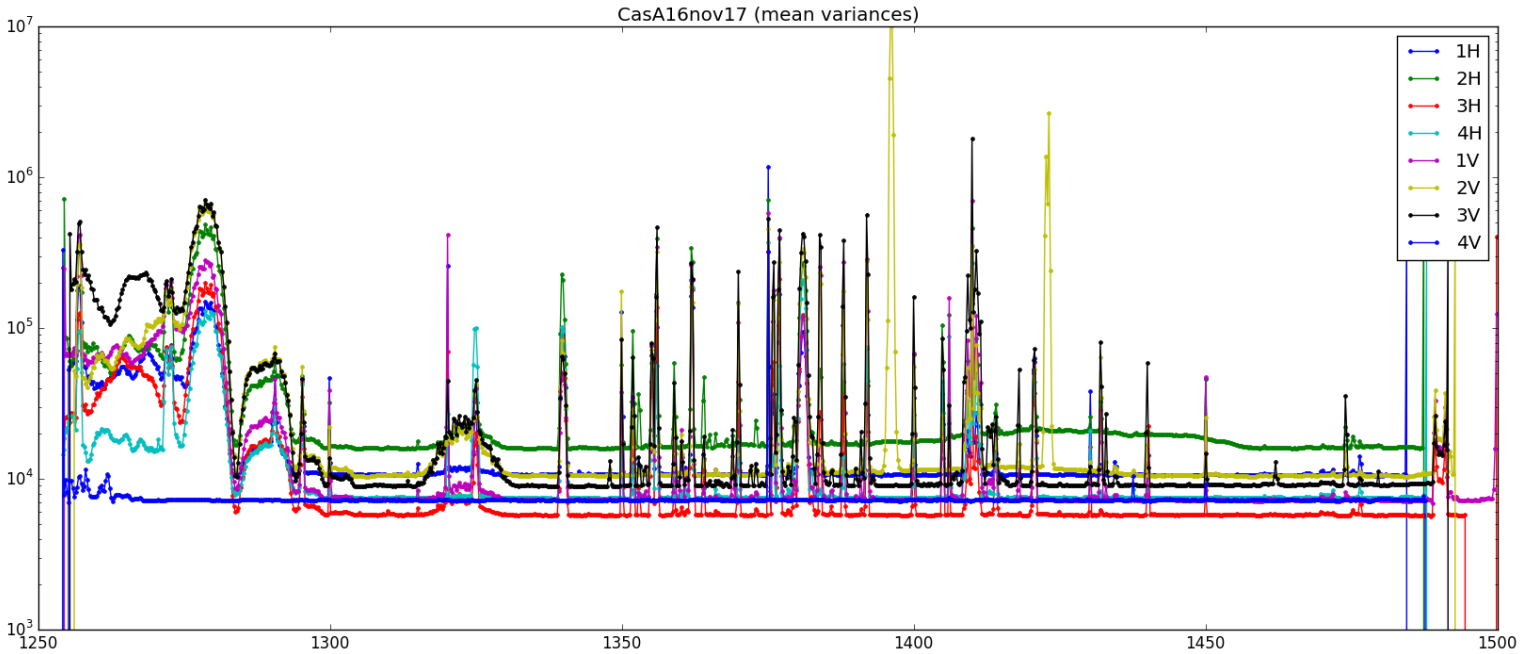
Sky data after gain calibration



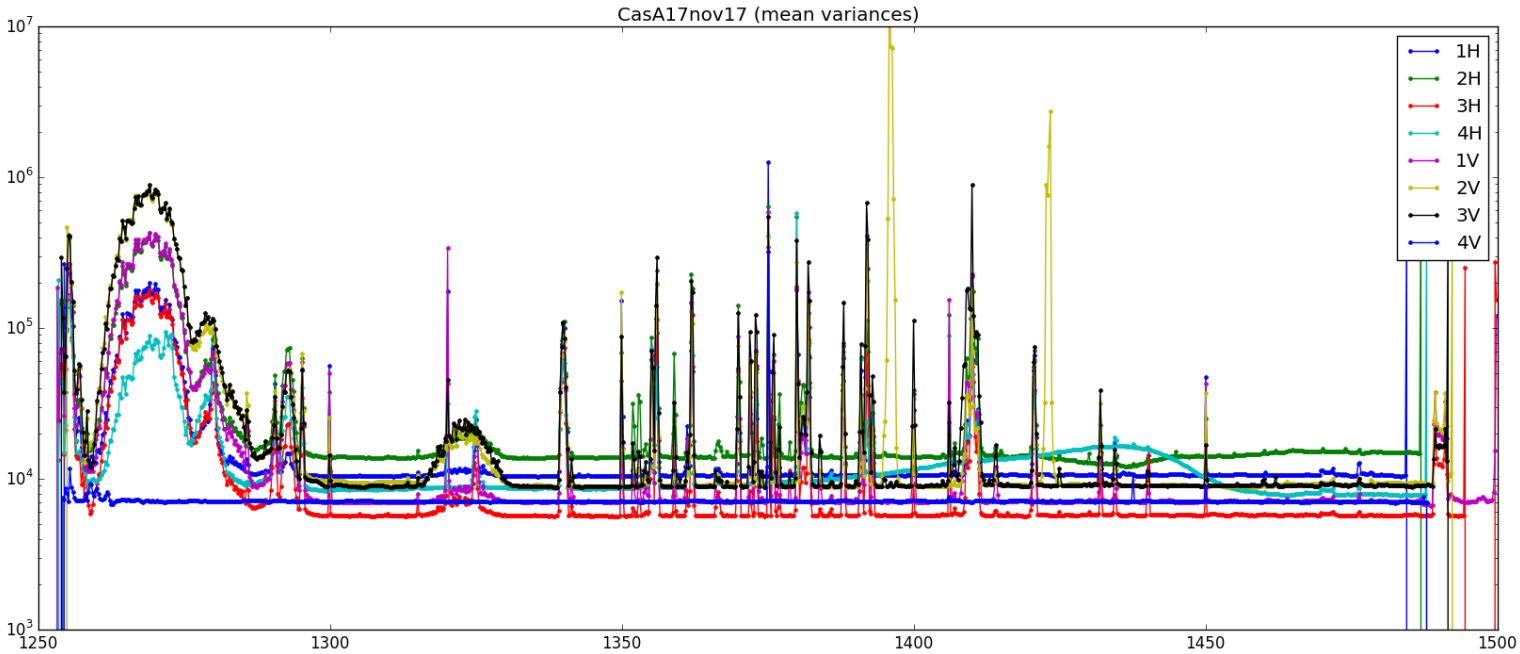
Flagging RFI

- take averaged T-F map of the variance of the signal in each bin
- look at averaged of these over integration periods
- ⇒ identify perdturbation source(s) (better shioelding ?)
- ⇒ identify “ clean” frequencies for further processing(s)

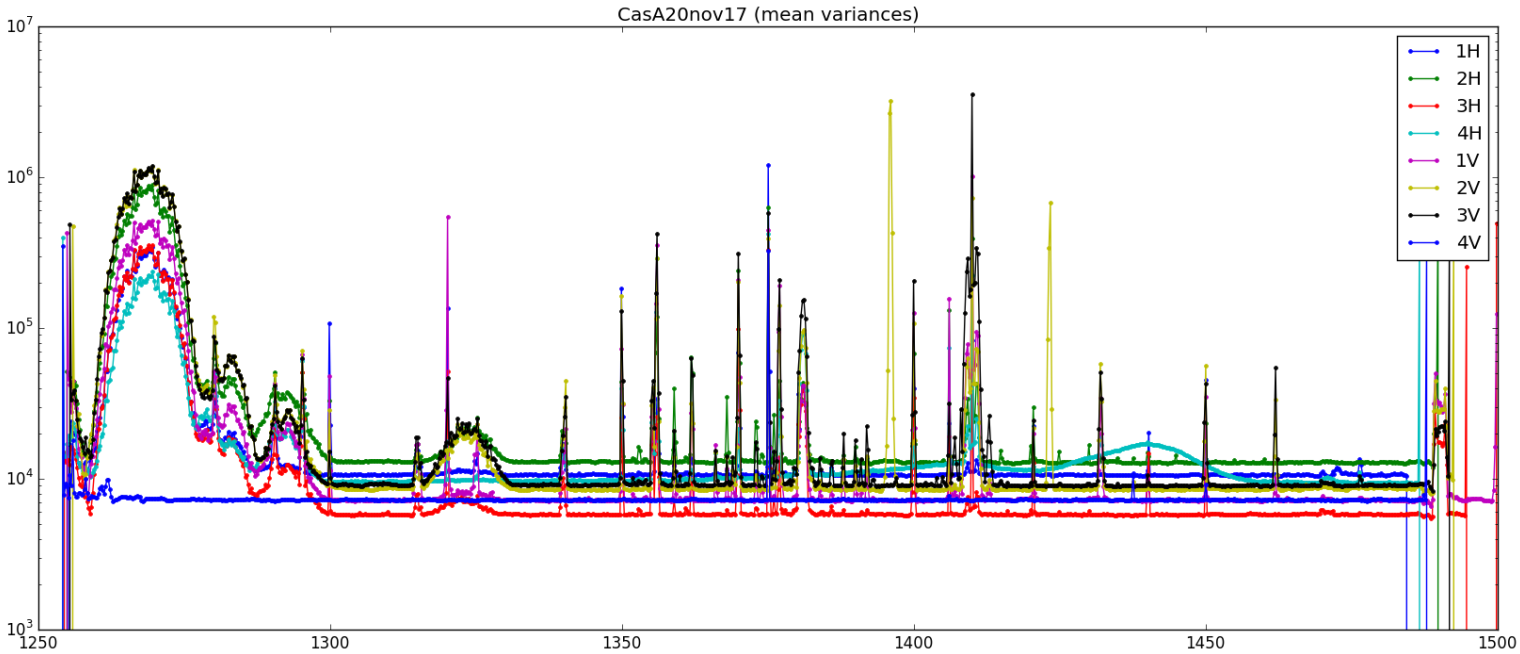
Variance distribution



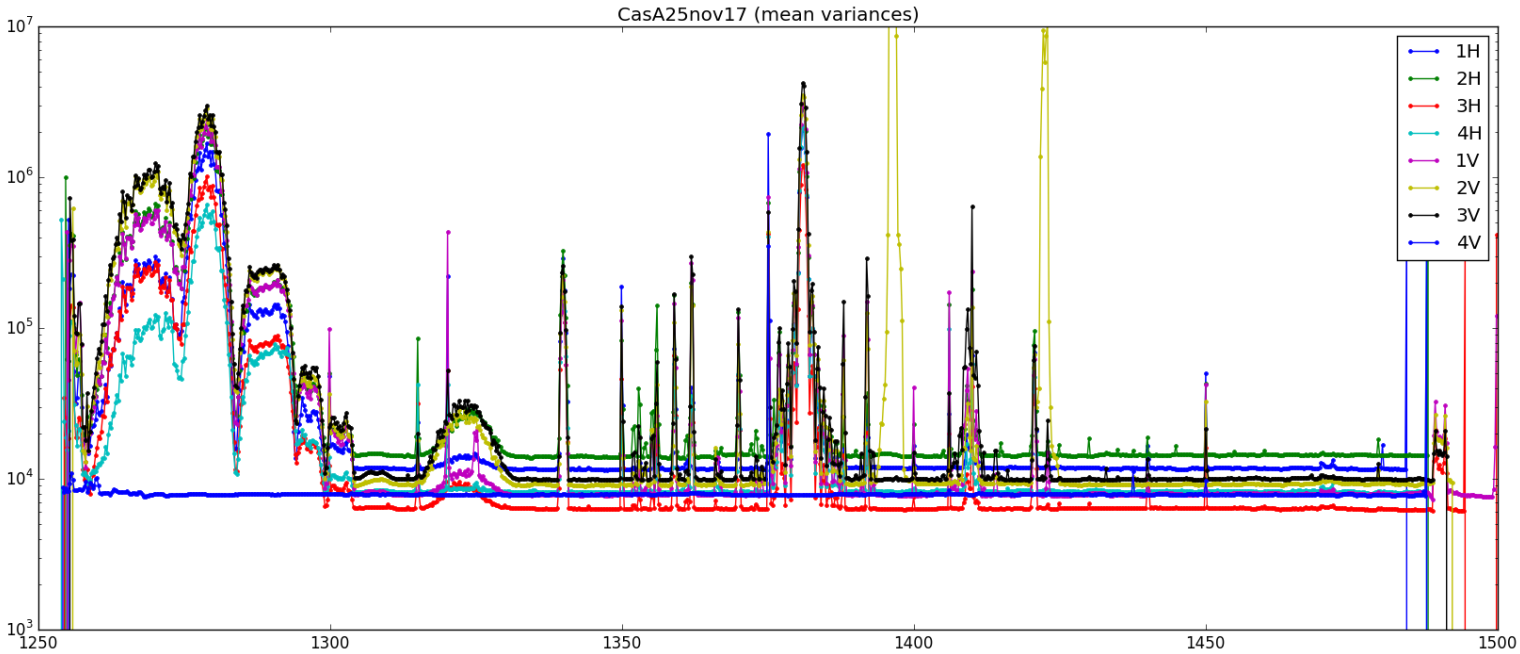
Variance distribution



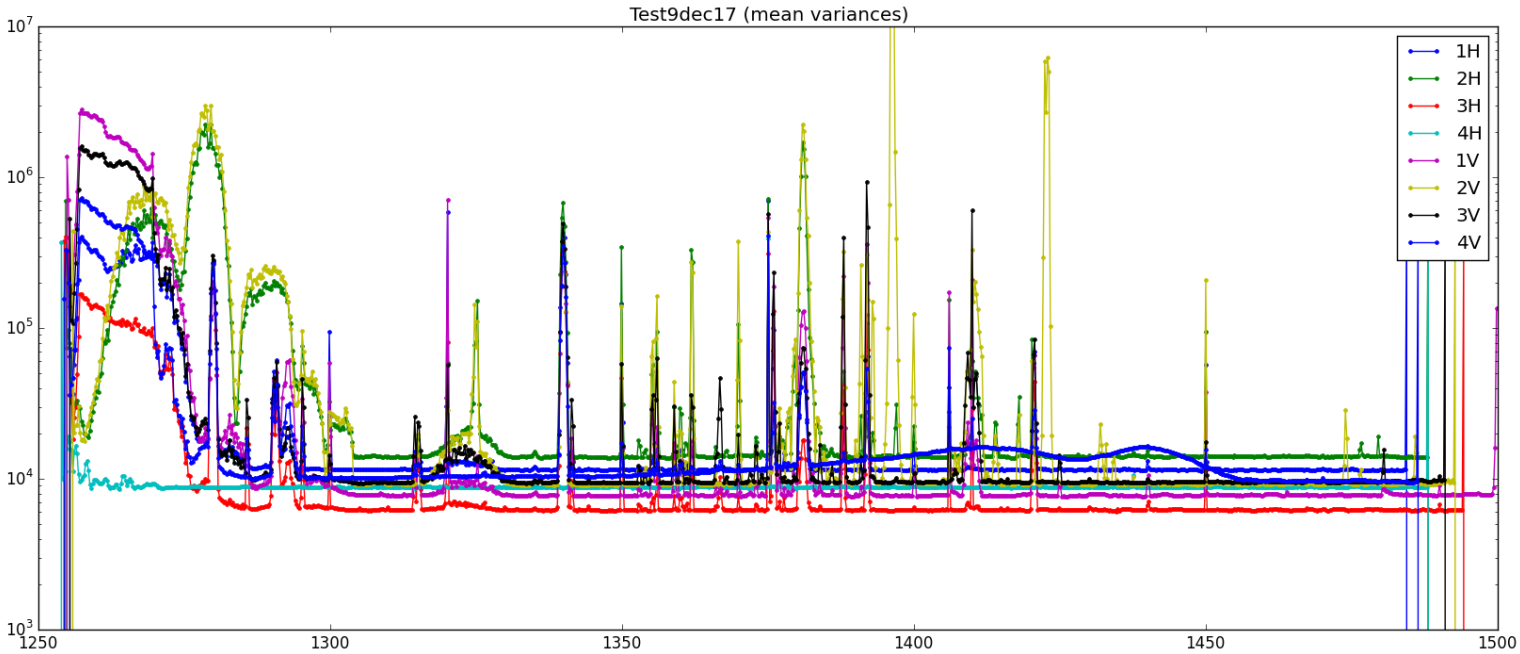
Variance distribution



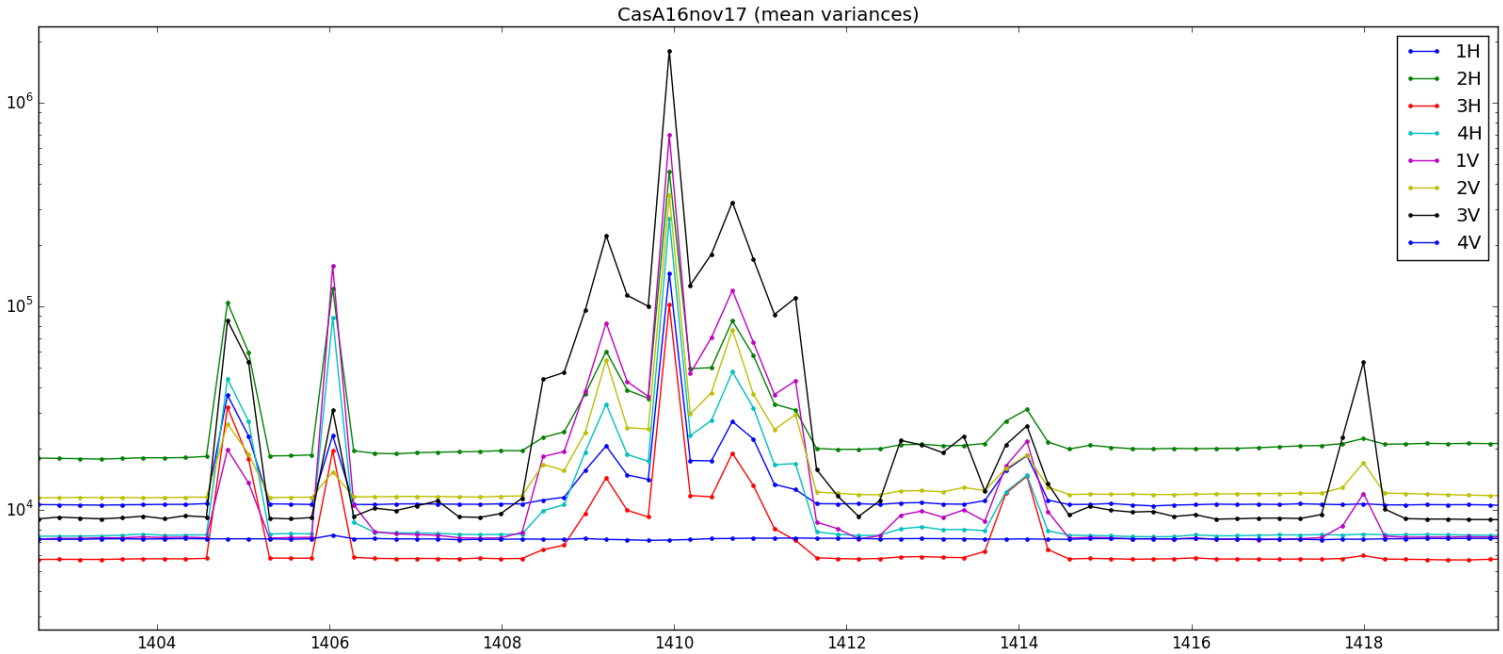
Variance distribution



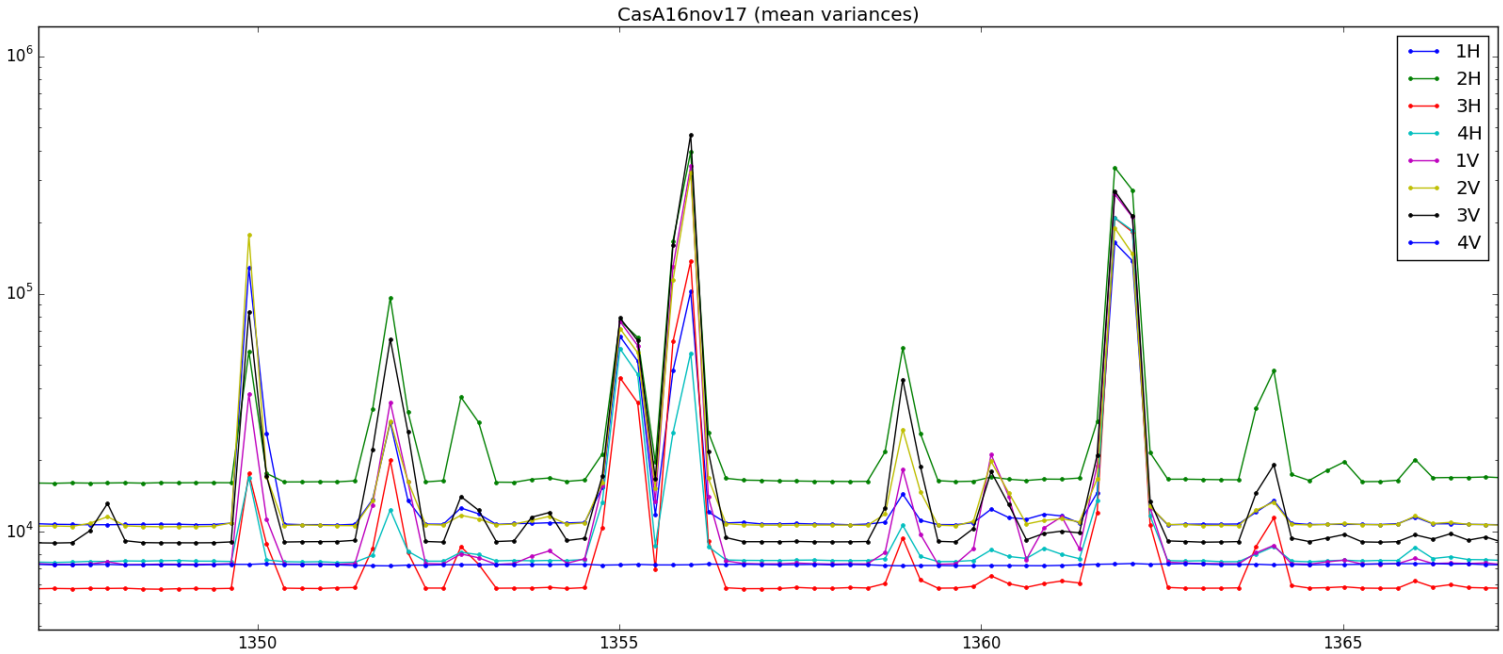
Variance distribution



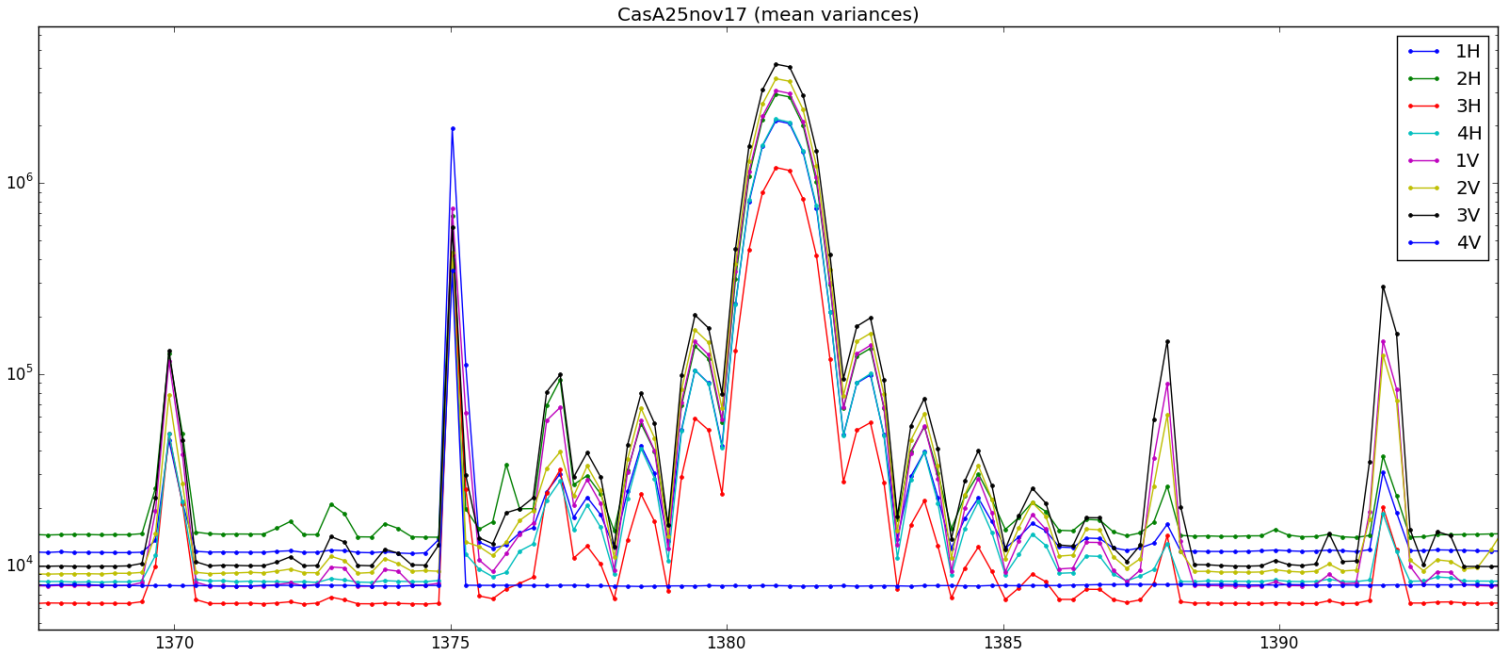
Zooms (16/11)


CasA16nov17 (mean variances)
1H
2H
3H
4H
1V
2V
3V
4V
10^6
10^5
10^4
1404
1406
1408
1410
1412
1414
1416
1418

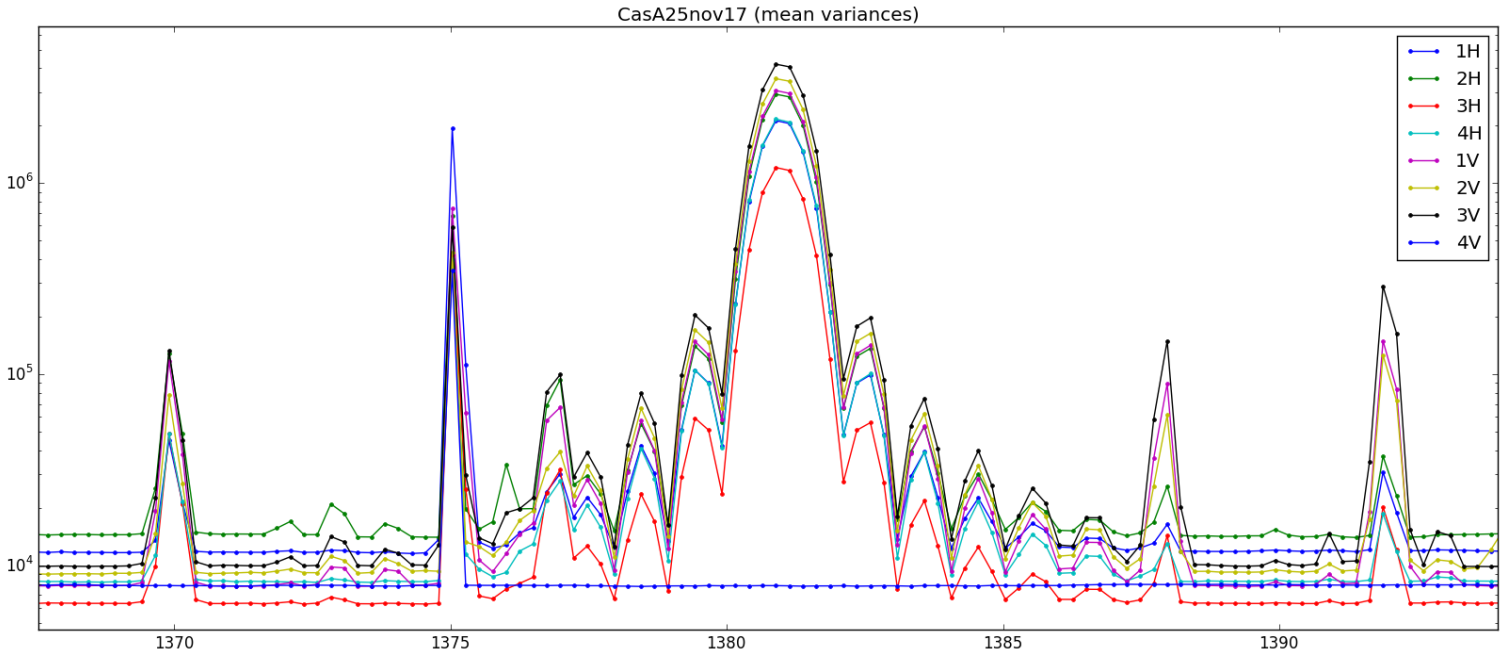
Zooms (16/11)


CasA16nov17 (mean variances)
10^6
10^5
10^4
1350
1355
1360
1365
1H
2H
3H
4H
1V
2V
3V
4V

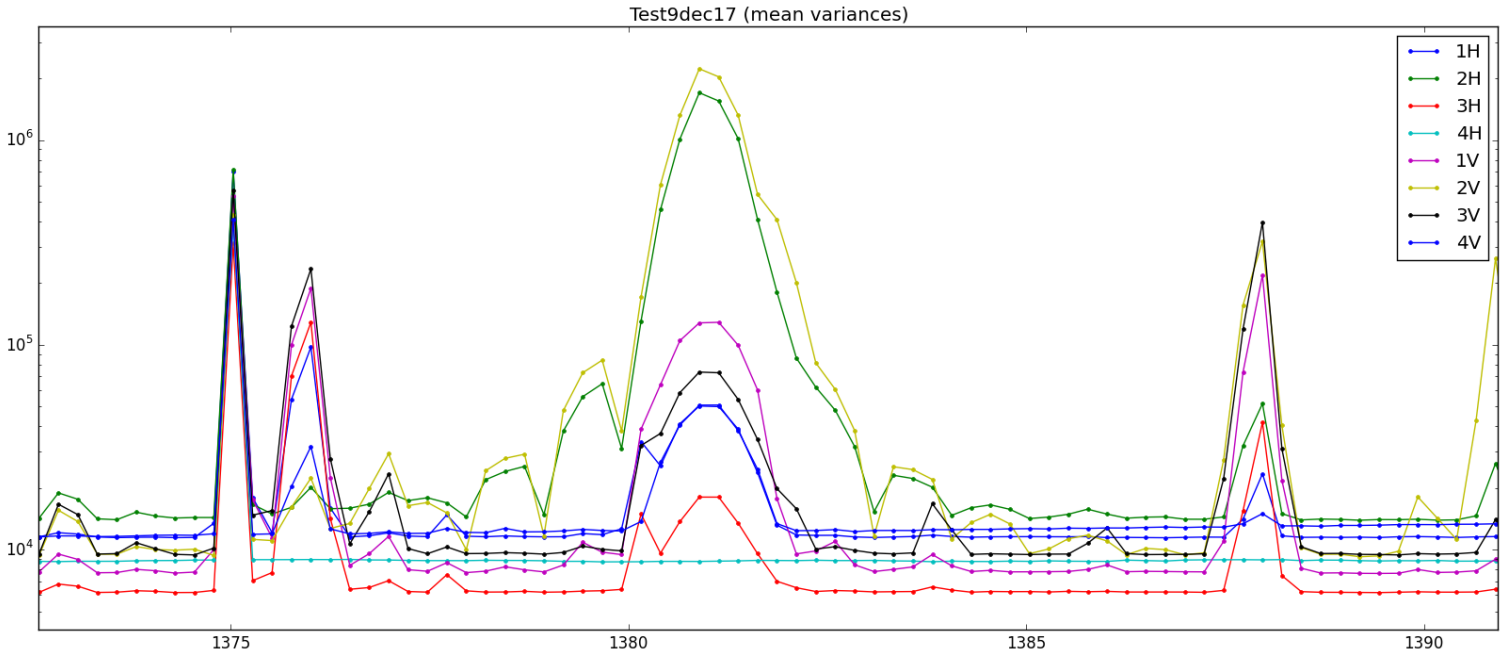
Zooms (16/11)


CasA25nov17 (mean variances)
1H
2H
3H
4H
1V
2V
3V
4V
10^6
10^5
10^4
1370
1375
1380
1385
1390

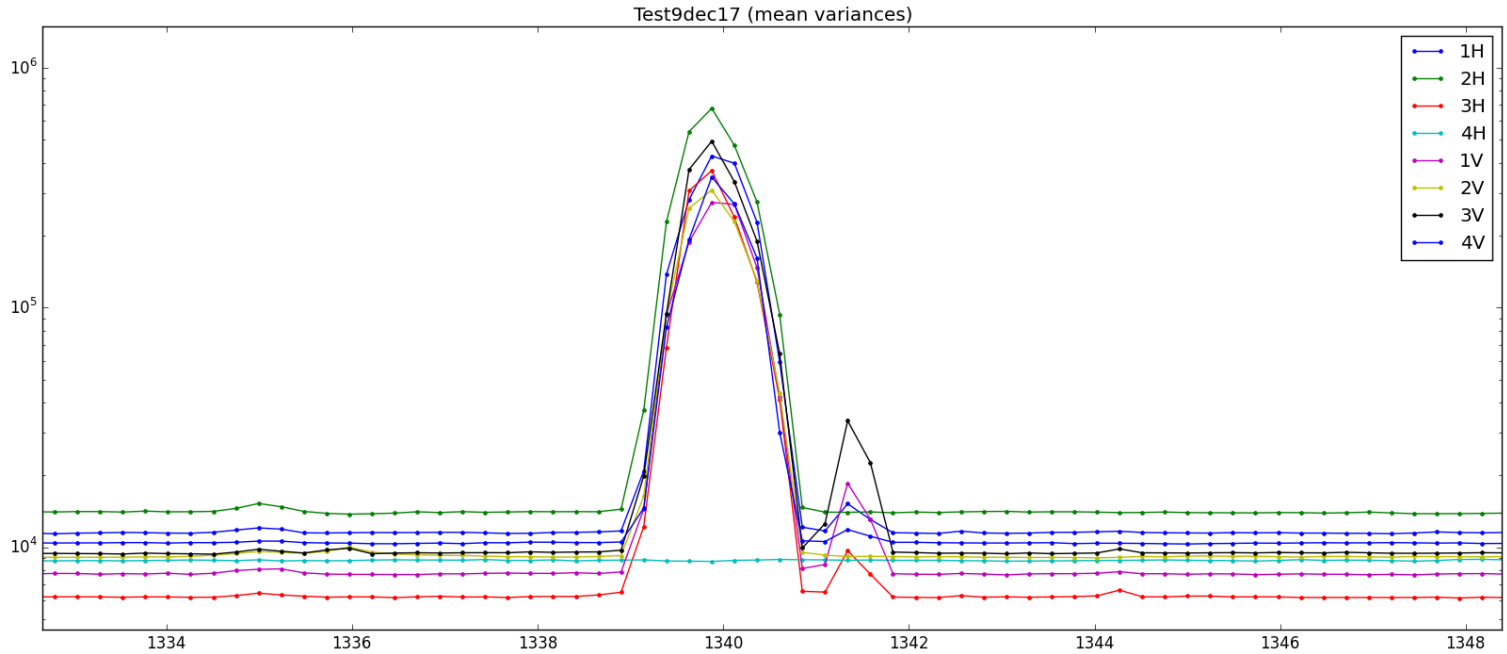
Zooms (25/11)


CasA25nov17 (mean variances)
1H
2H
3H
4H
1V
2V
3V
4V
10^6
10^5
10^4
1370
1375
1380
1385
1390

Zooms (9/12)


Test9dec17 (mean variances)
1H
2H
3H
4H
1V
2V
3V
4V
10^6
10^5
10^4
1375
1380
1385
1390

Zooms (9/12)


Test9dec17 (mean variances)
10^6
10^5
10^4
1334
1336
1338
1340
1342
1344
1346
1348
1H
2H
3H
4H
1V
2V
3V
4V

Observations

- some patterns are sky related (2H/V on dec 9th look at different direction)
- affected frequencies are the same from one day to the other
- some narrow rays, some with “lobe” patterns
- will look e.g. at data w/o clim from last friday