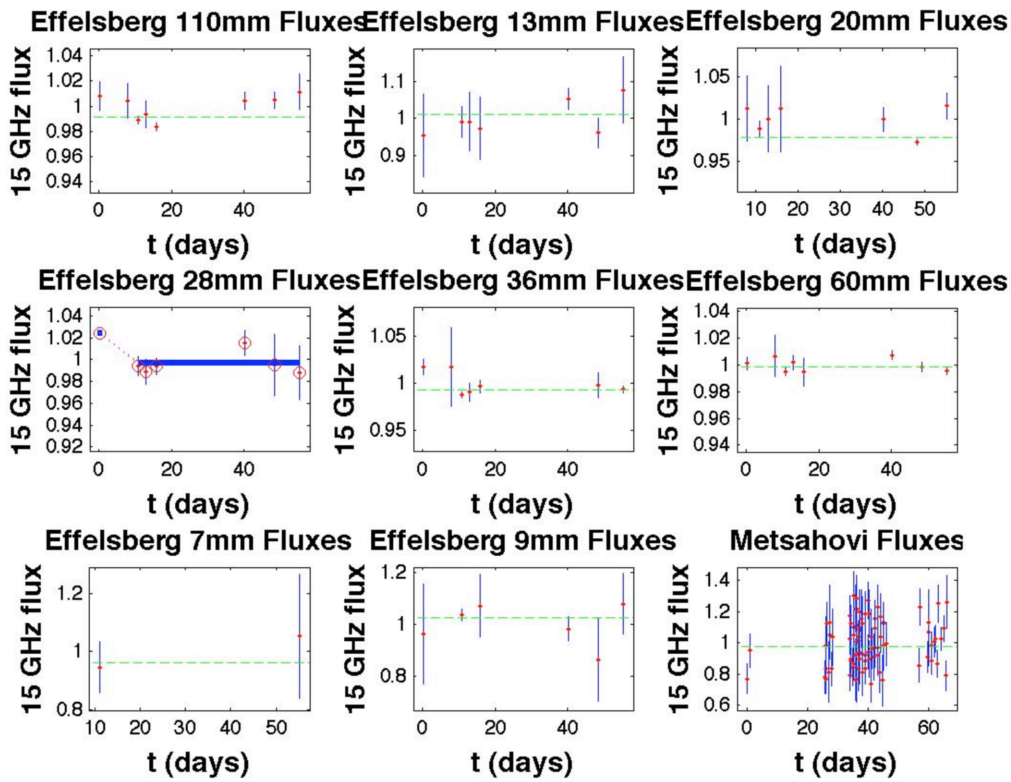
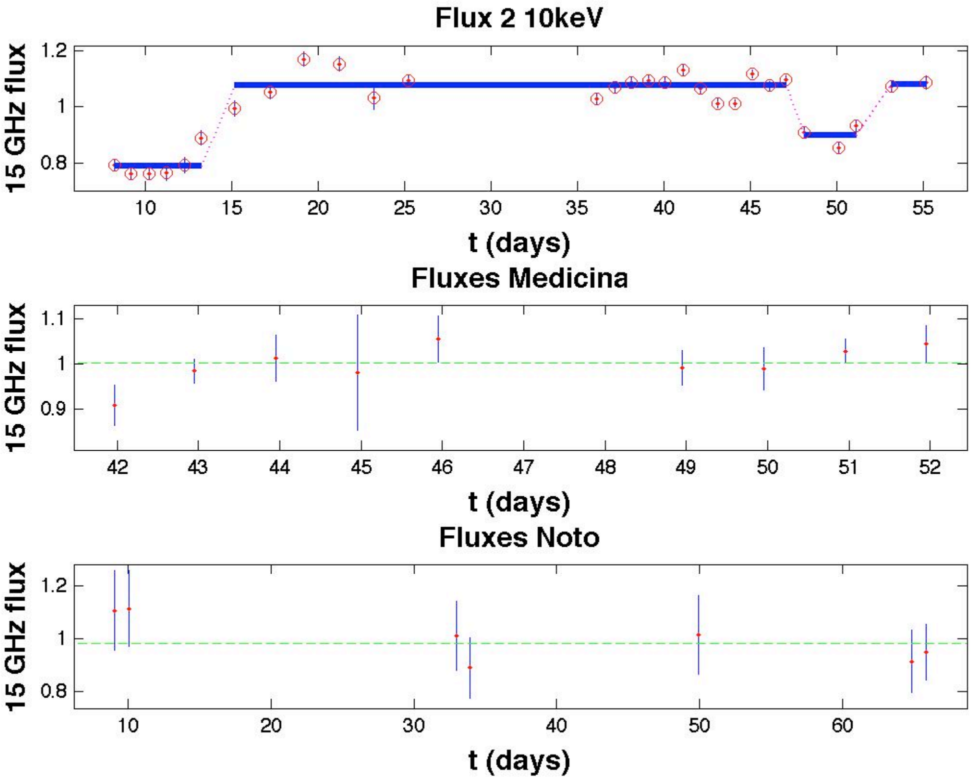
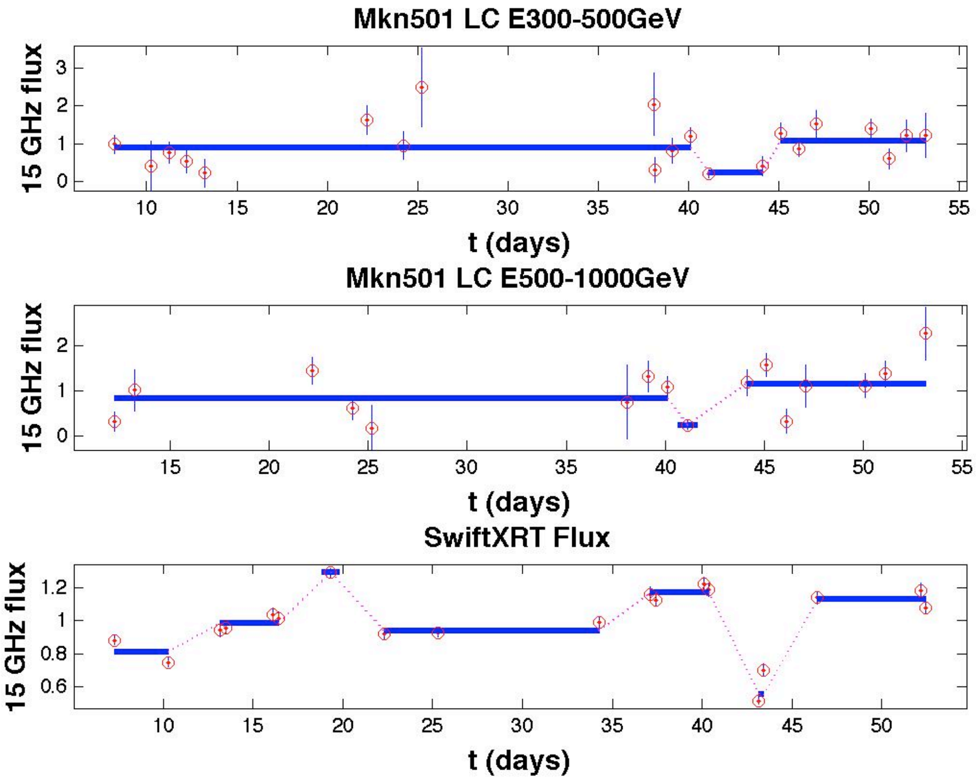
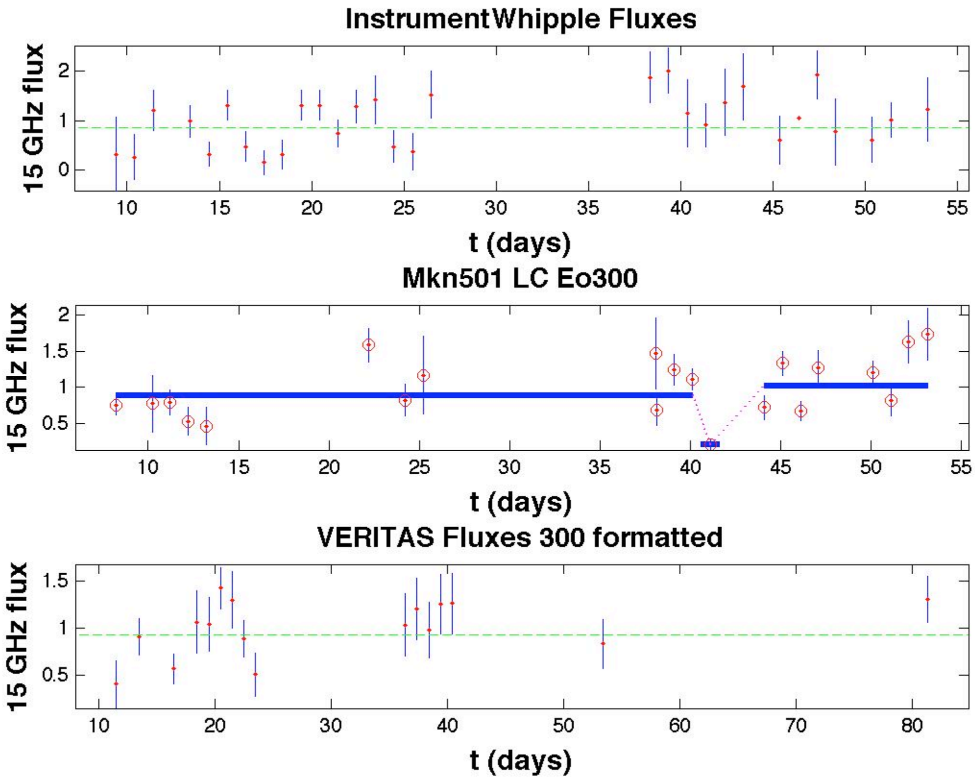
The first step is to compute the Bayesian block representations of all the light curves, as shown in the first set of figures below. If the algorithm finds no evidence for variability at all, a horizontal dashed line is drawn at the mean flux. Otherwise, two or more blocks are indicated with horizontal solid lines. These 18 figures are based on a standard choice for the parameter in the adopted prior distribution of the number of blocks. This rather conservative choice results in a number of "no variability" determinations. In order to better sense small variations, a second set of computations was done with a parameter choice that yields more blocks.



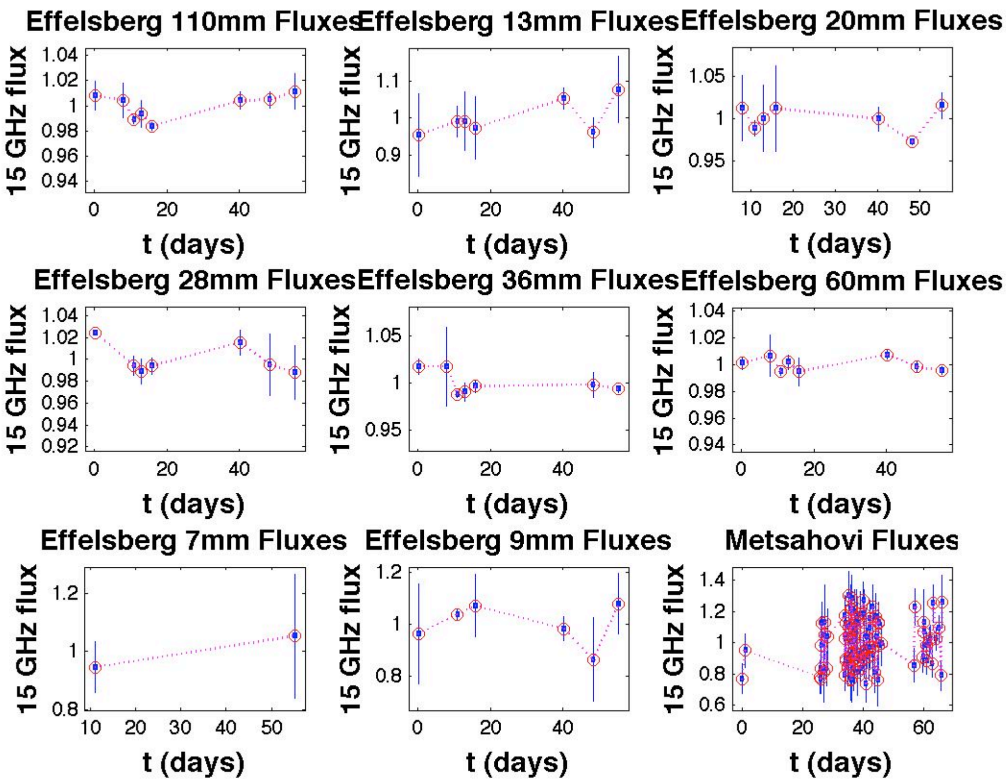

Flux 2 10keV
15 GHz flux
t (days)
Fluxes Medicina
15 GHz flux
t (days)
Fluxes Noto
15 GHz flux
t (days)

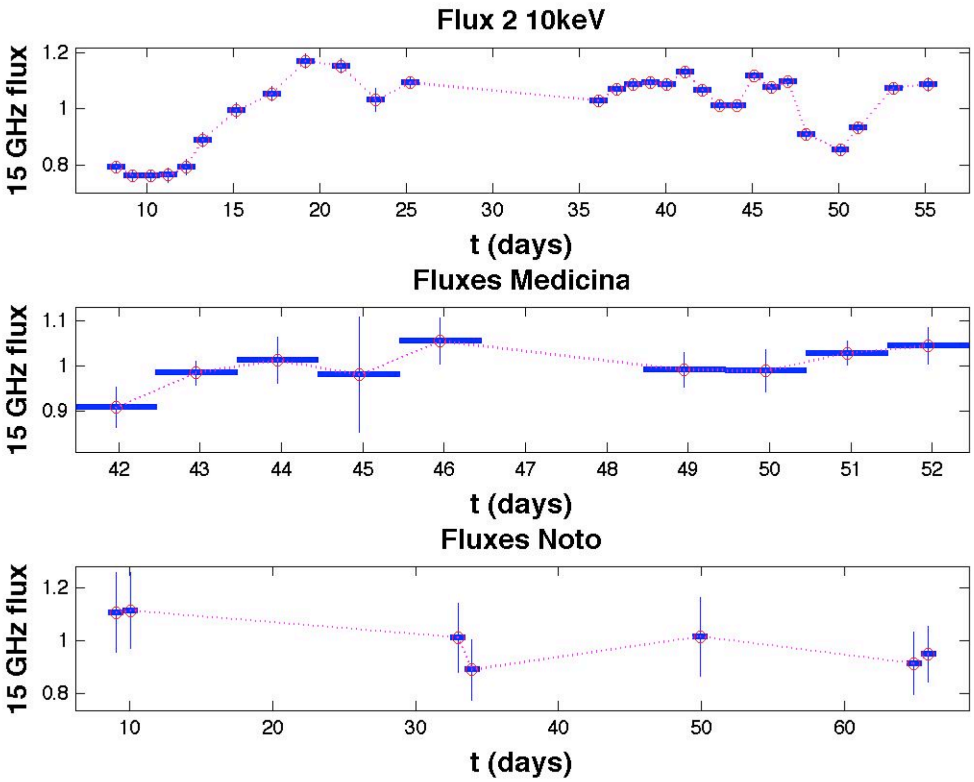

Mkn501 LC E300-500GeV
15 GHz flux
t (days)
Mkn501 LC E500-1000GeV
15 GHz flux
t (days)
SwiftXRT Flux
15 GHz flux
t (days)



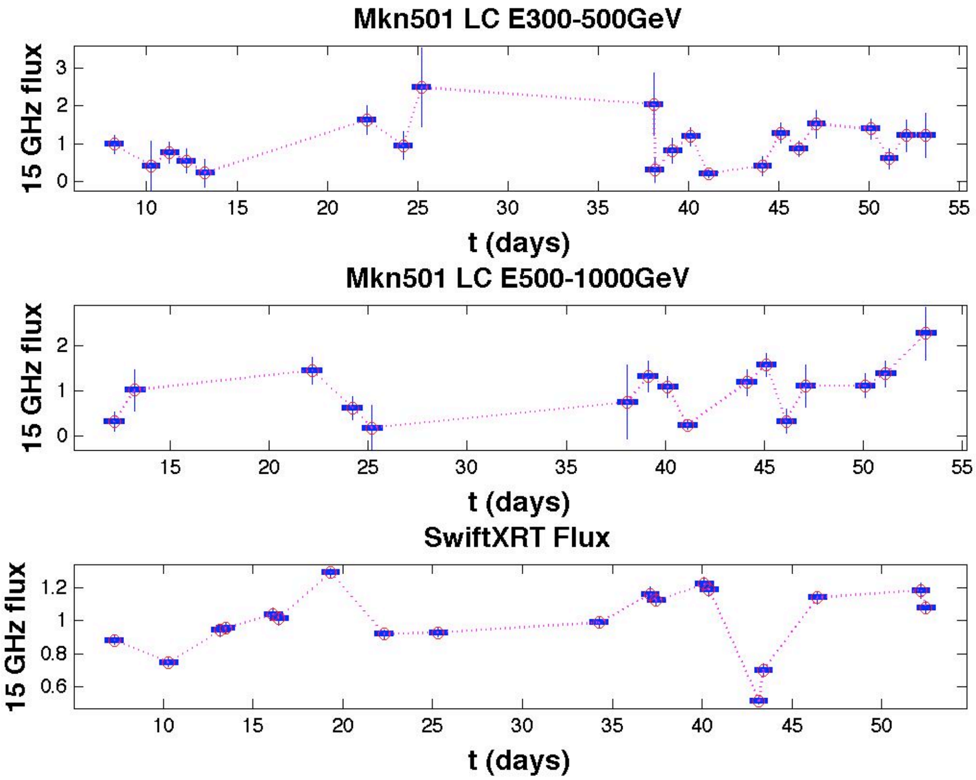
InstrumentWhipple Fluxes
15 GHz flux
t (days)
Mkn501 LC Eo300
15 GHz flux
t (days)
VERITAS Fluxes 300 formatted
15 GHz flux
t (days)

Here are the block representations with the less conservative prior. Note more blocks on the average, and a considerable number of cases where the block consists of just one data point.

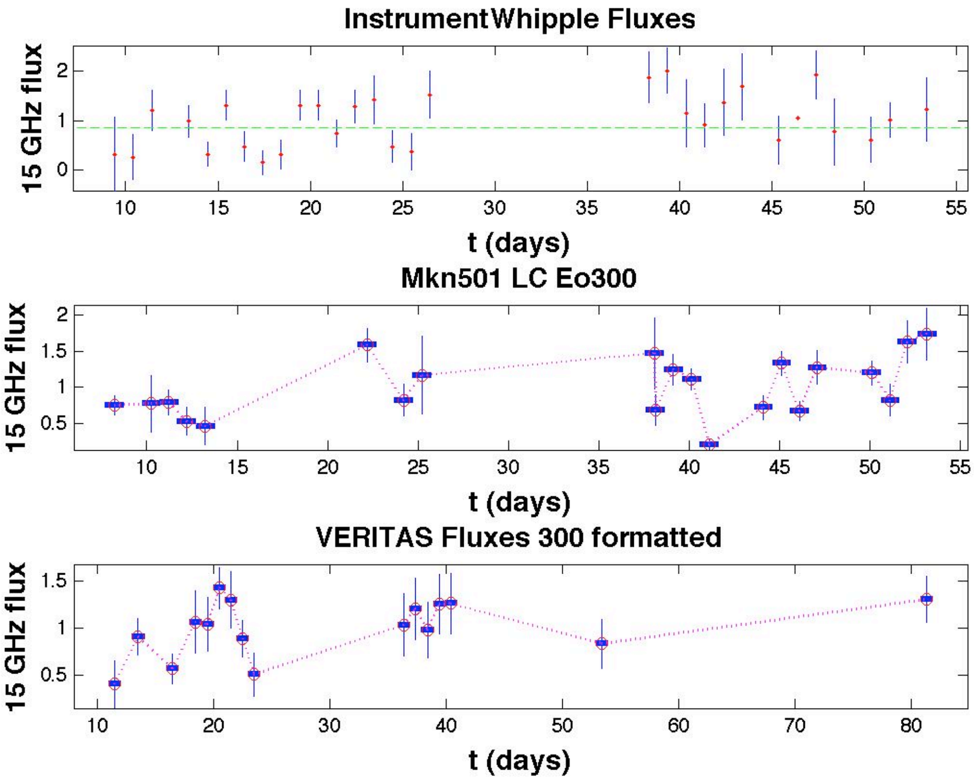




Flux 2 10keV
15 GHz flux
0.8
1
1.2
10
15
20
25
30
35
40
45
50
55
t (days)
Fluxes Medicina
15 GHz flux
0.9
1
1.1
42
43
44
45
46
47
48
49
50
51
52
t (days)
Fluxes Noto
15 GHz flux
0.8
1
1.2
10
20
30
40
50
60
t (days)



Mkn501 LC E300-500GeV
15 GHz flux
t (days)
Mkn501 LC E500-1000GeV
15 GHz flux
t (days)
SwiftXRT Flux
15 GHz flux
t (days)



The next step is to compute a measure of degree of variability. I chose the sum of the absolute values of the flux changes from one block to the next (absolute value so that a flux decrease counts the same as a flux increase), divided by the mean flux in the light curve (to make this a measure of relative variability, not absolute variability):

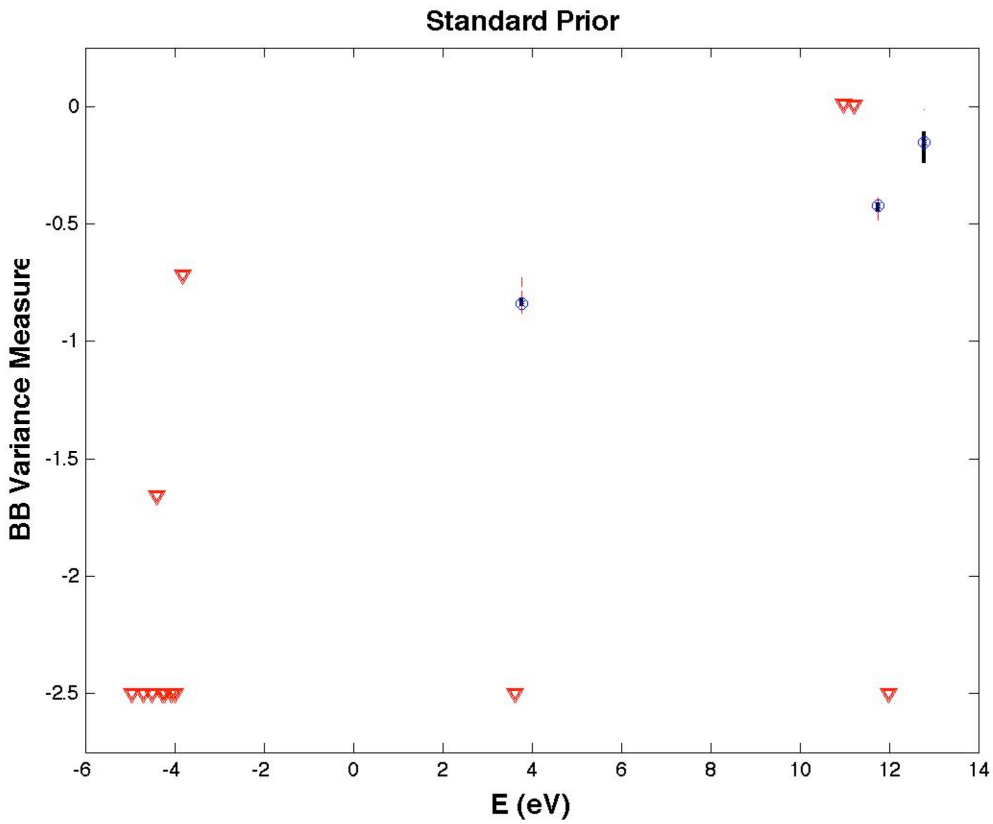
```
V = sum( abs(  diff( xx ) ) )
```

is the MatLab expression, where xx is the array of block amplitudes. Other variability measures could also be derived from the blocks.

Note that no assumption has been made about the time scale of the detected variations!

The log-log plots below show the dependence on energy for this measure.

Each of the 18 points is the variability measure for the light curve at the corresponding energy (shown as blue x's enclosed in circles). The errors were determined by carrying out the analysis on a Monte Carlo simulation in which the fluxes were drawn from a normal random distribution with mean equal to the measured flux and variance equal to the reported observational errors. The solid vertical lines indicate the effective one-sigma errors (obtained as the 15.9% and 84.1% points in the distribution of 1000 simulations); the dashed lines go from the minimum value of V obtained to the maximum value. The first plot is for the standard prior, which includes a number of upper limits (red triangles).



The next plot is for the prior that yields more blocks, and hence fewer upper limts and more estimates of V.