LONG-TERM RADIO TIME SCALES OF ACTIVE GALACTIC NUCLEI

T. Hovatta [1], *M. Tornikoski* [1], *M. Lainela* [2], *E. Valtaoja* [2], *I. Torniainen* [1], *M.F. Aller* [3], *H.D. Aller* [3]

[1] Metsähovi radio Observatory
Metsähovintie 114 02540 Kylmälä, Finland
[2] Tuorla Observatory, University of Turku, Finland
[3] Department of Astronomy, University of Michigan
tho@kurp.hut.fi

We have studied long-term variability time scales of a large sample of Active Galactic Nuclei at several frequencies between 4.8 and 230 GHz. The sample consists of 80 sources from different classes of AGN. In our sample we have quasars, BL Lacertae objects and Radio Galaxies. Our sample consists of sources from the Metsähovi monitoring programme where a sample of compact extragalactic radio sources has been monitored for over 25 years. In addition we use lower frequency data from the University of Michigan monitoring programme and data obtained from the SEST-telescope between 1986 and 2003.

We used the first order structure function, the discrete auto-correlation function and the Lomb-Scargle periodogram to study the characteristic time scales of variability. We were interested in finding differences and similarities between classes and frequencies. Also the methods were compared in order to find the most efficient one for different purposes.

We have also compared the results of this study with earlier structure function analysis by Lainela & Valtaoja (1993). In the earlier analysis the structure function was used to study 42 sources from the Metsähovi monitoring sample at 22 and 37 GHz frequencies. We wanted to find out how the time scales have changed after the amount of monitoring data has more than tripled.

The main conclusion of our study is that in these sources smaller variations happen also in short time scales but larger outbursts only in time scales of many years. Therefore in order to study how often sources are in active state and how long these flares typically last the long-term monitoring is needed.

References

Lainela M., Valtaoja E.: *ApJ*, 1993, **416**, 485.