

# MSSS – Source Extraction (BDSM) & Global Sky Model (OR\_GSM)

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# Blob Detection and Source Measurement (BDSM)

- Fortran version (f-BDSM) and Python version (PyBDSM).
- f-BDSM (ver 2.0) now almost frozen, no major improvements expected.
- PyBDSM still under development. Already has basic functionality.
- Simpler, faster (real-time) Python based package developed by Amsterdam group.

# Source Extraction (f-BDSM)

- Reads in a FITS 3-d image.
- Collapses to a 'channel-0' image.
- Identifies islands of emission in latter.
- Decomposes each island into
  - A set of *gaussians*. These gaussians are then grouped into *sources*.
  - A (cartesian) *shapelet* basis.
- Outputs list of 1. gaussians, 2. sources, 3. shapelets.
- Outputs gaussian and shapelet residual FITS images.

# Source Extraction (f-BDSM) ...

- Can run BDSM on a collapsed or any channel.
- Flexibility in setting thresholds.
- Flexibility in fitting multiple gaussians, flagging.
- Output lists in formats compatible with fv, AIPS etc
- Can inspect shapelet and gaussian fit results for each island and plot.

# BDSM : tricks for the future

- Variable psf estimation in f-BDSM by Apr 2008.
- Scale dependent source extraction to be implemented in PyBDSM by Aug 2008.
- Spectral index for very extended structures not yet satisfactory.
- Implement all f-BDSM functionality in PyBDSM.

# Anaamika 2.0

- Includes f-BDSM.
- Has a basic simulation package of the radio sky. Only point and double sources using source counts.
- Has an image visualisation and analysis package.
- Has a package to visualise BDSM results graphically and troubleshoot.
- Can analyse each island seperately.
- All packages, including BDSM, are well documented.

# Source extraction for MSSS

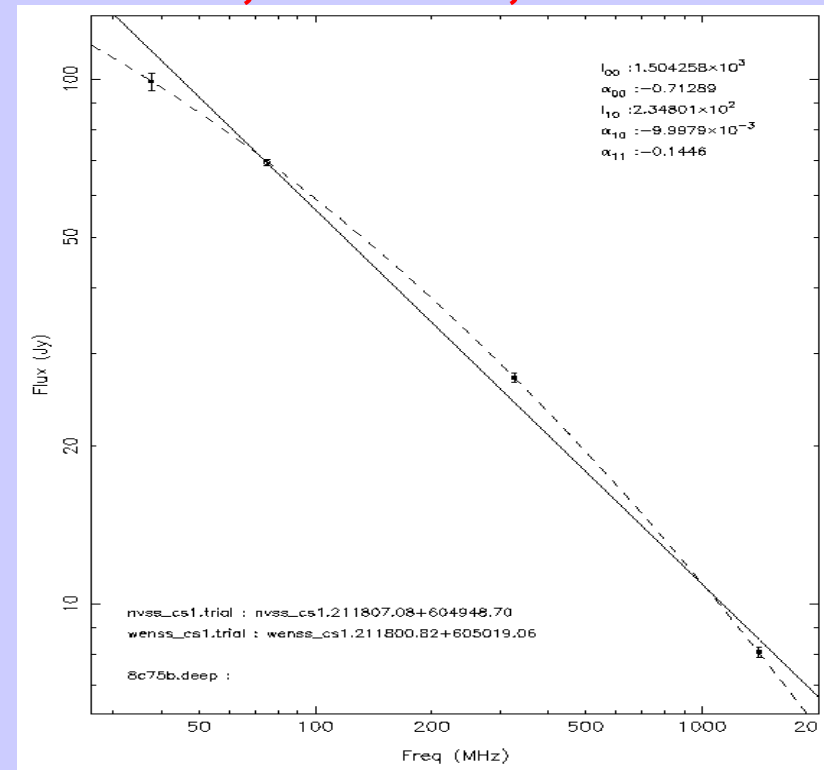
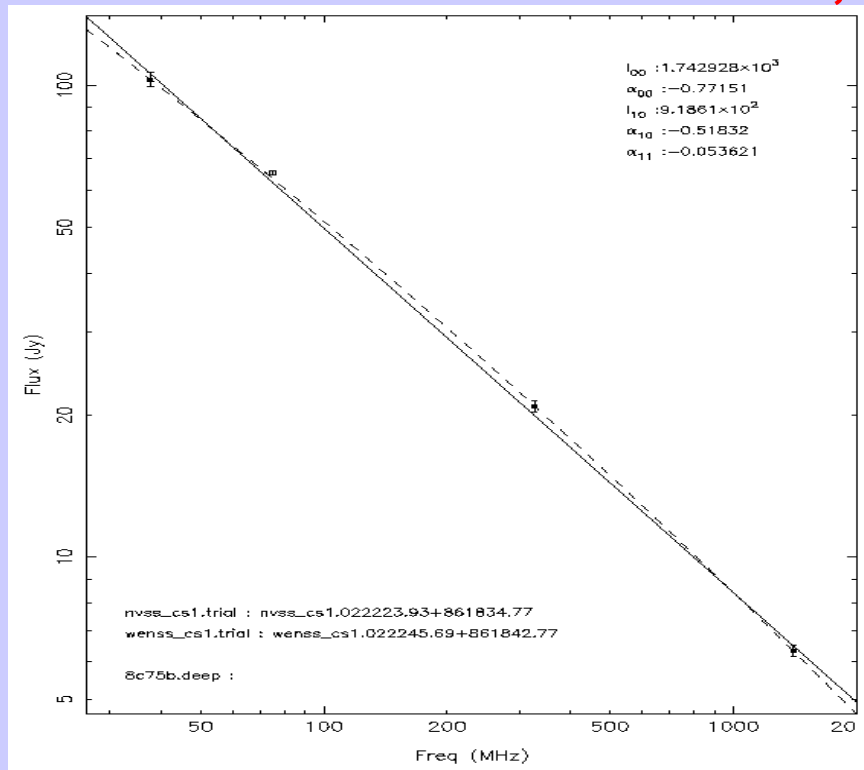
- Typical image size of  $1600^2$  should take  $\sim 1$  min
- A million sources can easily be handled and administered using the AstroWise environment in which BDSM is embedded.
- Not confusion limited.
- Need spectral indices across 32 MHz ? Diff in flux is 14% at 150 MHz.
- RM needed in BDSM for survey ?
- Plans for mosaicing ?
- Need bdsm for online calibration ?
- Problem - diffuse emission, esp galactic. Whats the shortest spacing scale ?

# Optimised Radio Global Sky Model

- Select a number of gaussian lists (made by BDSM or imported from external catalogues)
- Select which ones to fit and which to predict for.
- Associates every pair of catalogues (to id bad ones).
- Associates all the catalogues together. Fits linear and curvature parts of spectrum of each association.
- Plots spectra of each association.
- Writes out the GSM table and also predicted flux for each.
- Plots observed/predicted flux for each catalogue vs RA, Dec, flux, distance from Cas A etc.
- Outputs image of observed/calculated flux !

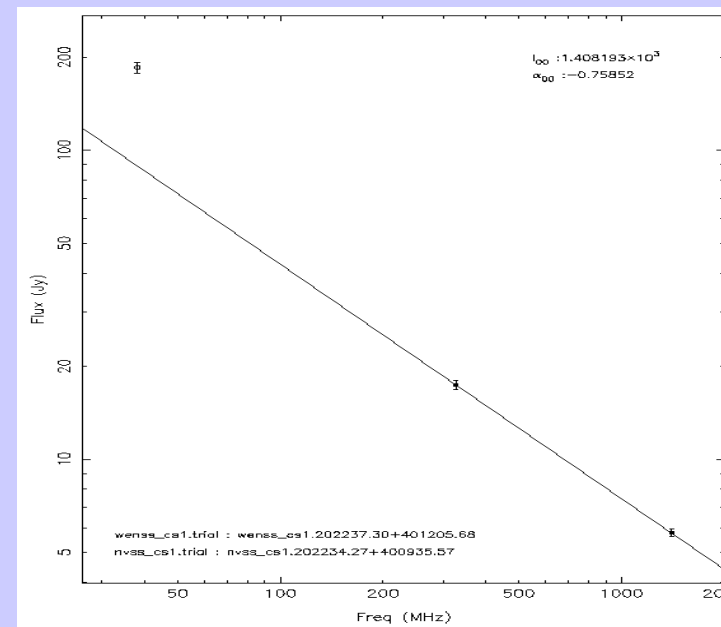
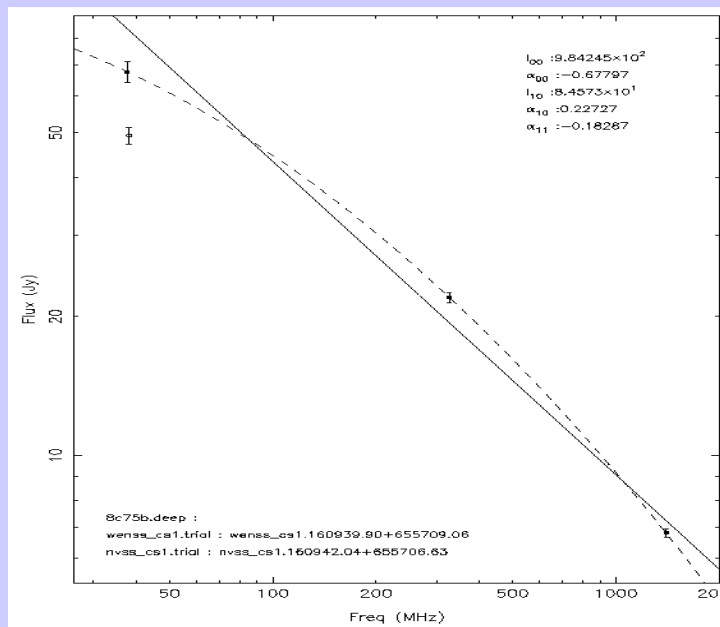
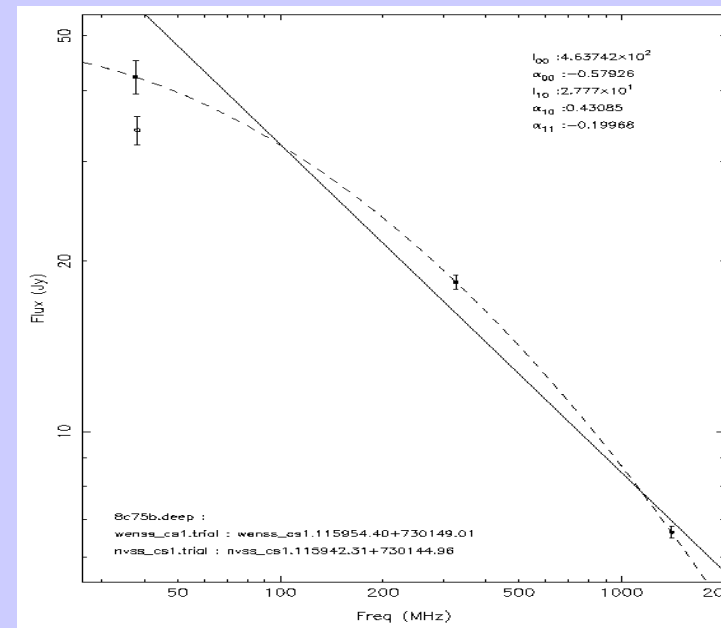
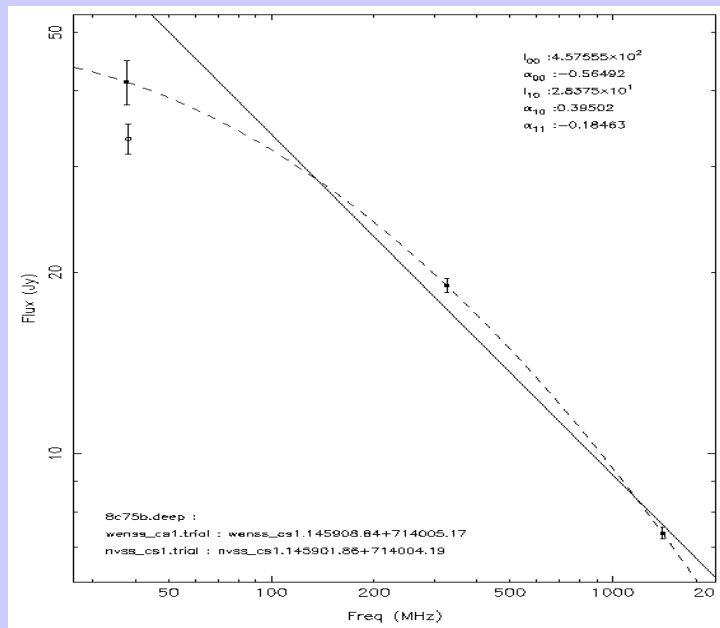


# GSM : NVSS, WENSS, VLSS, 8C

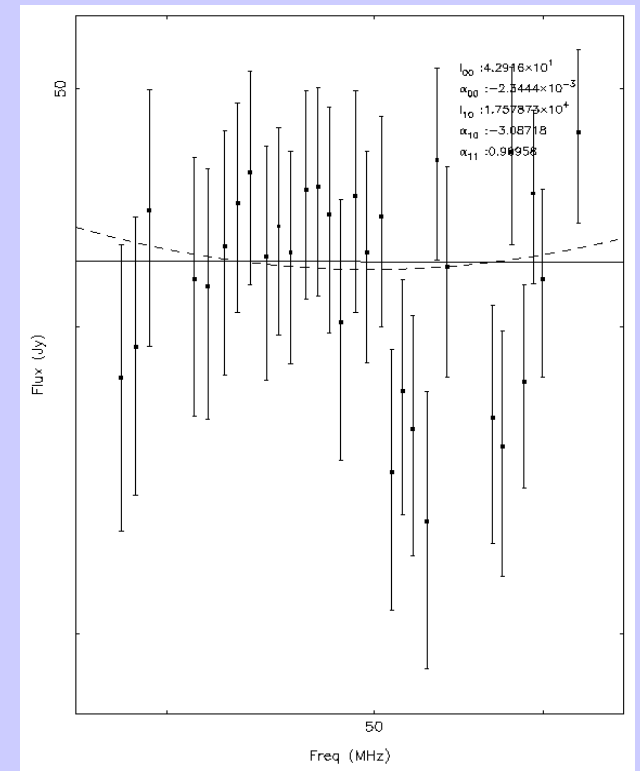
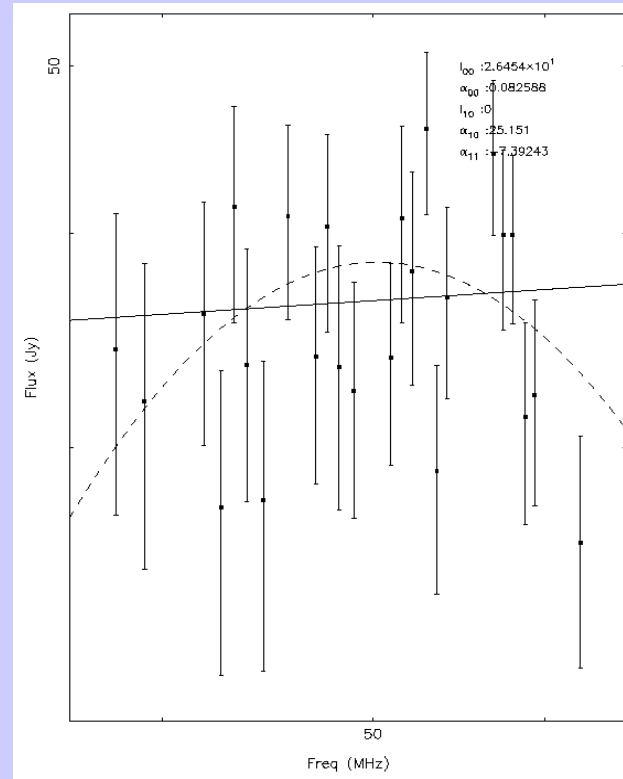
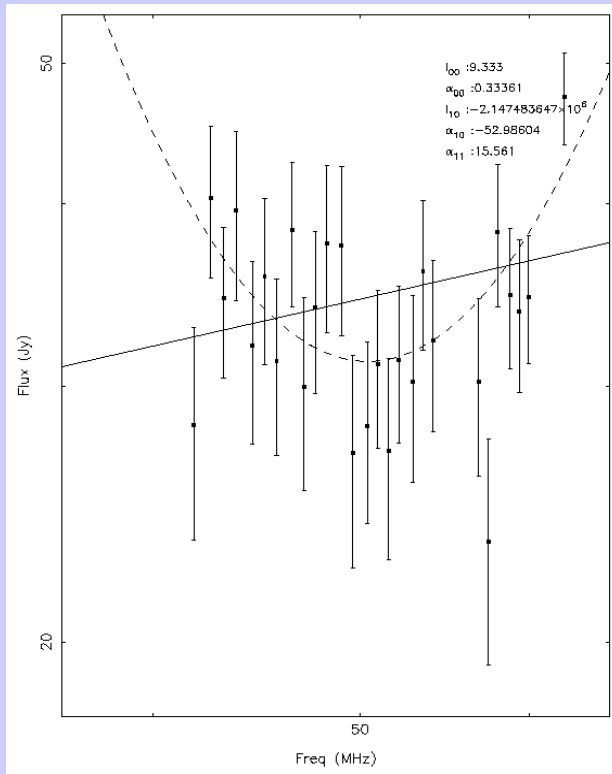


- Use maps convolved to CS1 resolution
- sp.ind : mean=-0.75; std=0.2
- Can observe curvature in certain sources.

# GSM : NVSS, WENSS, 8C vs CS1



# GSM : CS1 3565 multi-band



- Construct GSM with all 36 subbands of 3565 data.
- Spectra consistent with being flat.
- Due to assumed flat spectrum of Cas A and Cyg A.

# GSM : all of them now ...

