

SAMBA processing routines

Athanasios Boudouridis

Space Science Institute

member of the SAMBA team

Eftyhia Zesta PI

**2nd SAMBA meeting, Punta Arenas, Chile
November 3-4, 2013**

Introduction

All codes are written in IDL

- **Read and initial processing/plotting codes**
- **Data processing/plotting codes**
- **Field Line Resonance (FLR) codes**
- **Other (inventory, testing, format changing, etc.)**
- **Specific project codes**

Read and initial processing/plotting codes

❑ Code functions

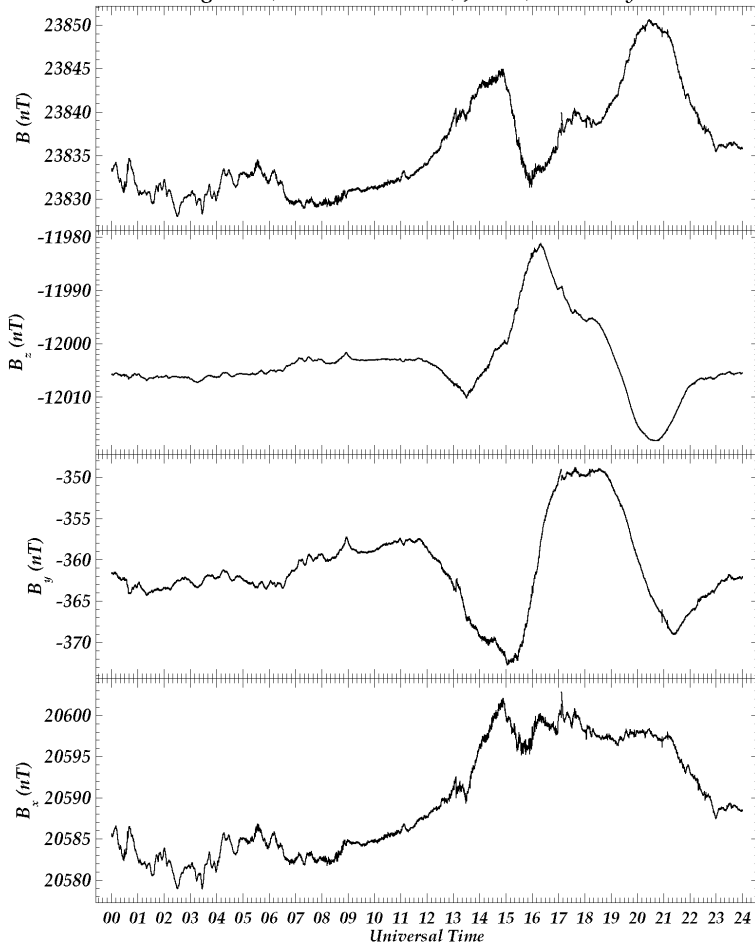
- Read the various format original data (SMALL, Themis Ascii, WAIS-D, McMAC, etc.)
- Despiking the data
- Make simple line plots of the data
- Put the data in the standard SAMBA Ascii format for subsequent use by the processing codes
- Create additional CDF data format
- Write additional 5s and 1m Ascii data formats

❑ Examples

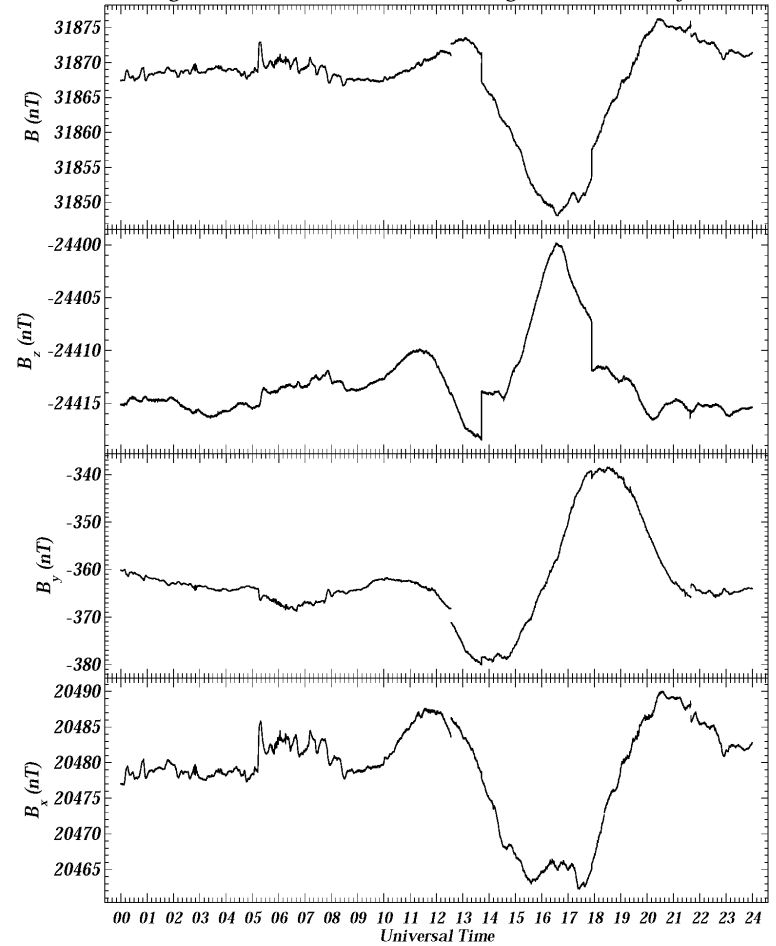
- `read_small_b5.pro`, reads SMALL data format
- `read_ffascii.pro`, reads Themis data format
- `read_waisd.pro`, reads WAIS-D data format
- `read_mcmac.pro`, reads McMAC chain data format

Plot examples

Mag. data, La Serena (SER), June 4, 2008 (day 156)



Mag. data, Punta Arenas (PAC), August 10, 2012 (day 223)



Data processing/plotting codes

□ Code functions

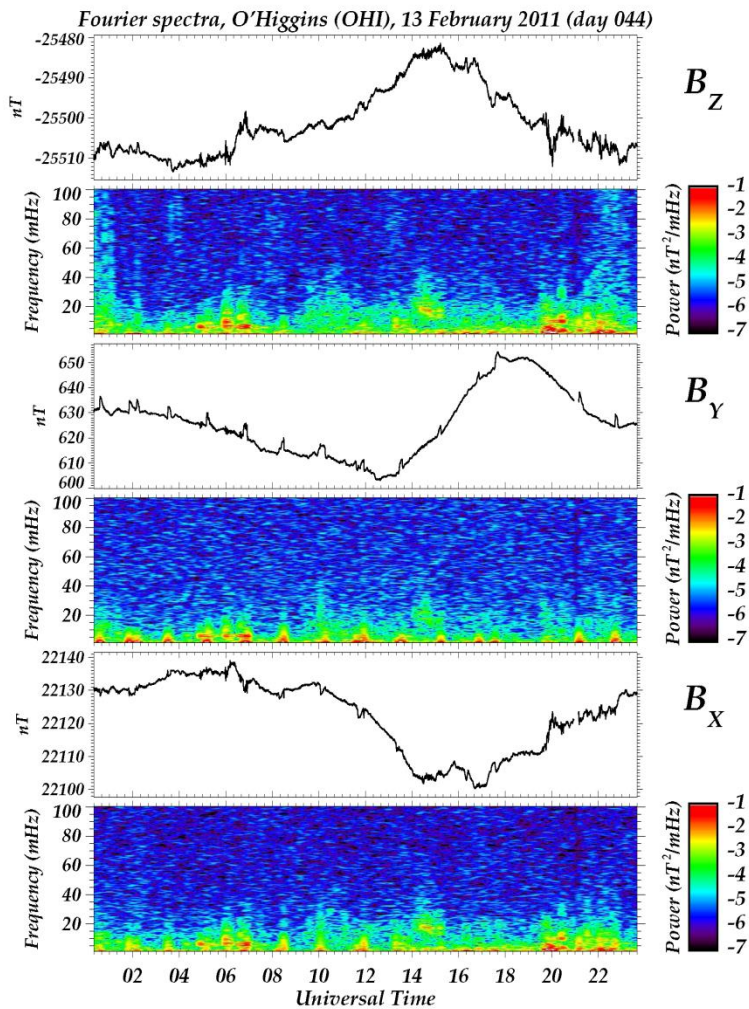
- Read the standard 1s SAMBA Ascii format (of CDF)
- Perform extra despiking
- Interpolate missing data (if needed)
- Perform various processing (digital filtering, Fourier transforms, Wavelet transforms, etc.)
- Plot the results

□ Examples

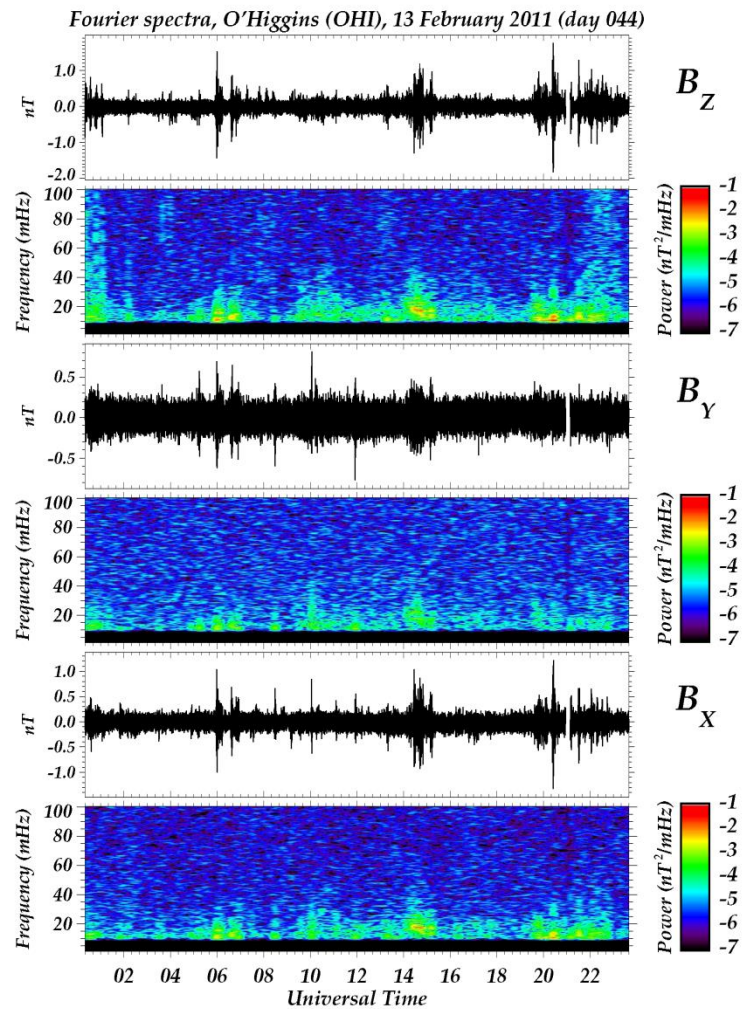
- `digfilter_web.pro`, digital filtering of the data
- `fourier.pro`, Fourier transforms
- `transform.pro`, Wavelet transforms

Plot examples

Fourier spectra



Filtered/Fourier spectra



Field Line Resonance (FLR) codes

❑ Code functions

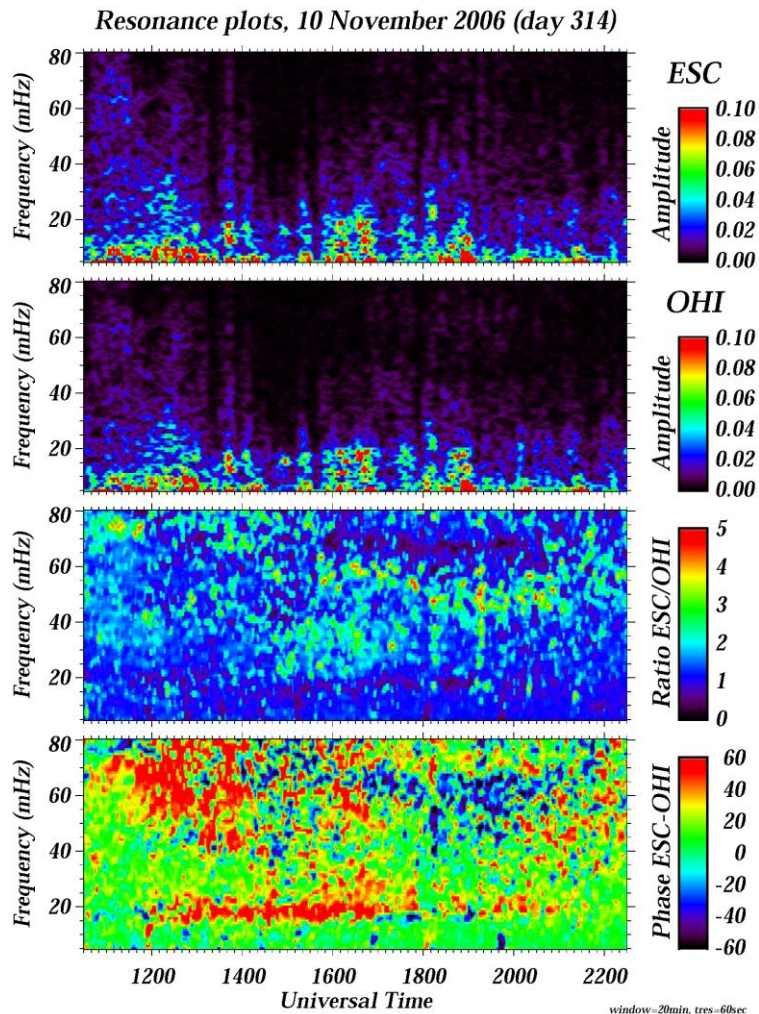
- Read the standard 1s SAMBA Ascii format (of CDF) from a pair of stations
- Perform extra despiking
- Interpolate missing data (if needed)
- Perform digital filtering and/or Fourier transforms on both station data
- Plot the results
- Additional functions: FLR frequency calculation, phase difference and amplitude ratio estimation

❑ Examples

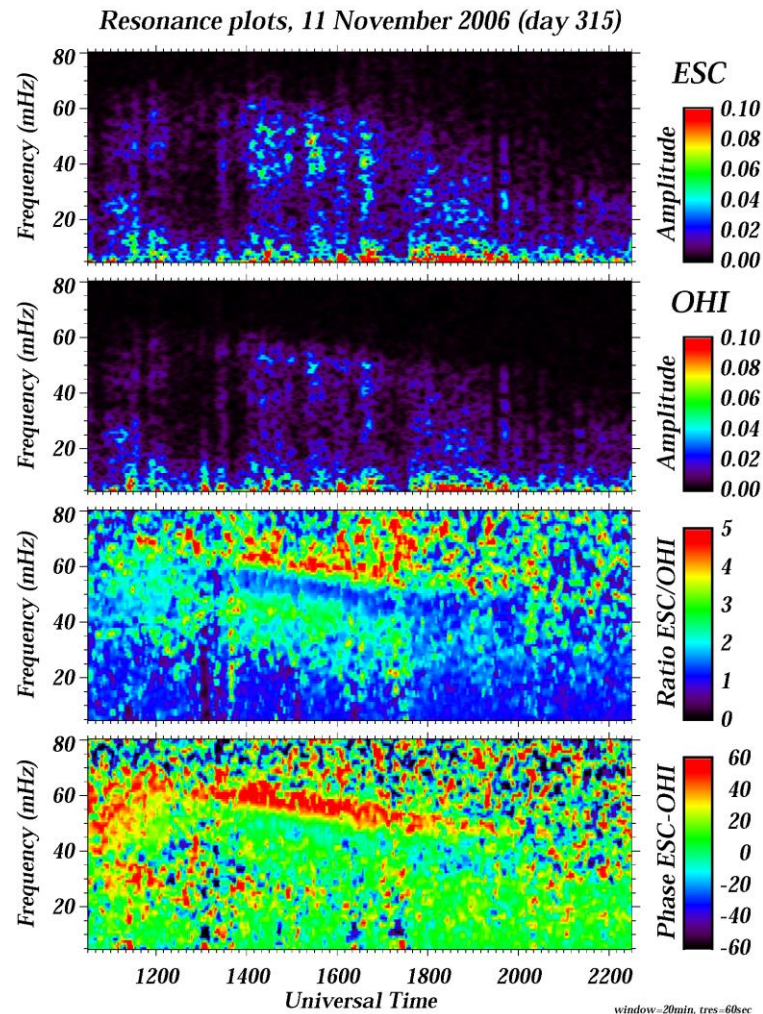
- `fourier_resplot.pro`, Fourier summary resonance plot
- `fourier_res_flr.pro`, automated Fourier FLR frequency determination
- `resonance.pro`, Wavelet resonance plots
- `flrmap.pro`, FLR and mass density L/UT mapping

Plot examples

Resonance plot

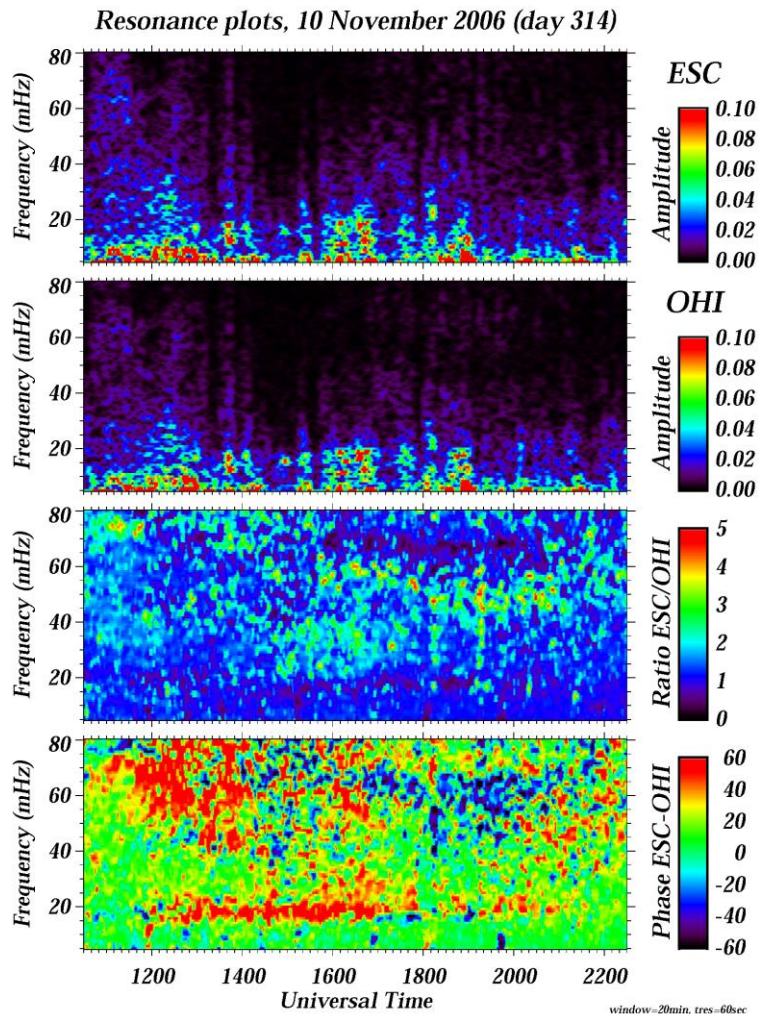


Resonance plot

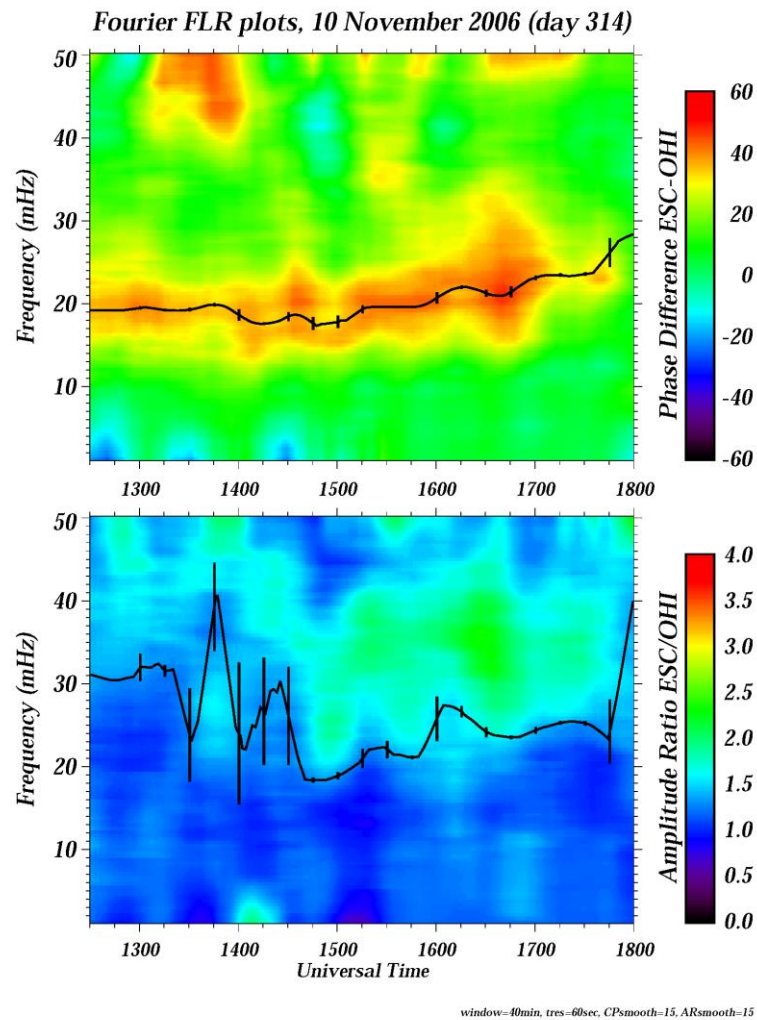


Plot examples

Resonance plot

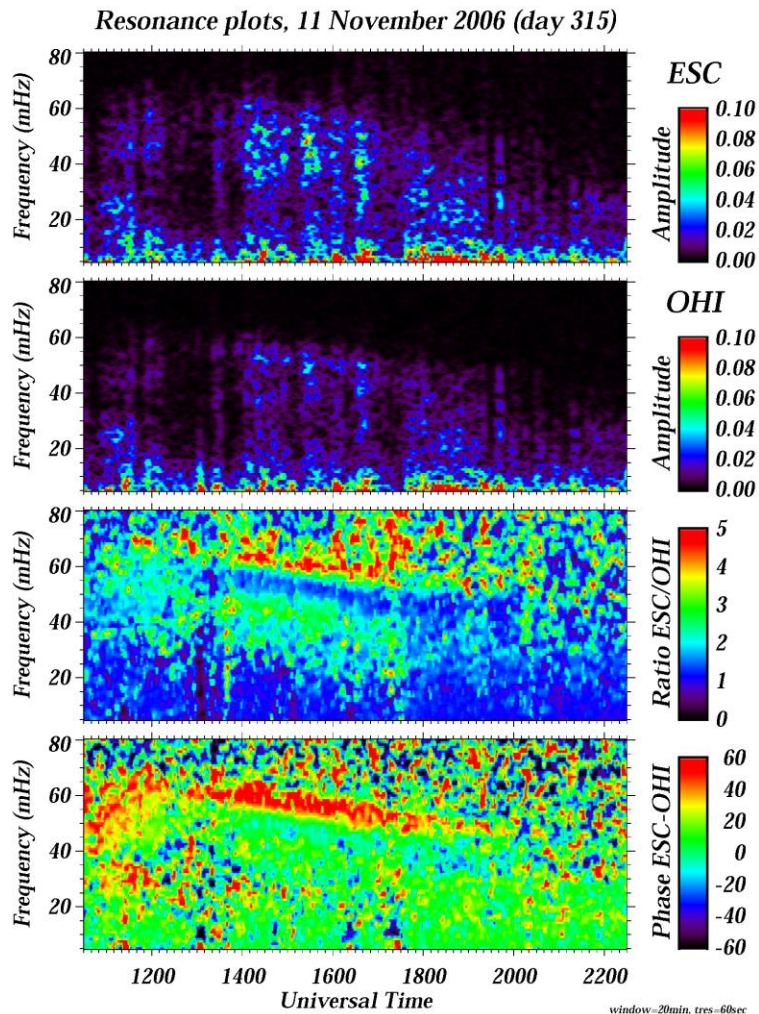


FLR determination

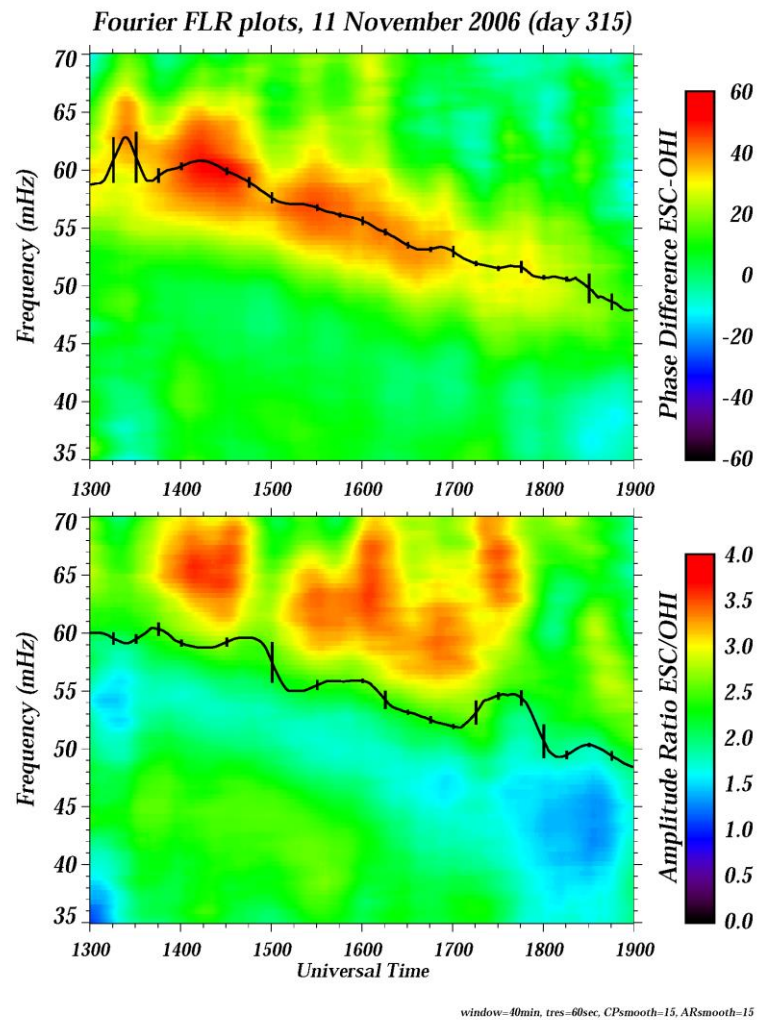


Plot examples

Resonance plot

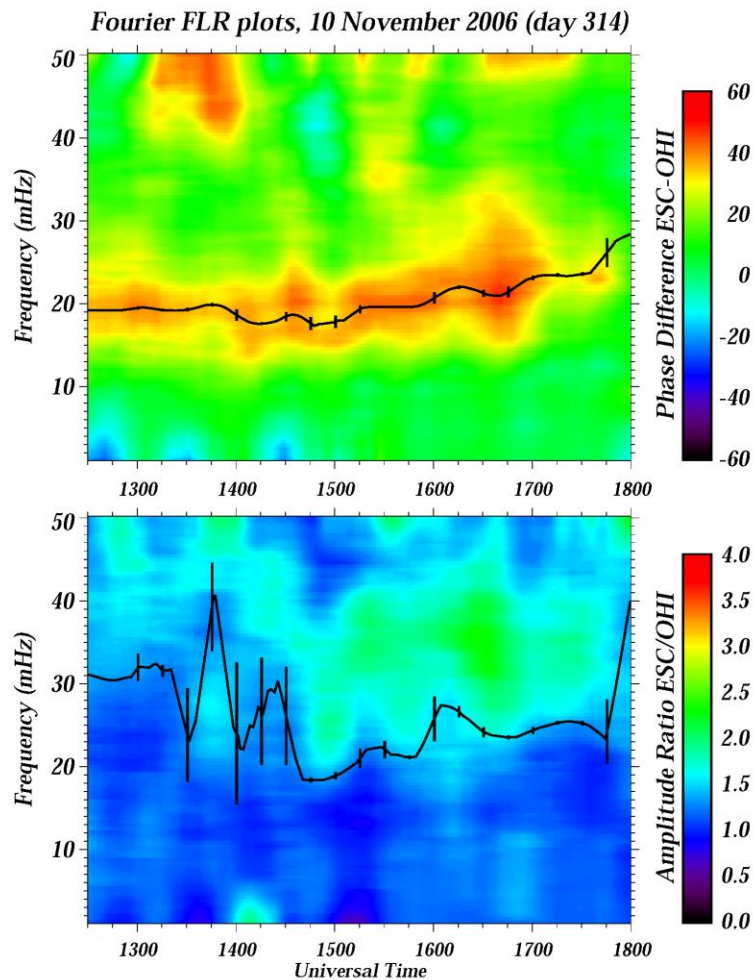


FLR determination



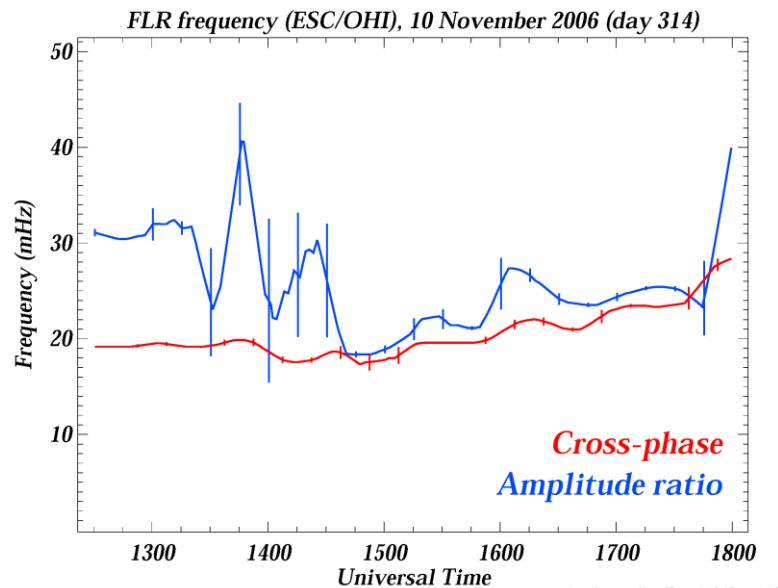
Plot examples

FLR determination



window=40min, tres=60sec, CPsmooth=15, ARsmooth=15

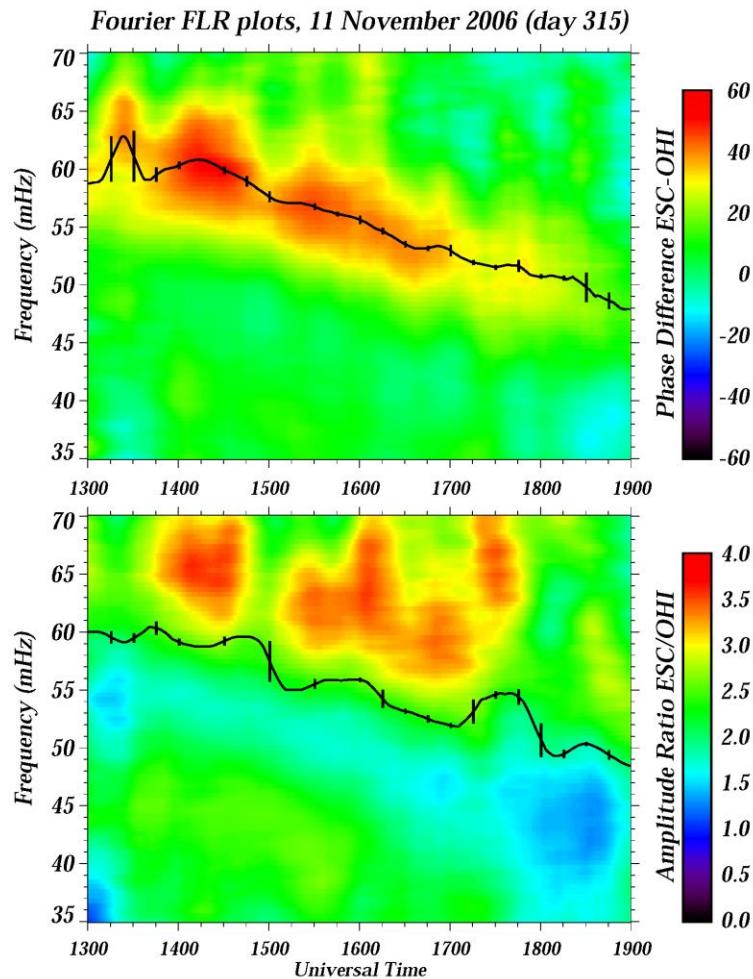
FLR determination



window=40min, tres=60sec, CPsmooth=15, ARsmooth=15

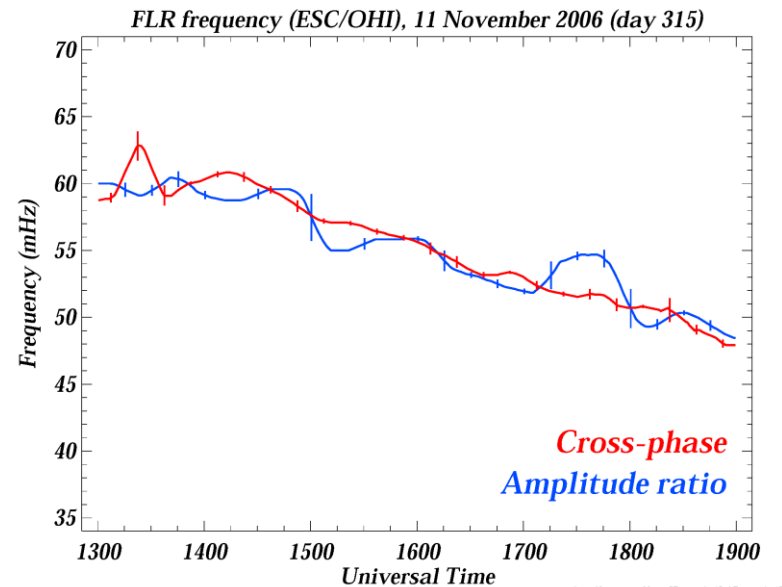
Plot examples

FLR determination



window=40min, tres=60sec, CPsmooth=15, ARsmooth=15

FLR determination



window=40min, tres=60sec, CPsmooth=15, ARsmooth=15

FLR map plot examples

