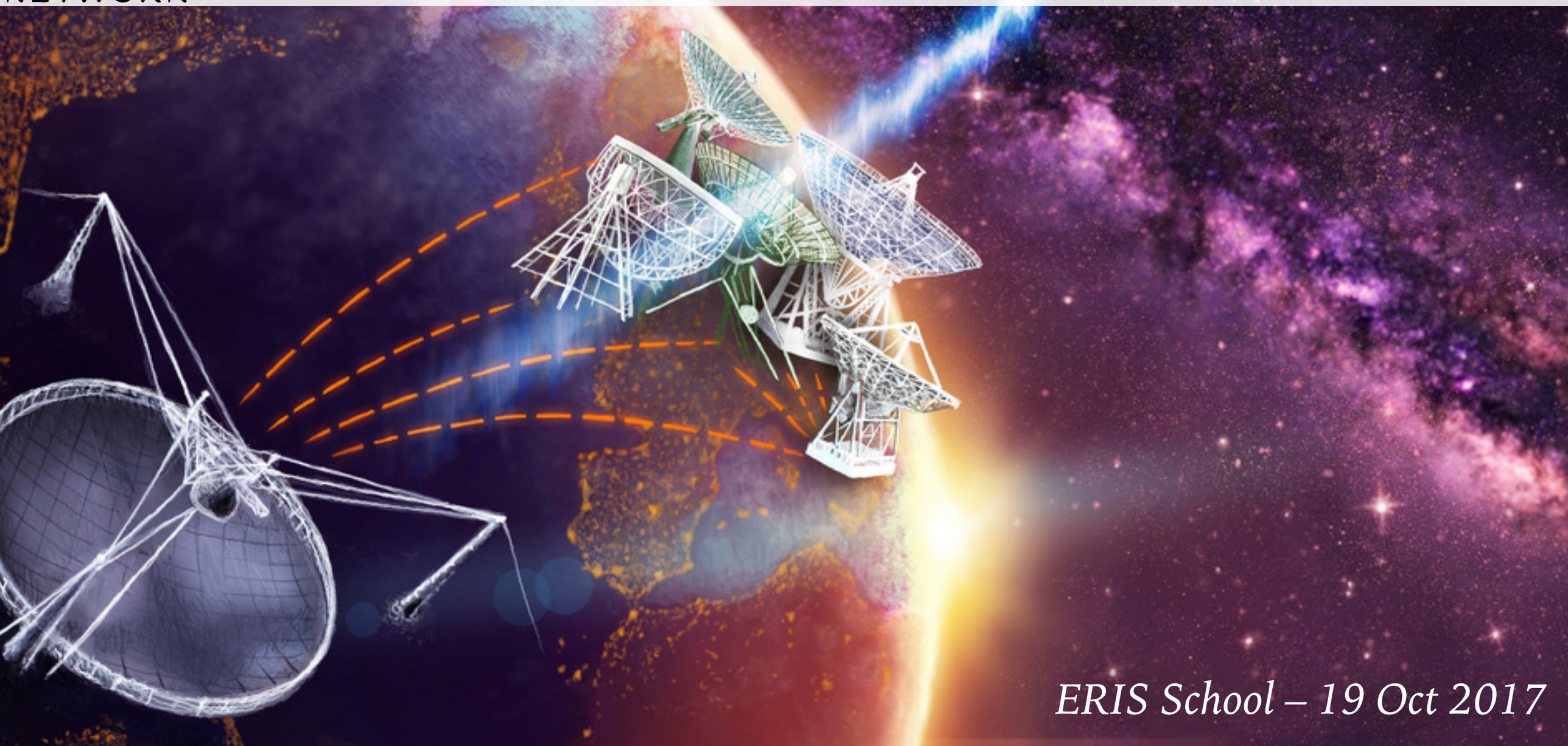
JIVE
Joint Institute for VLBI ERIC

RadioNet

EUROPEAN vlbi NETWORK

THE EVN PIPELINE

Benito Marcote – EVN Support Scientist



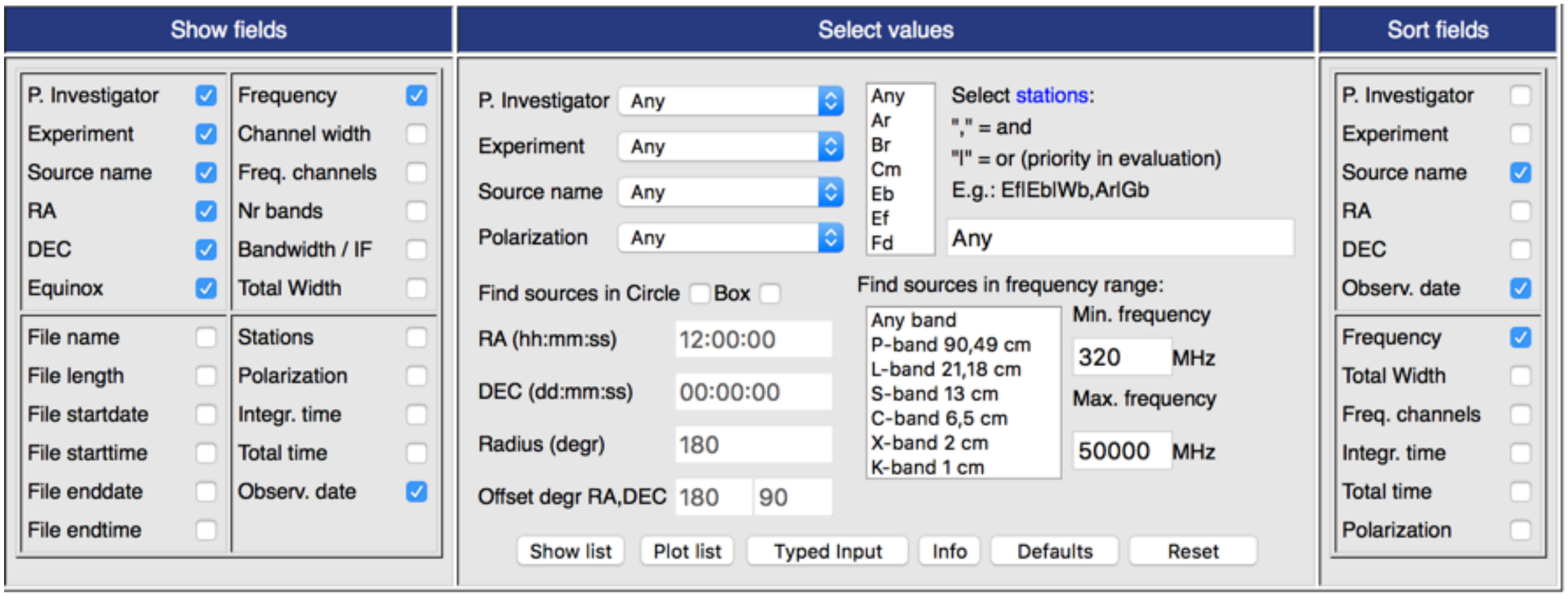
ERIS School – 19 Oct 2017

THE EUROPEAN VLBI NETWORK (EVN)

Image by Paul Boven (boven@jive.eu). Satellite image: Blue Marble Next Generation, courtesy of Nasa Visible Earth (visibleearth.nasa.gov).

DO YOU NEED VLBI DATA FOR A SPECIFIC SOURCE?

- *Has it been already observed?*
  Look in the data archives first (EVN, VLBA, LBA)
  http://archive.jive.nl/scripts/avo/fitsfinder.php
  Proprietary during 1 year (6 months for target of opportunity)



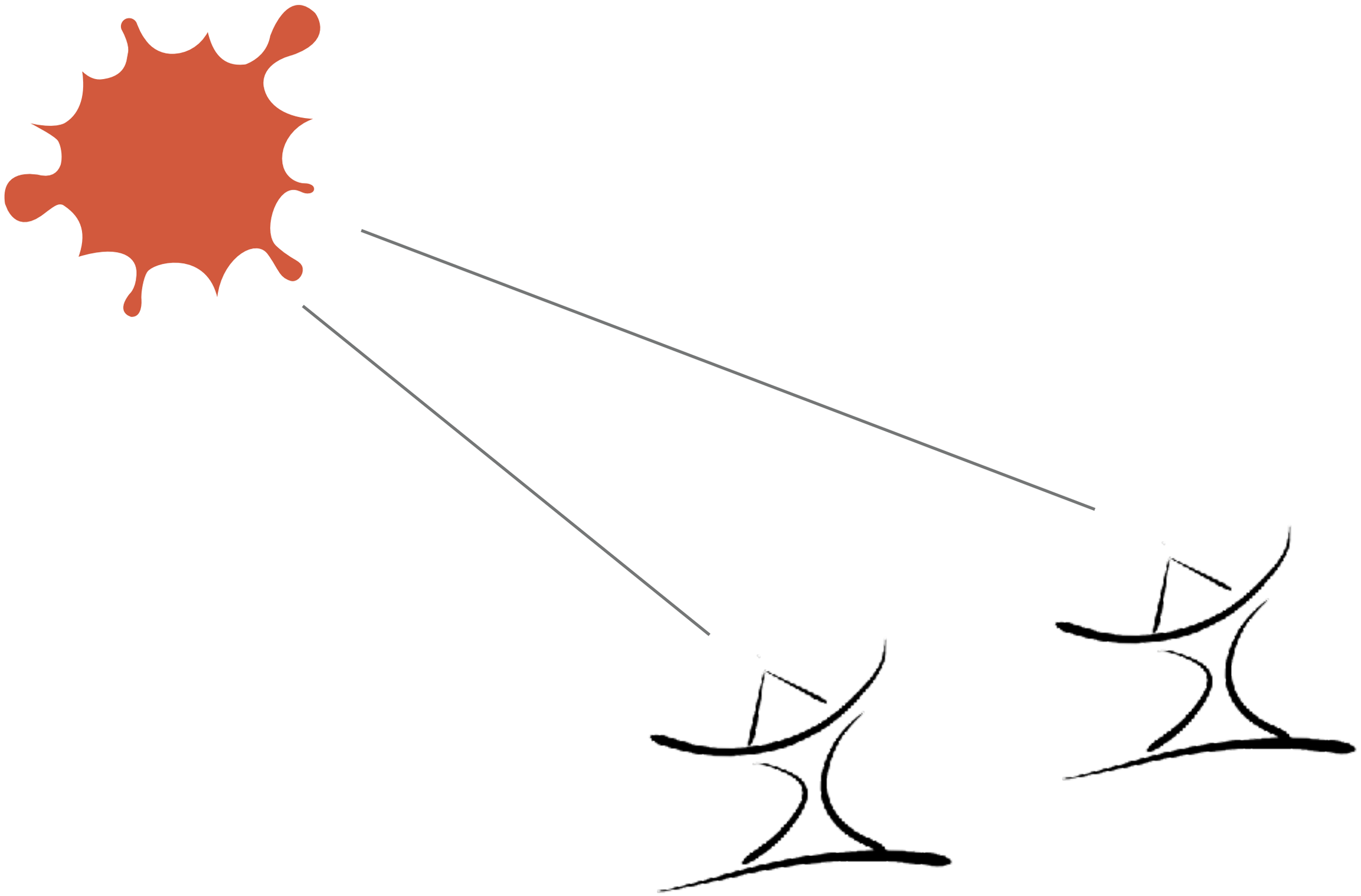
DO YOU NEED VLBI DATA FOR A SPECIFIC SOURCE?

- *If you have a great idea… make a proposal to observe!*
  http://www.evlbi.org/proposals/proposals.html
  http://proposal.jive.nl
  1 February, 1 June, 1 October

Essential information for EVN users

- Call for Proposals
- How to propose observations with the EVN
- How to schedule EVN observations (including EVN block schedules)
- Analysis of EVN data
- The EVN Data Archive. See also the EVN Data Access Policy.
- EVN Data Reduction Guide - makes use of the results from the EVN user pipeline
- The EVN Calculator is a useful tool at all stages of an EVN experiment. This allows baseline and image sensitivities to be calculated for various combinations of antennas, data rates and frequencies.
- The working status of the EVN telescopes is available in the general EVN status tables and the e-VLBI status tables
- Travel support to JIVE and the EVN observatories is also available for EVN PIs
- Personal EVN user support is available from the Joint Institute for VLBI ERIC (JIVE)

EVN OBSERVATIONS



EVN OBSERVATIONS

THE EVN TELLS YOU WHEN YOUR DATA ARE READY

Dear PI,

We have examined your project (N16C1,18/02/2016) and the data are ready for distribution to you. You can download the data directly from the EVN Data Archive (see below). Contact your support scientist to arrange a password for your experiment. If your experiment included the phased array Westerbork, it may be possible to provide you the Wb synthesis array data in IDI FITS format, which may prove useful for the amplitude and polarization calibration of the VLBI data set.

The experiment scheduled the following telescopes: JbWbEfMcNtO8ShT6UrTrYsYdSvZcBdIr.
However note: no Sh,Yd.

Your experiment was processed with the following parameters:
Fass1: 14 Tels, 8 band X 4 pols, each with 64 points, 2 sec int.

The originally recorded disks from the stations can be released after two weeks. If you have any questions, contact us at jops@jive.eu.

EVN and Global VLBI Observations correlated at at JIVE are now automatically calibrated via a pipeline process. You will receive email notification when the pipeline is complete. In particular, the a priori amplitude calibration table (and the associated, final ANTAB file -- note that it is better to use this file from the pipeline rather than the individual-station antabfs files available from the "Station Logfiles" tab of the archive), plus various other tables and plots will be available to download from the EVN archive (subject to the EVN Data Archive policy as discussed below). A description of the pipelining process can be found at:

www.evlbi.org/pipeline/user_expts.html

The EVN data archive at JIVE is now a central location for obtaining the information you need in reviewing your project. You can find network feedback from the stations, standard plots from the correlation review done here prior to distribution, pipeline results, and the FITS files themselves. Contact your support scientist to arrange for a

...

should be okay to use autocorrelations for bandpass corrections or to use ACFIT. For AIPS versions starting
with 31DEC13, you should set DIGICOR to -1 in FITLD (previously, it would do that automatically if the array was not VLBA).

Remarks on plots or individual stations:

Jb: Polarization leakage. Stopped few minutes before the end of the session.
Wb:

Ef: Started observing at 14:13:02 due to technical reasons.

Mc:

Nt: Observation interrupted from 12:45 to 13:45 UT due to strong wind.

O8:

Sh: Did not participate in the experiment due to maintenance.

T6:

Ur:

Tr:

Ys:

Yd: No available.

Sv:

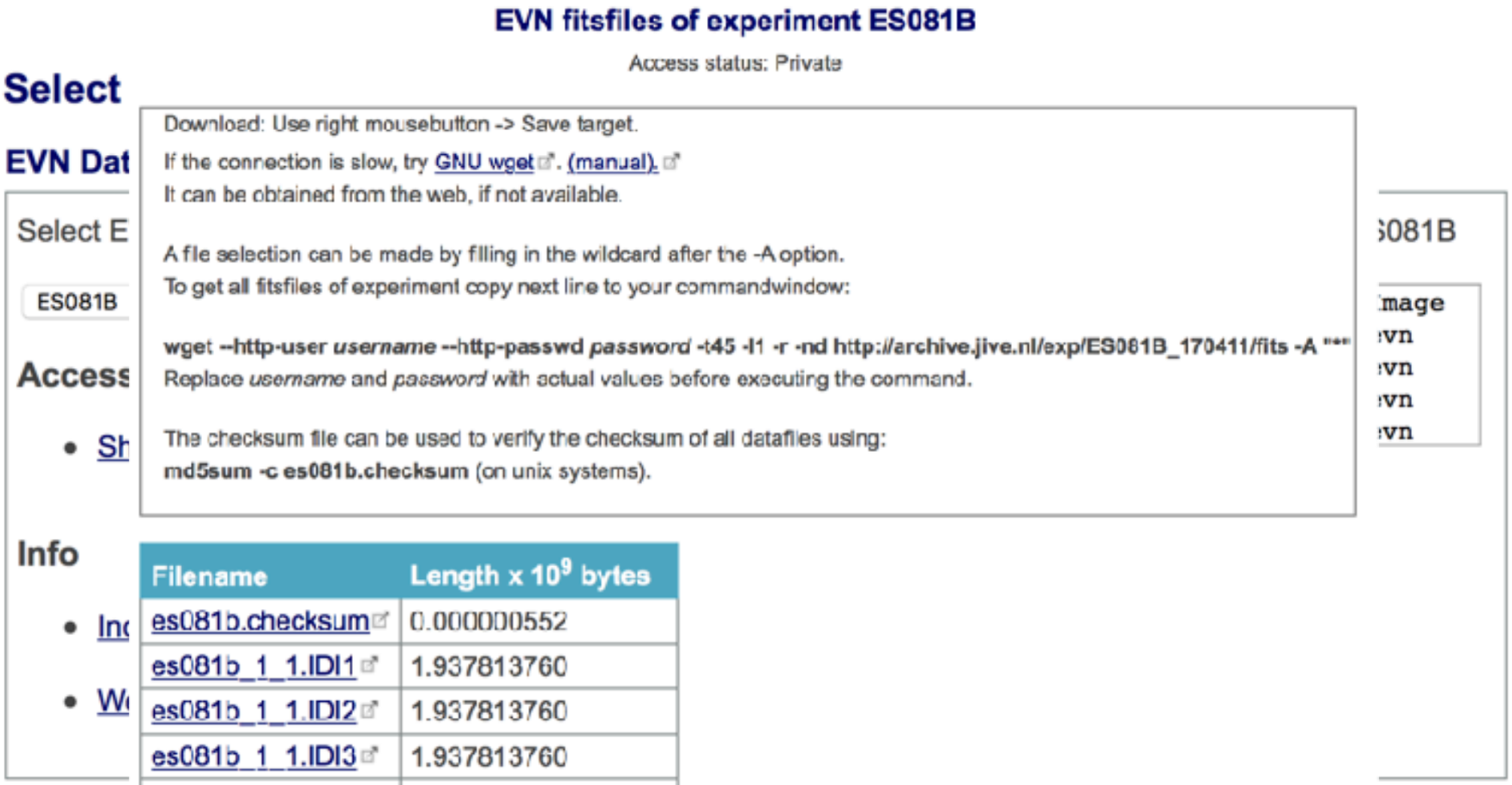
Zc: Only L polarization properly recorded.

Bd:

Ir: Started few minutes later due to technical reasons.

YOU CAN DOWNLOAD THE DATA

- http://www.jive.eu/select-experiment



YOU KNOW WHAT TO EXPECT EVEN BEFORE DOWNLOADING

- We do several tests and plots to check the consistency of the data

Standard plots

Info | Feedback | Logfiles | Standard plots | Pipeline | Fitsfiles | Abstract

EVN Standard Plots of experiment EM111

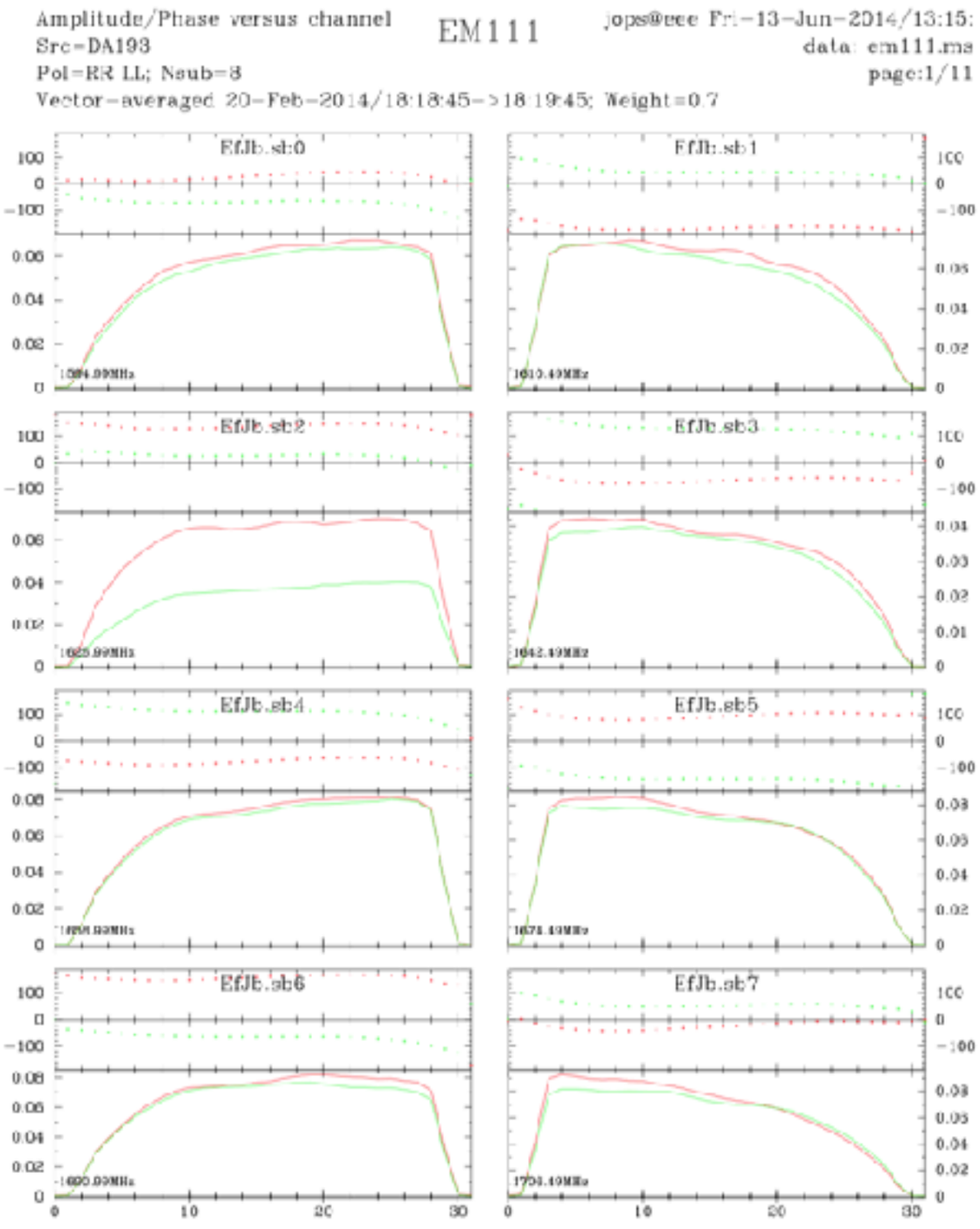
Exp. Name	EM111
P.I. Name	Marcote
Description	Morphological changes of the extended emission of HESS J0632+057
Wavelength	18cm
Stations	EfJbMcOnTrWbHhSvZcBdUrShNtRo
Plot description	Description

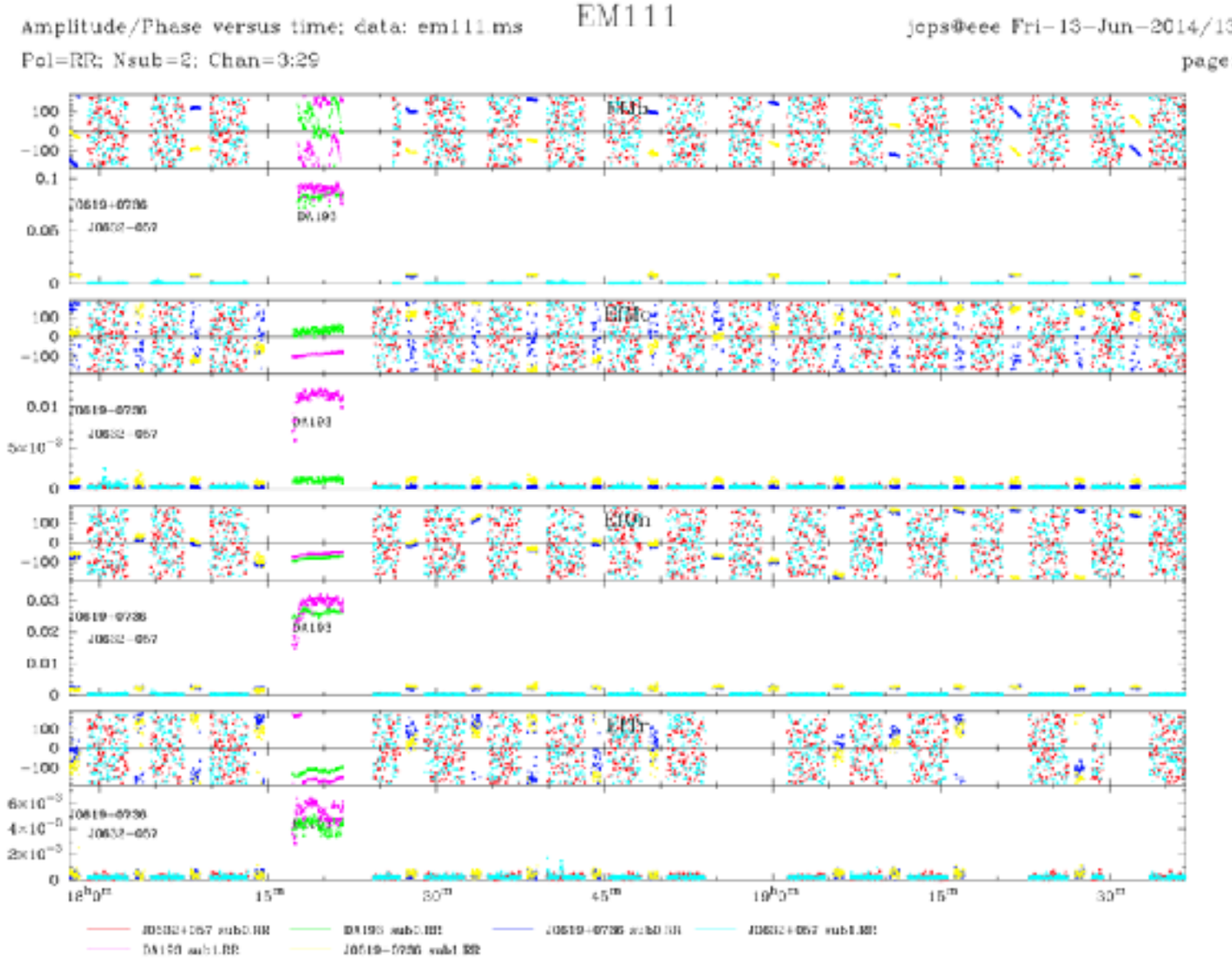
Obs. Date	140220
Completion Date	140602
Distribution Date	140627
Release Date	
Support Scientist	Surcis
Letter to P.I.	em111.piletter

ps.gz | png | tar.gz

cross corr. amp/phase	auto corr. amp/phase	amp/phase versus time	weights versus time
em111-cross-1.ps.gz	em111-auto-1.ps.gz	em111-ampphase.ps.gz	em111-weight.ps.gz
	em111-auto-2.ps.gz		

YOU KNOW WHAT TO EXPECT EVEN BEFORE DOWNLOADING





THE EVN PIPELINE

Pipeline

Info | Feedback | Logfiles | Standard plots | Pipeline | Fitsfiles | Abstract

EVN User Experiment Pipeline Feedback of EM111

A description of the pipeline is available from the pipeline homepage.
The links will direct you to webpages containing:

- A series of plots produced by the pipeline which should be useful in assessing the antenna performance and data quality in each experiment. (see pipeline description for details).
- A set of calibration tables (in FITS format) produced by the pipeline. These can be down-loaded and applied to the data provided by the EVN correlator. (see the EVN Data analysis guide, available from the EVN user guide, for details).
- A history file associated with the data processed by the pipeline and a summary of what the CL/SN tables contain (typically CL table 2 provides the apriori amplitude calibration and CL table 3 provides phase, phase-rate, delay and emp gain solutions from the calibrators).
- The parseltongue pipeline script can be found here.
- In addition, the original pipeline script is made available, together with final versions of the ancillary data (ANTAB, UVFLG files etc).

To download all the pipeline products use: GNU wget. (manual).
It can be obtained from the web, if not available.
To get all pipeline products, copy next line to your commandwindow:

wget -t45 -l1 -r -nd http://archive.jive.nl/exp/EM111_140220/pipe -A "em111*"

Pipeline products of experiment EM111	
Pipeline plots.	
AIPS calibration tables (FITS Format)	
AIPS history file.	
Short summary of CL/SN table contents.	
Input parameters for script.	
Associated EVN calibration.	
Associated VLBA / VLA / GBT file.	(Not available)
UVFLG flagged data.	
UVFLG Band-edge Flagging.	(Not available)
The pipeline logfile.	
Pipeline-calibrated UV FITS files.	

Explained in the VLBI tutorial

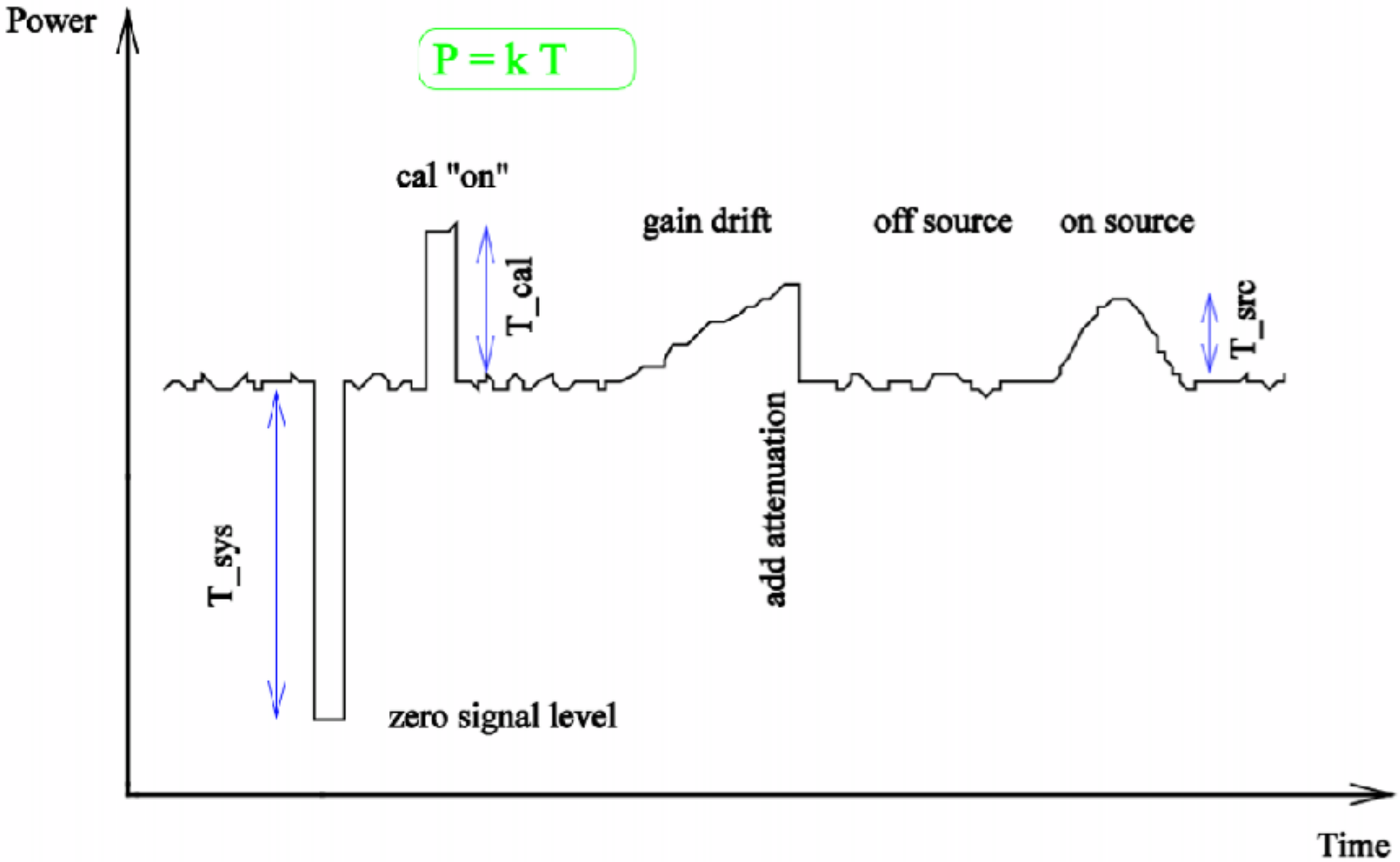
and in the EVN User Guide!

From here you can get your CL2 !

AMPLITUDE CALIBRATION

- You need to calibrate properly the amplitudes of all your antennas.
- In connected radio interferometers (e.g. VLA) you just observe a bright source with a well known, stable, flux density
- In VLBI this approach does not work anymore:
  - Sources must be really compact to not be resolved (mas scales)
  - This typically implies highly variable sources.
- You need to trust the system temperature ($T_{\rm sys}$) measurements performed by each antenna.

AMPLITUDE CALIBRATION



AMPLITUDE CALIBRATION

- In EVN observations all this process takes place in the background for the user.
- We create an ANTAB file that contains all the T_{sys} measurements and the System Equivalent Flux Density (SEFD).
- The EVN pipeline takes this information and generates the CL2.

- However there are some caveats:
  - *Poorly accurate* values for some antennas.
  - Only estimated for some of them.

THE EVN PIPELINE

Pipeline

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Pipeline-calibrated UV FITS files.	

THE EVN PIPELINE

General Commen
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pipelining results.
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Gain amplitude fr

Fringe-fit phase s
Comments.
CL3 station phase

Residual closure phase (visibility closure phase with model closure phase subtracted) for:
J0619+0736 .
DA193 .
J0632+057 (not available) .
0528+134 .
Comments.
Separate files per (fringed) source, showing closure phase plots for all the triangles (not just Ef-*-*). Only stokes=I shown.

Calibrated visibilities and the source model of:
J0619+0736 .
DA193 .
J0632+057 (not available) .
0528+134 .
Comments.
For the fringed source, plots of amp/phase on Ef-* baselines, calibrated with (post-SPLIT) table CL3, with a model-line overplotted.

Calibrated visibilities against *u,v* distance for:
J0619+0736: pdf , or png .
DA193: pdf , or png .
J0632+057: pdf , or png .
0528+134: pdf , or png .
Comments.
For each source, a plot of amp vs. luvl distance.

u,v coverage for:
J0619+0736: pdf , or png .
DA193: pdf , or png .
J0632+057: pdf , or png .
0528+134: pdf , or png .
Comments.
For each source, a plot of the u-v coverage.

Crude maps of sources:
J0619+0736: pdf , or FITS .
DA193: pdf , or FITS .
J0632+057: pdf , or FITS .
0528+134: pdf , or FITS .
Comments.
For each source, a CLEAN map resulting from the automated fringing and self-cal iterations in the pipeline script.

points. Here it is the
finders and bandpass

Sh=1, Hh=1, Ro=1) .

and Ur (LL).

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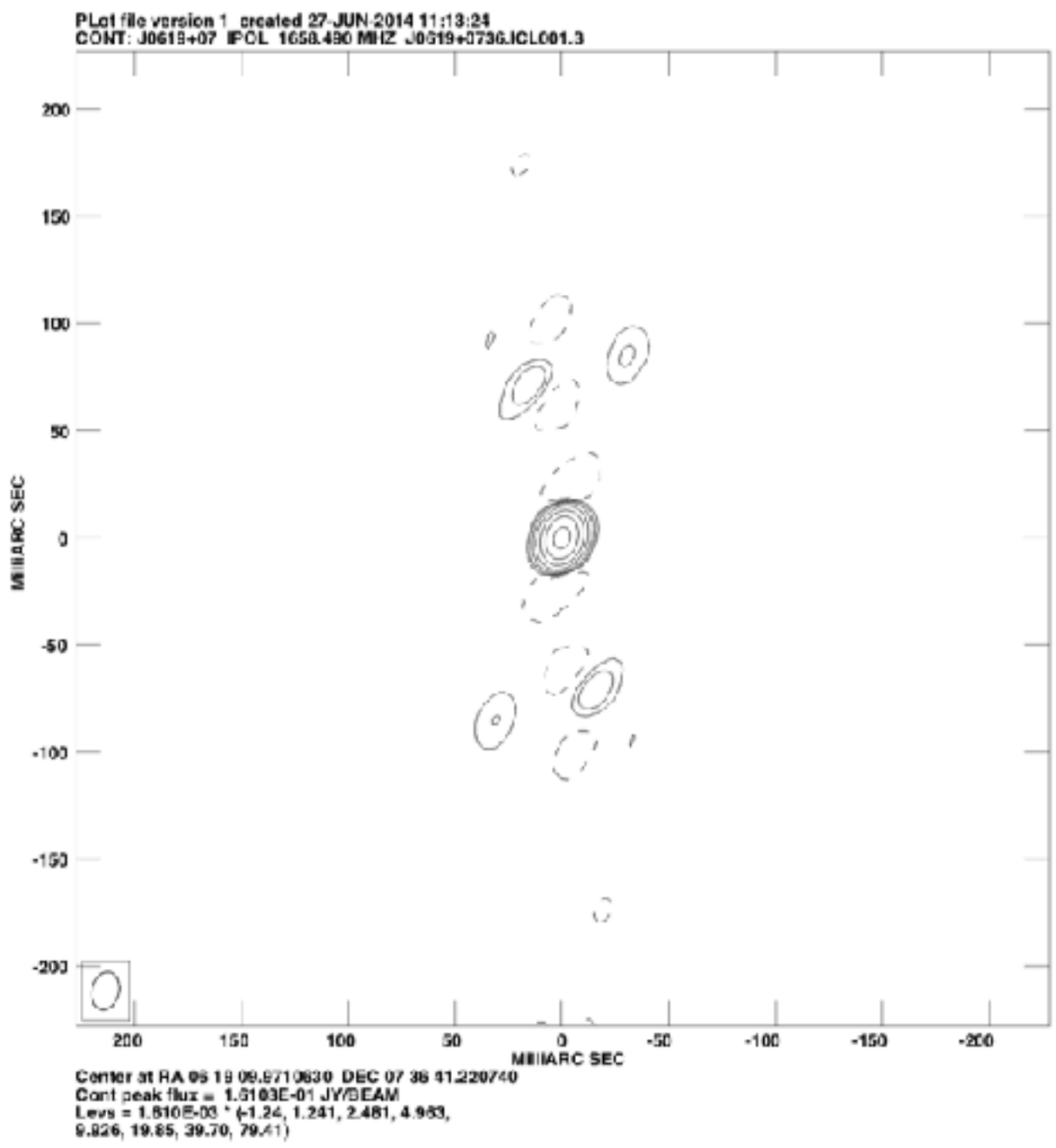
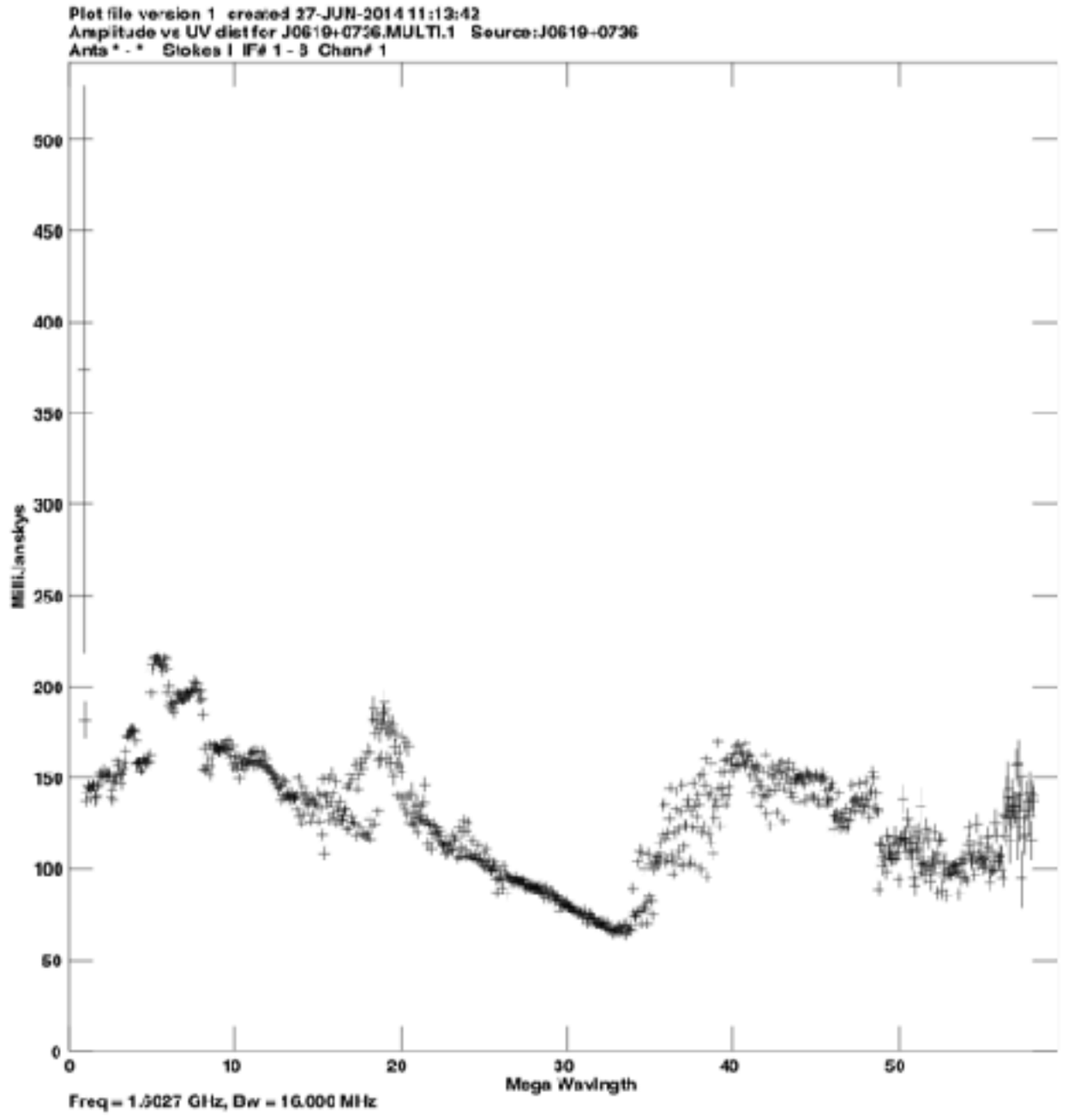
from SN2.

THE EVN PIPELINE



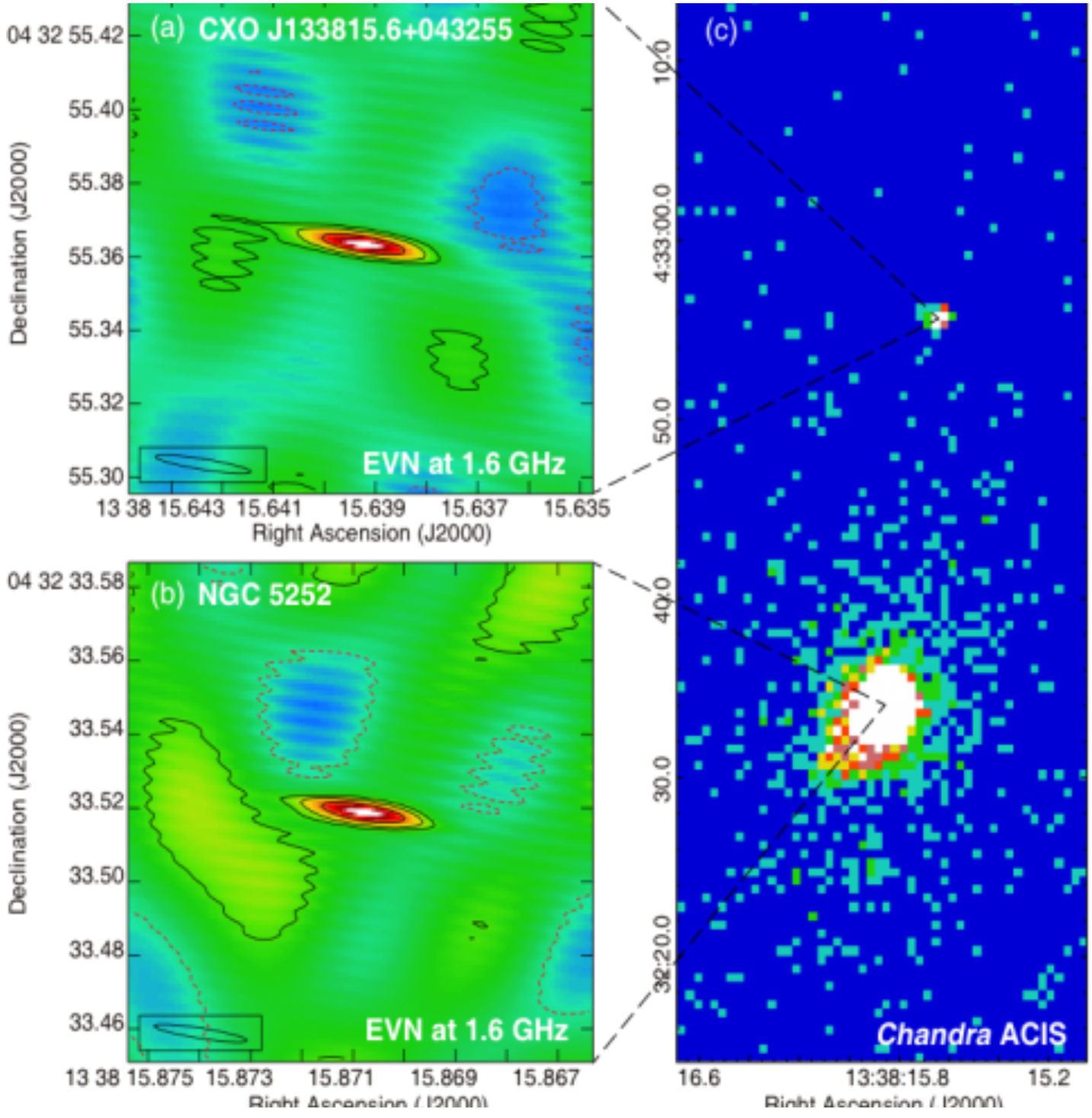


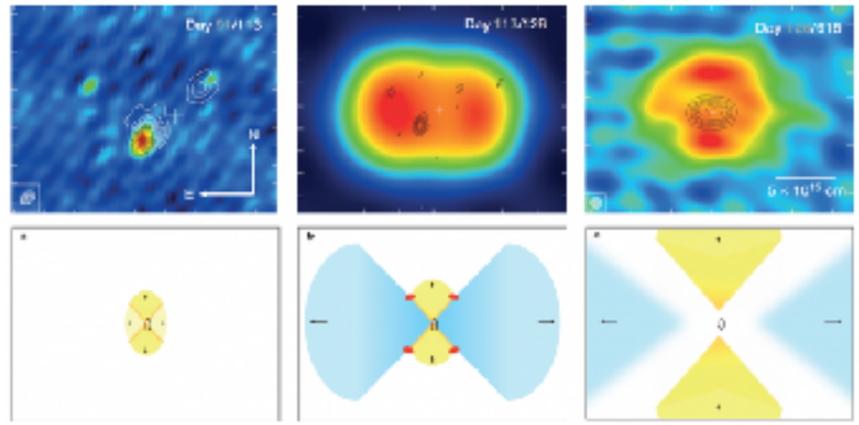
THE EVN PIPELINE

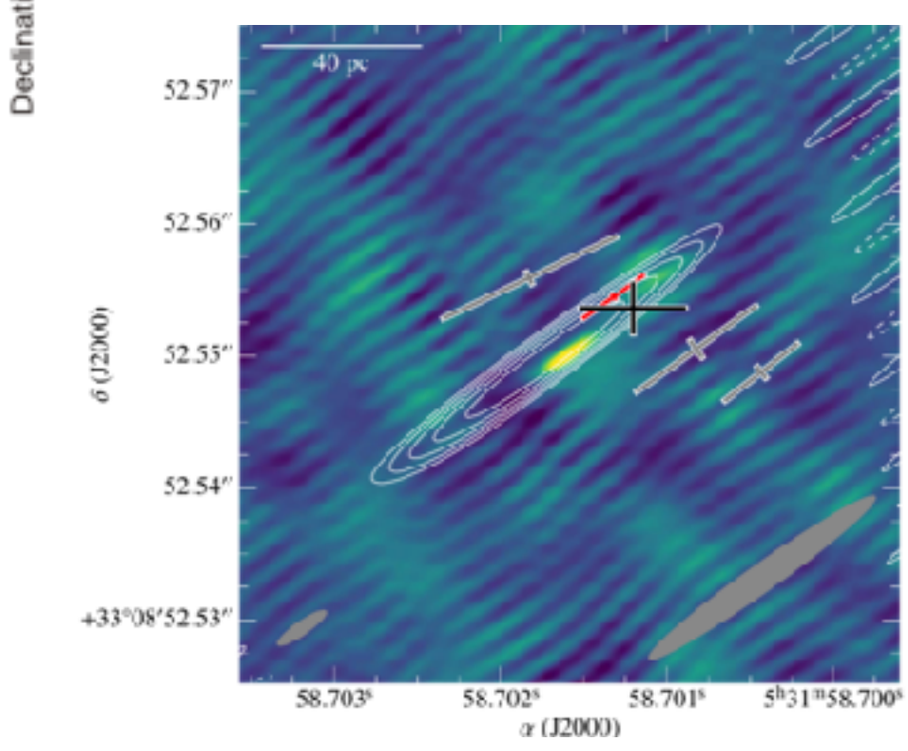
- You can use the EVN pipeline to get an estimation of the results that you can expect from your data.
- It is very useful to identify problems that you could spot (or not) during your manual calibration.

However!

- The EVN pipeline does not flag your data for RFI.
- It does not perform ionospheric/tropospheric corrections.
- An *automatic* self-calibration is performed in your calibrators.
- That is why you always need to do a manual calibration!







Then your data will be ready to be published!

…or ask your EVN support scientist for help!!