VERA Users Meeting on 28 September 2011

AIPS/ParselTongueスクリプトを使ったVERAデータ解析

VERA data analysis using ParselTongue scripts in AIPS

今井　裕　Hiroshi Imai
（鹿児島大学大学院理工学研究科物理・宇宙専攻）
Graduate School of Science and Engineering, Kagoshima University

AIPS data analysis using ParselTongue / Python scripts

- ParselTongue: Developed in JIVE
  - Function library controlling AIPS tasks /verbs
  - Control AIPS with Python scripts from outside of POPS

  Including adverb setting, task executing, and catalog file control

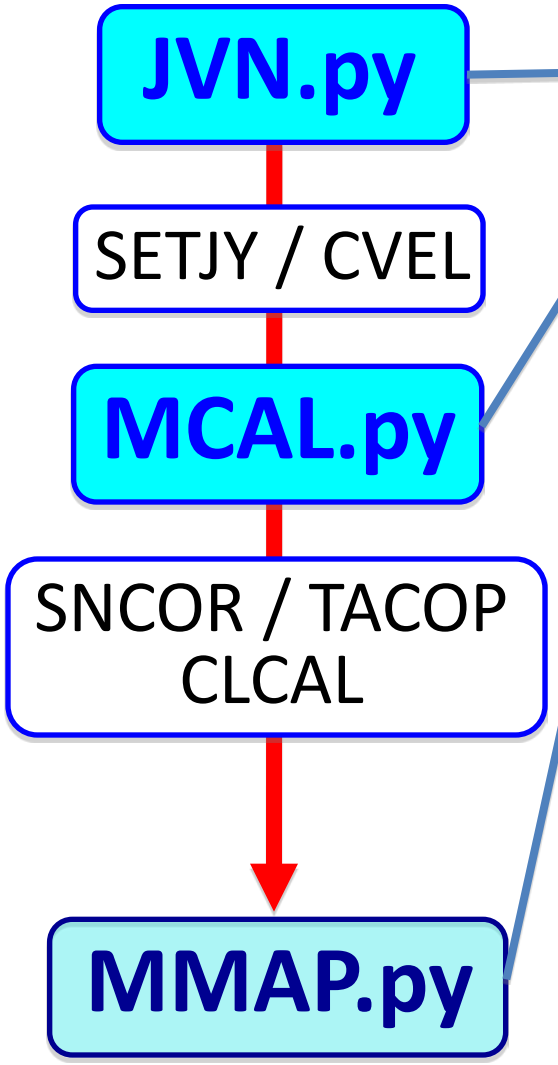
  - **Bigger advantage than AIPS POPS**

  Editing parameter files out of AIPS with shell commands

  - Very long, complicated processing with long scripts
- Script development for VERA / JVN (2009-2011)
  - **Source files are now opened in VCON Wiki**

  http://milkyway.sci.kagoshima-u.ac.jp/groups/vcon_lib/
  - Pseudo full-automatic data calibration including ϕ-referencing
  - Automatic production of maser source image cubes

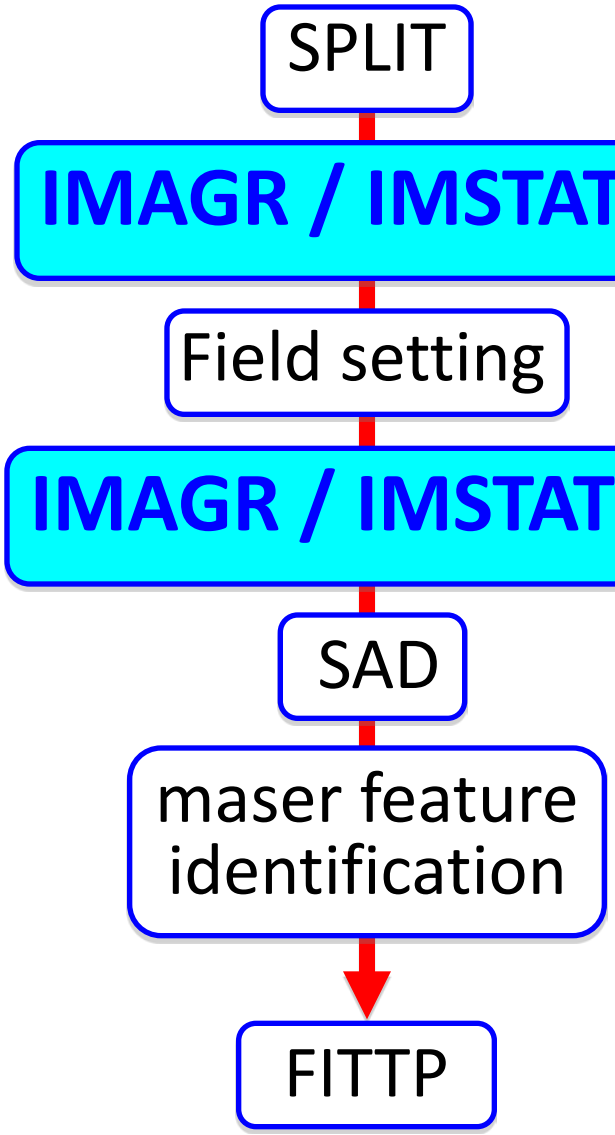
Data reduction for maser source with AIPS



jvn_funcs.py, jvn_aips_tasks.py

- **JVN.py:** fundamental calibration, continuum source imaging
- Doppler velocity tracking
- **MCAL.py:** calibration for maser source
- Data calibration for VERA astrometry (if necessary)
- **MMAP.py:** wide-field, automatic mapping of maser source

Automatic, wide-field maser source mapping



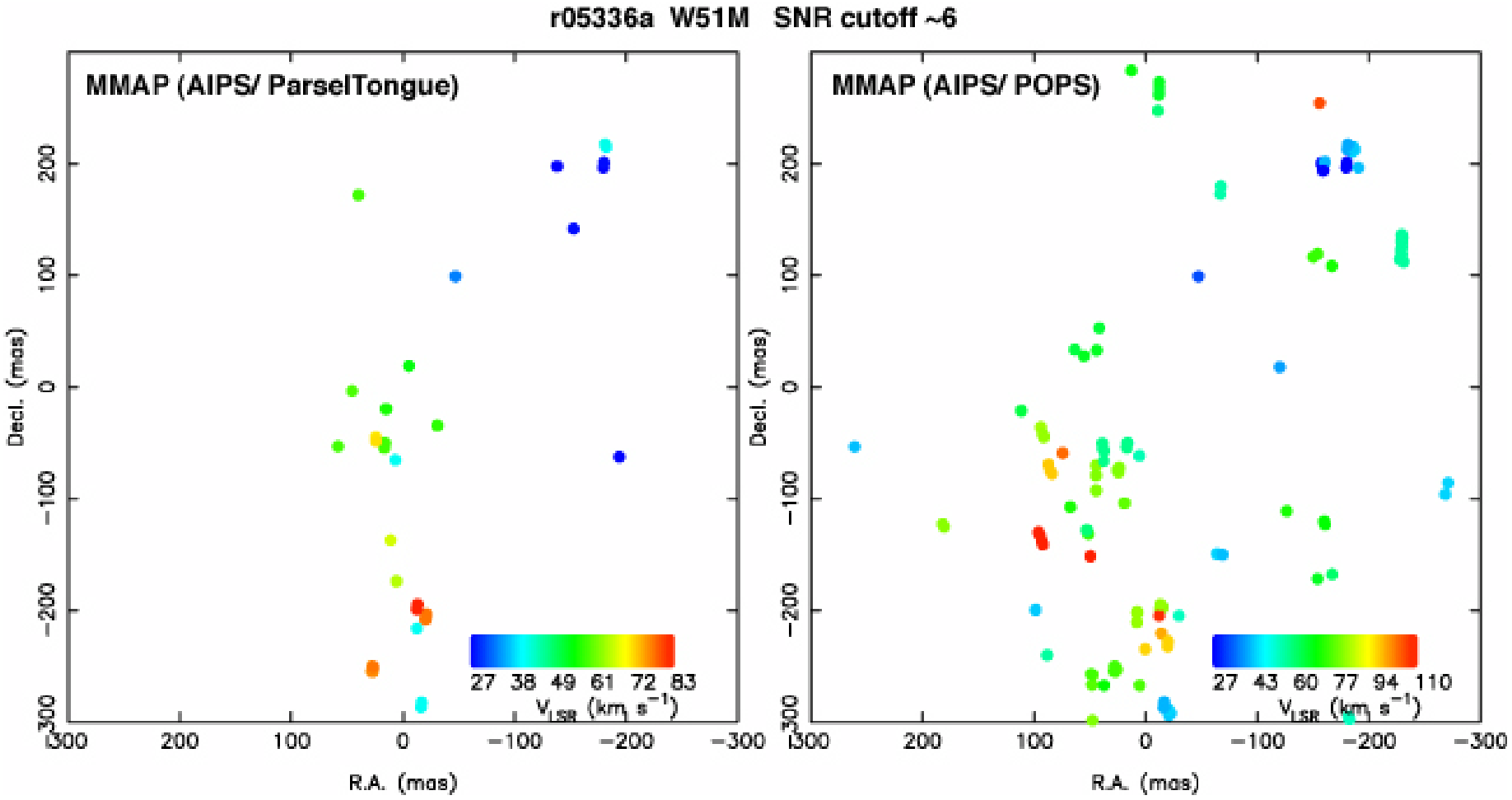
XXX iterative process

e.g. CLEAN box setting

(*I* > SNR cutoff x *N*)

- Selecting mapped velocity channels
- Maser spot search
  - Using larger grid (~1/2 beam size)
  - Multiple fields from beginning
  - **Iterative setting of CLEAN boxes**
- Final selection of mapped 3D fields
- Multi-field, iterative CLEAN
  - **Iterative setting of CLEAN boxes**
- Gaussian fitting to maser spots
- Identification of maser features
- FITS outputs from image cubes

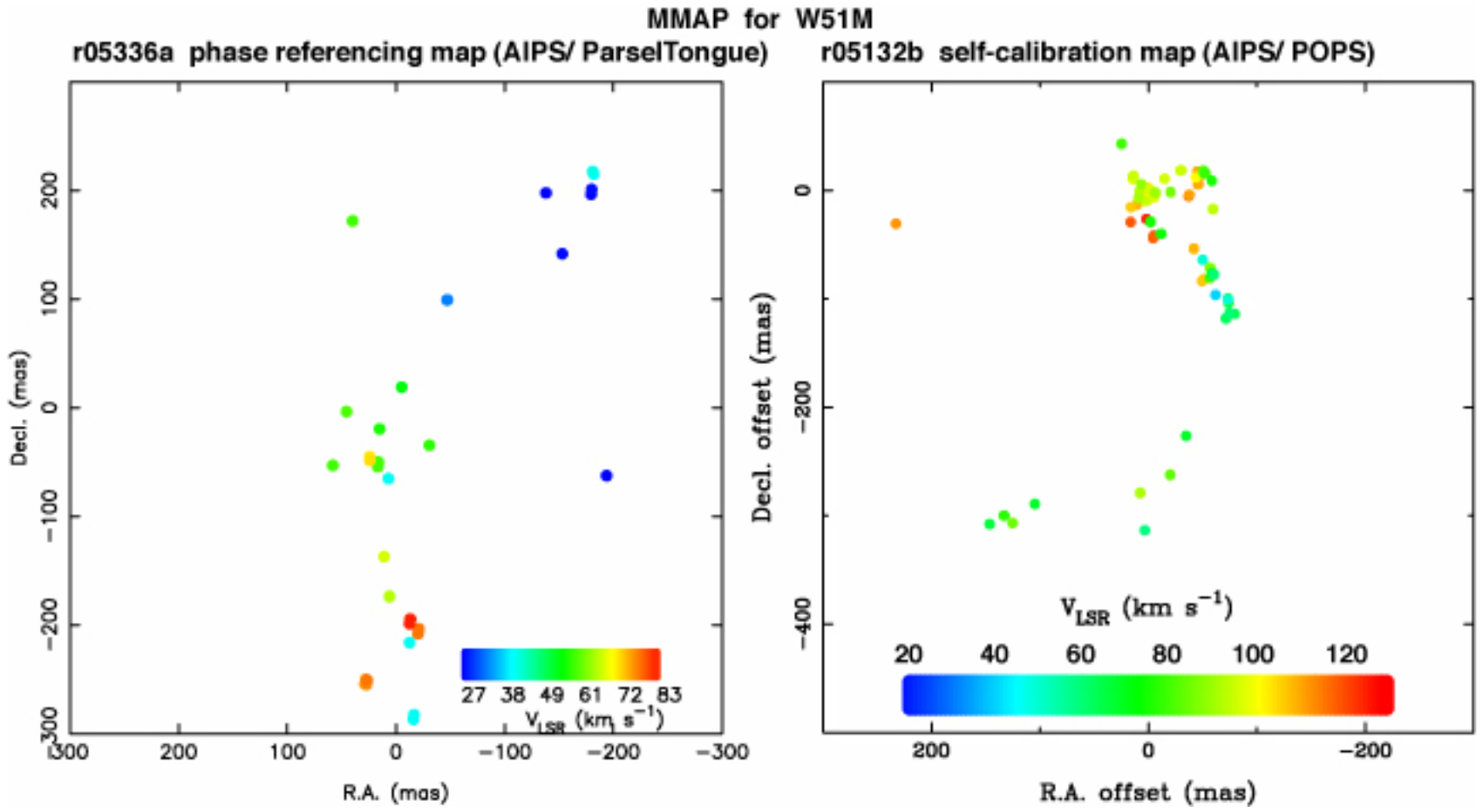
MMAP (ParselTongue v.s. POPS)



Reducing false maser spot identifications

More time consuming due to iterative CLEAN process

Phase referenced v.s. self-calibrated images (W51M)



Remained issue: maser spot identification across velocity channels with “false spot pattern”

Future perspectives of ParselTongue / Python scripts

- Toward efficient data processing
  - Automatic / daily fundamental processing
  - Users manual should be prepared by users themselves.
  - Scripts for several modes of phase referencing
- Application to JVN / EAVN
  - Polarimetry
  - Processing for maser source movie
    (excluding annual-parallactic motion)
- VLBI data processing in CASA
  - CASA scripts is written in Python.
  - VLBI modules in CASA now in construction @JIVE