



# ARTA for radio interferometry

## Focus on 3D Image Visualization

Pikky Atri  
Staff scientist, WISE Fellow  
JIVE VLBI School - 2025

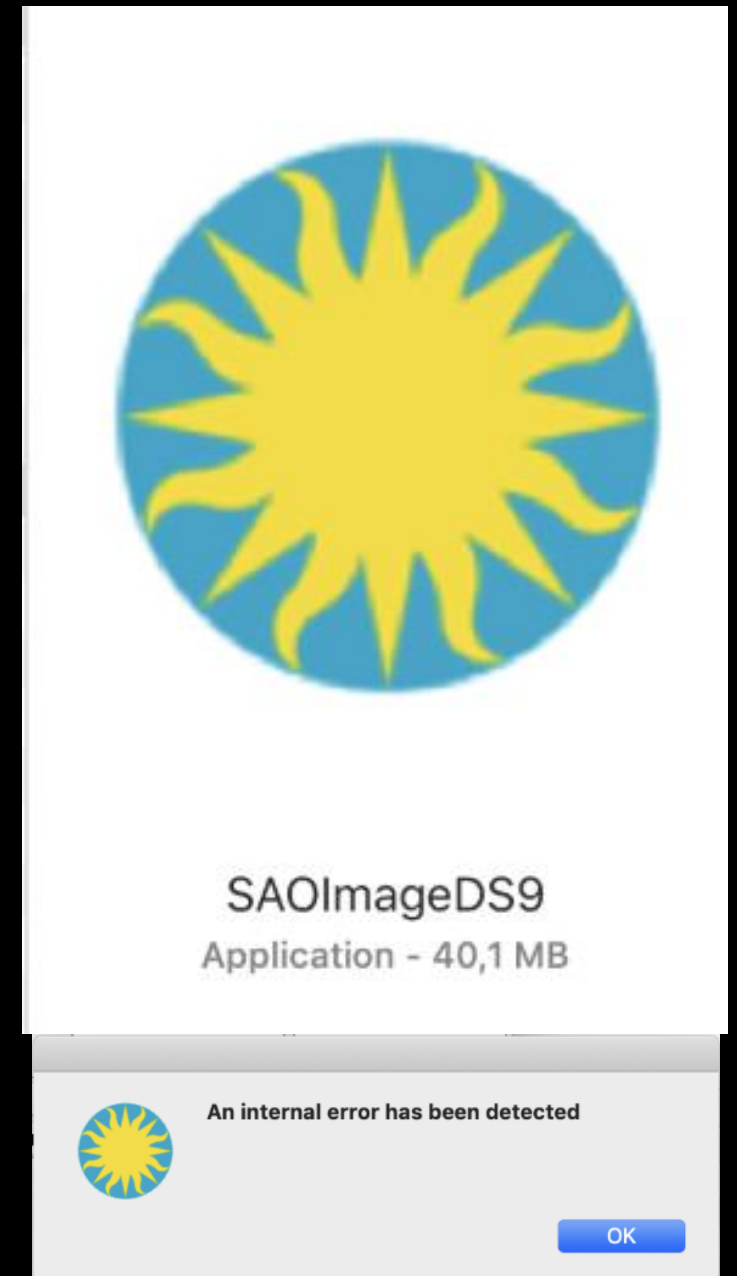
ASTRON

Radboud Universiteit



# Why CARTA?

- If not, then DS9?
- Transition to HPC for data analysis
- Using DS9 over ssh is slow
- Impossible for interactive color scaling
- File size >500 MB for standard MeerKAT images
- Traditional tools weren't built for modern data sizes
- We need web-based, GPU-accelerated solutions
- Summary of CARTA capabilities

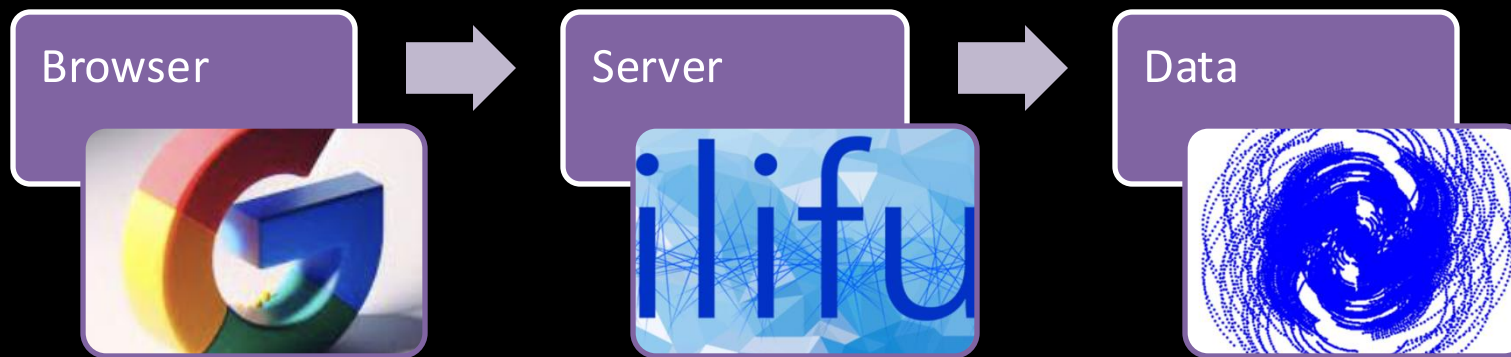


# What is CARTA?

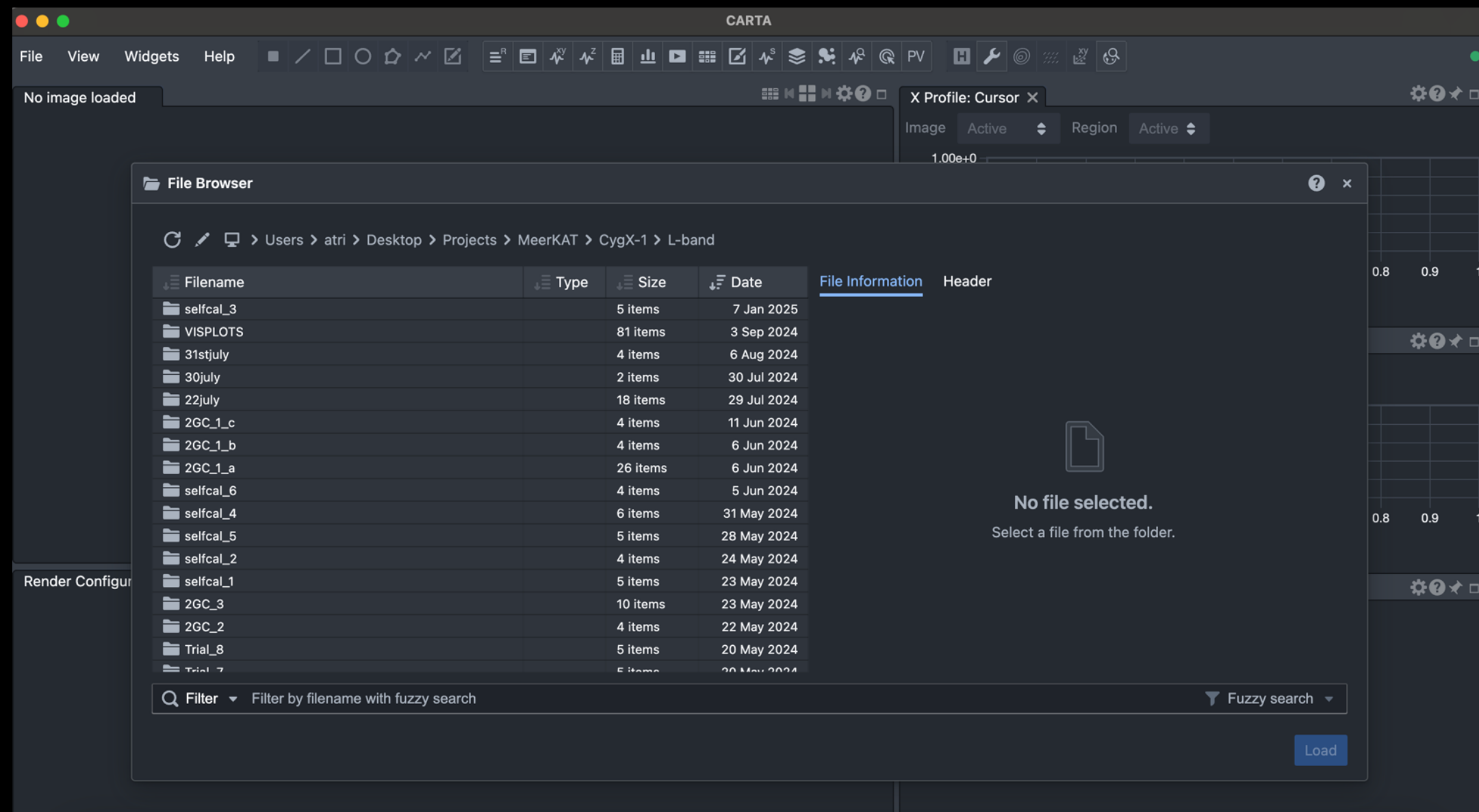
- GPU acceleration
- Handles TB-scale data
- Developed specifically for radio astronomy
- No installation needed - just a browser
- Server does heavy lifting
- Supports (FITS, CASA, HDF5)

## CARTA

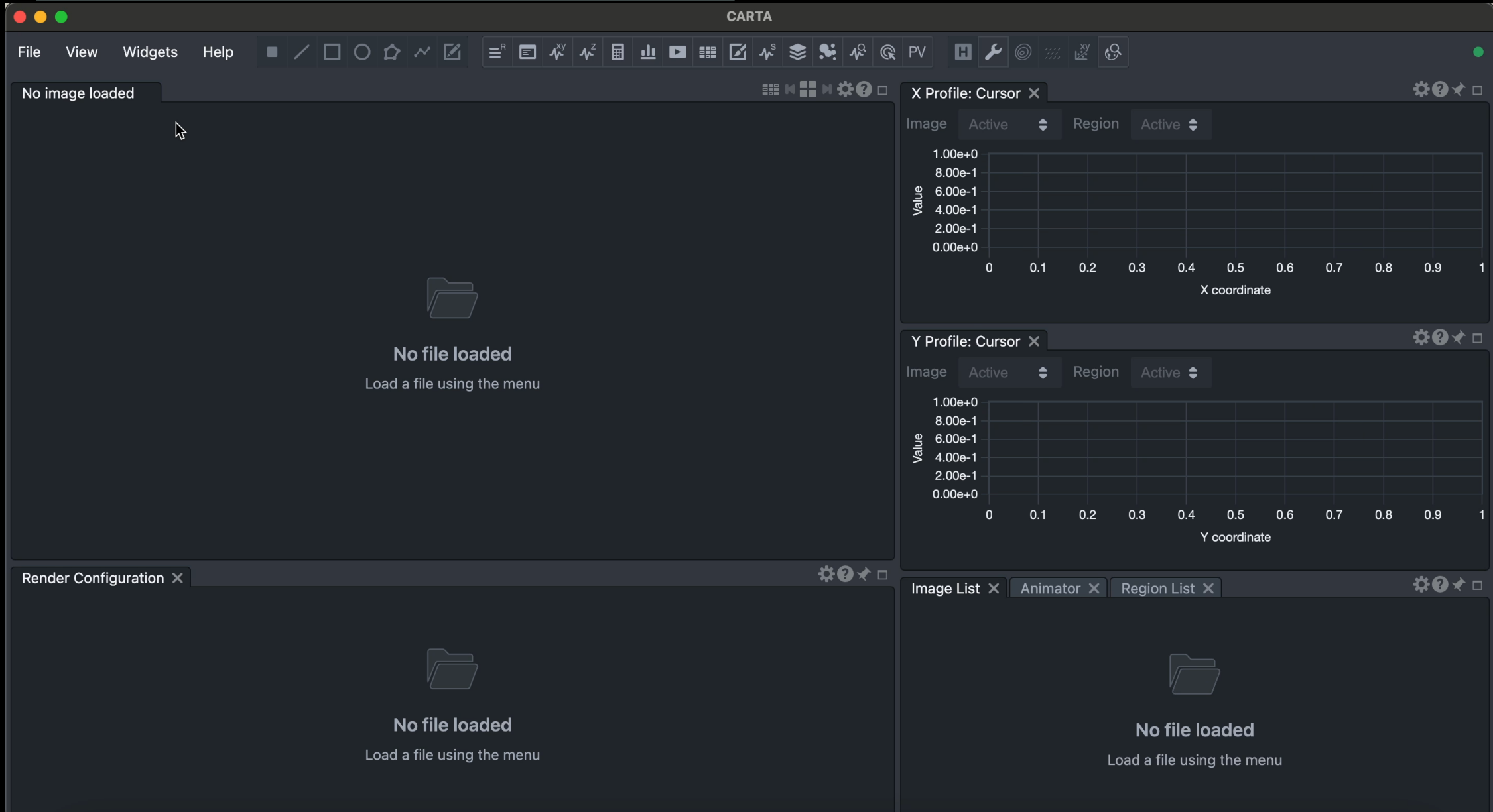
Cube Analysis and Rendering Tool for Astronomy, is a next-generation image visualization and analysis tool designed for ALMA, VLA, and SKA pathfinders.



# Getting Started - The Interface



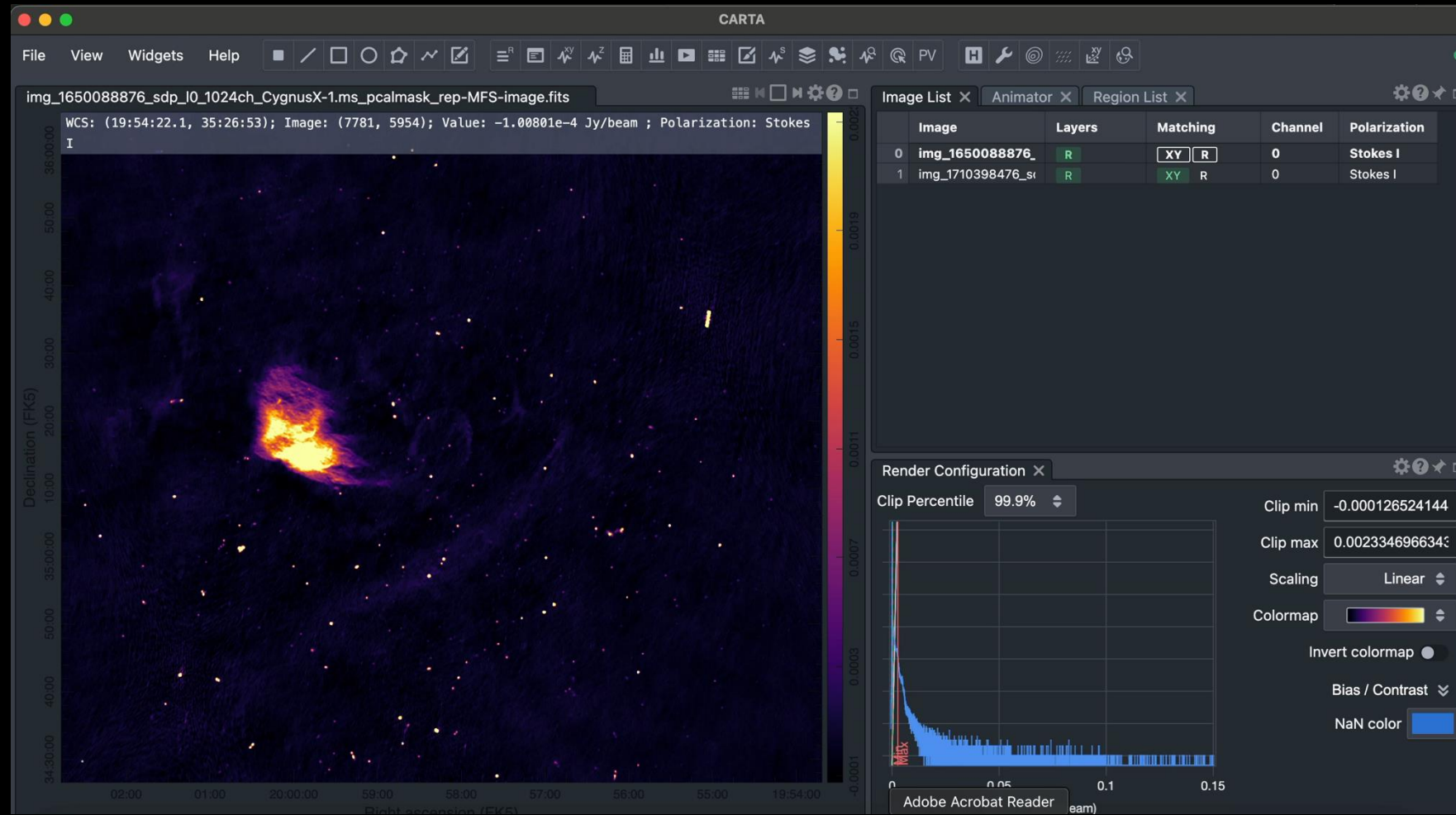
# Making your images pop





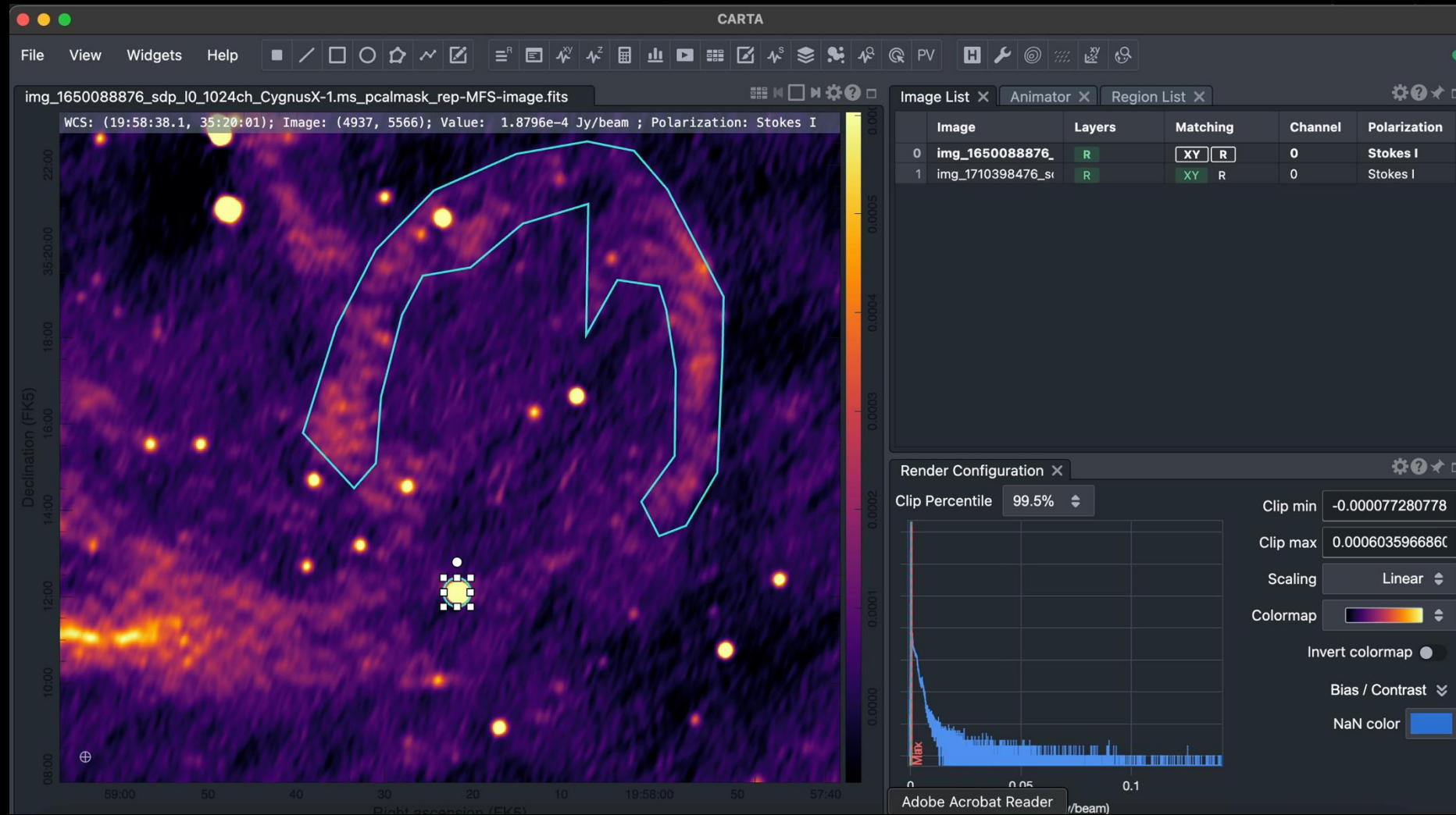
# Region analysis

- Creating regions
- Region statistics



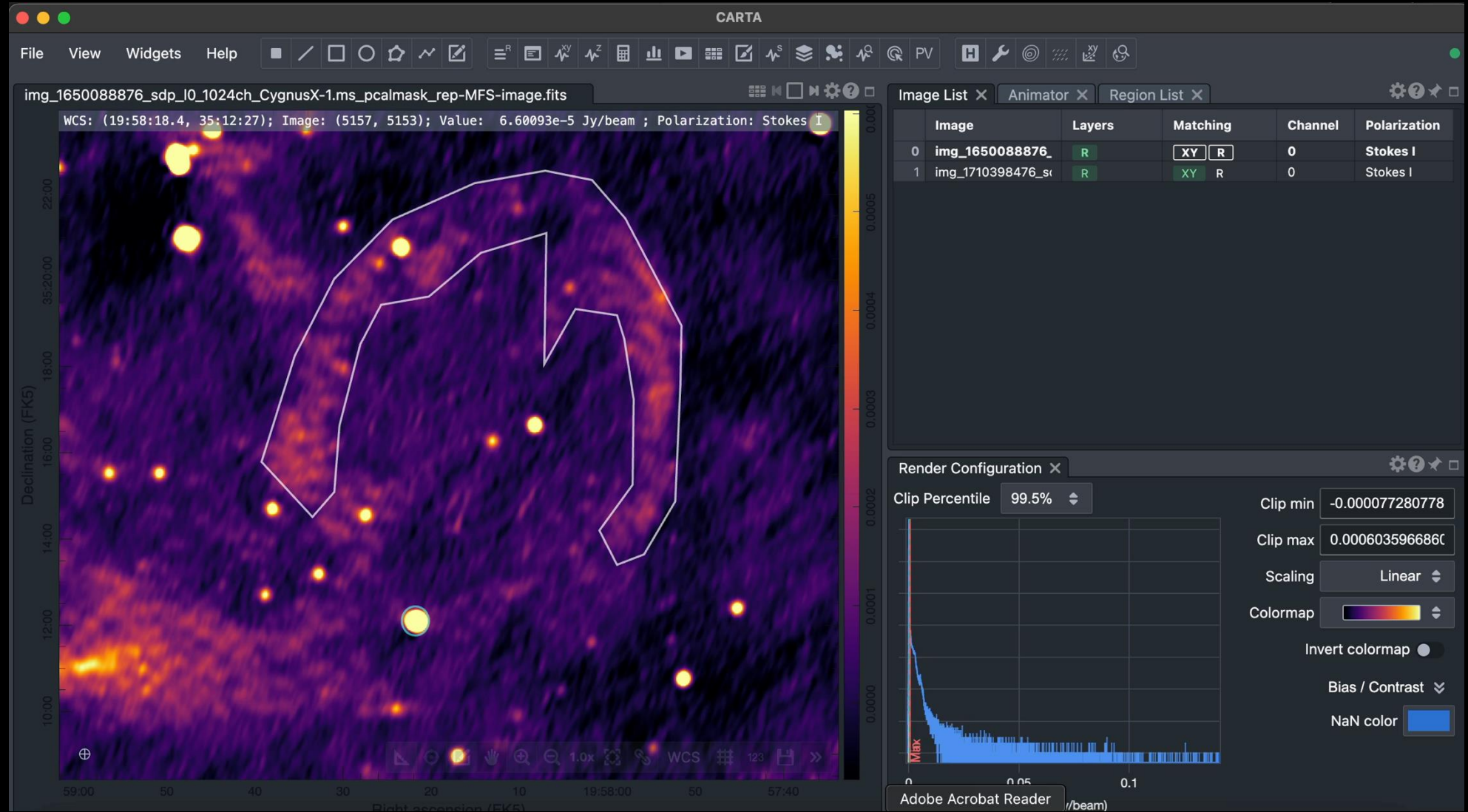
# Region analysis

- Region list
- Export/import



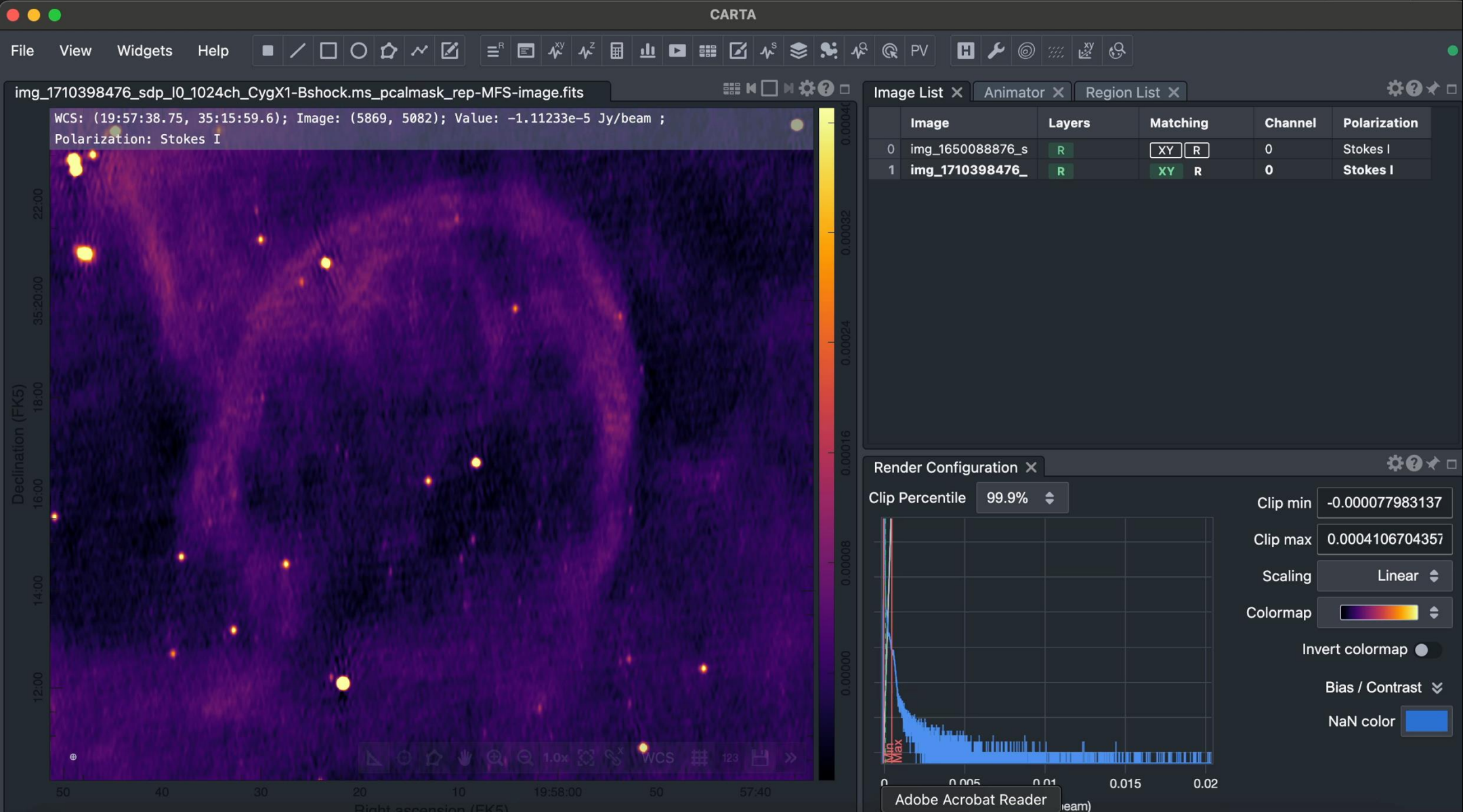
# Region analysis

- Geometric distance



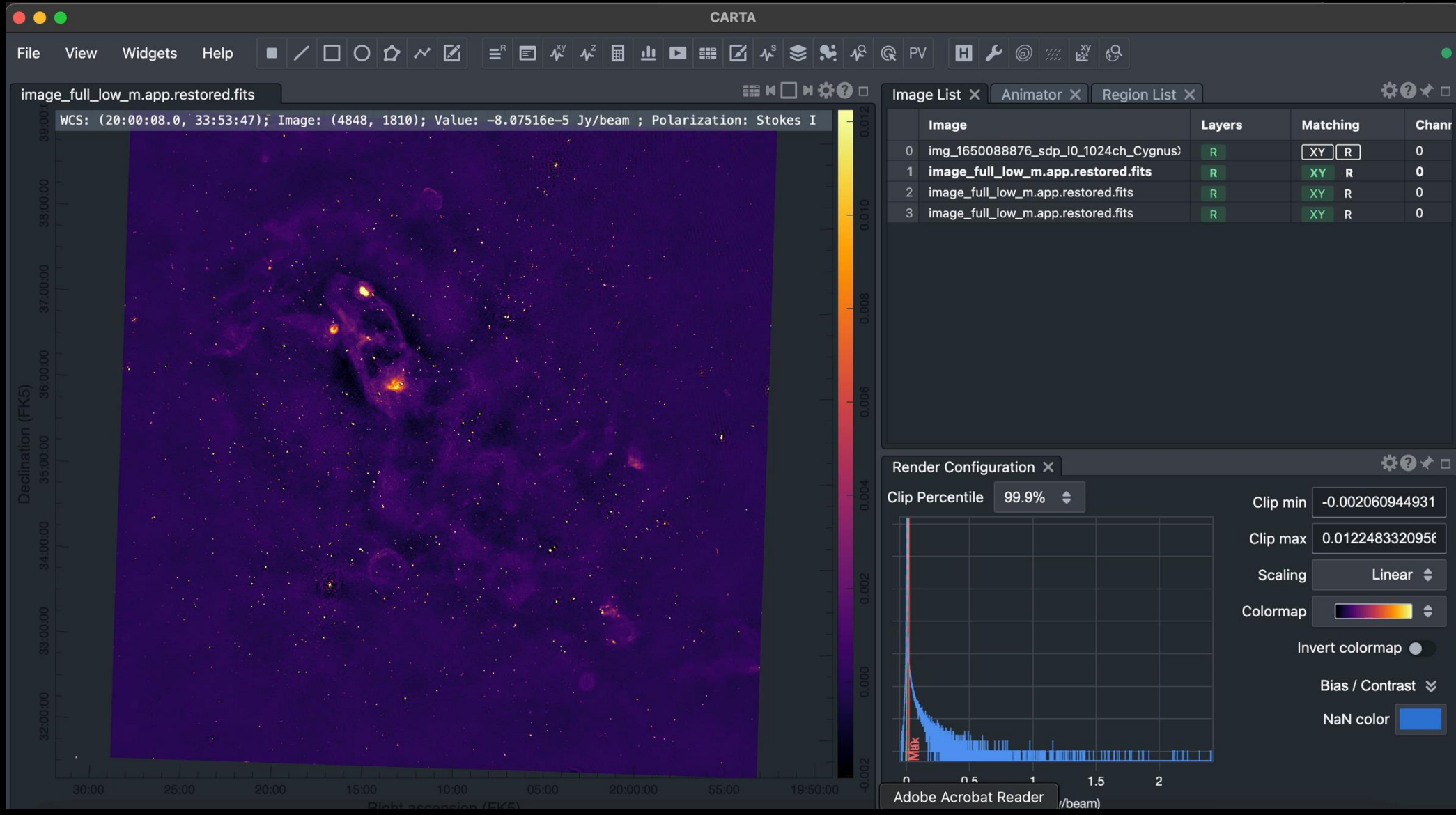


# Contouring

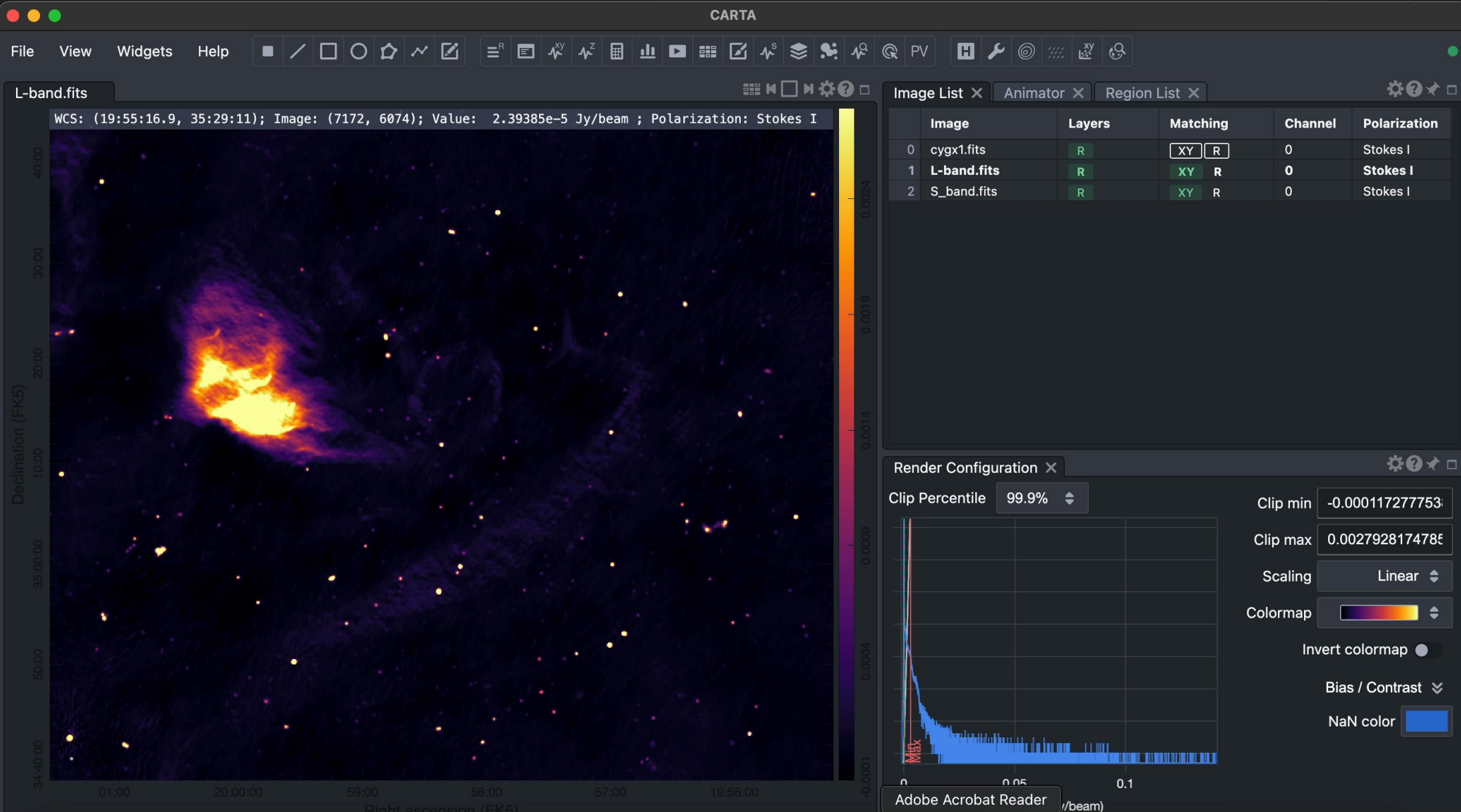


# Multi-panel view

## - Animator

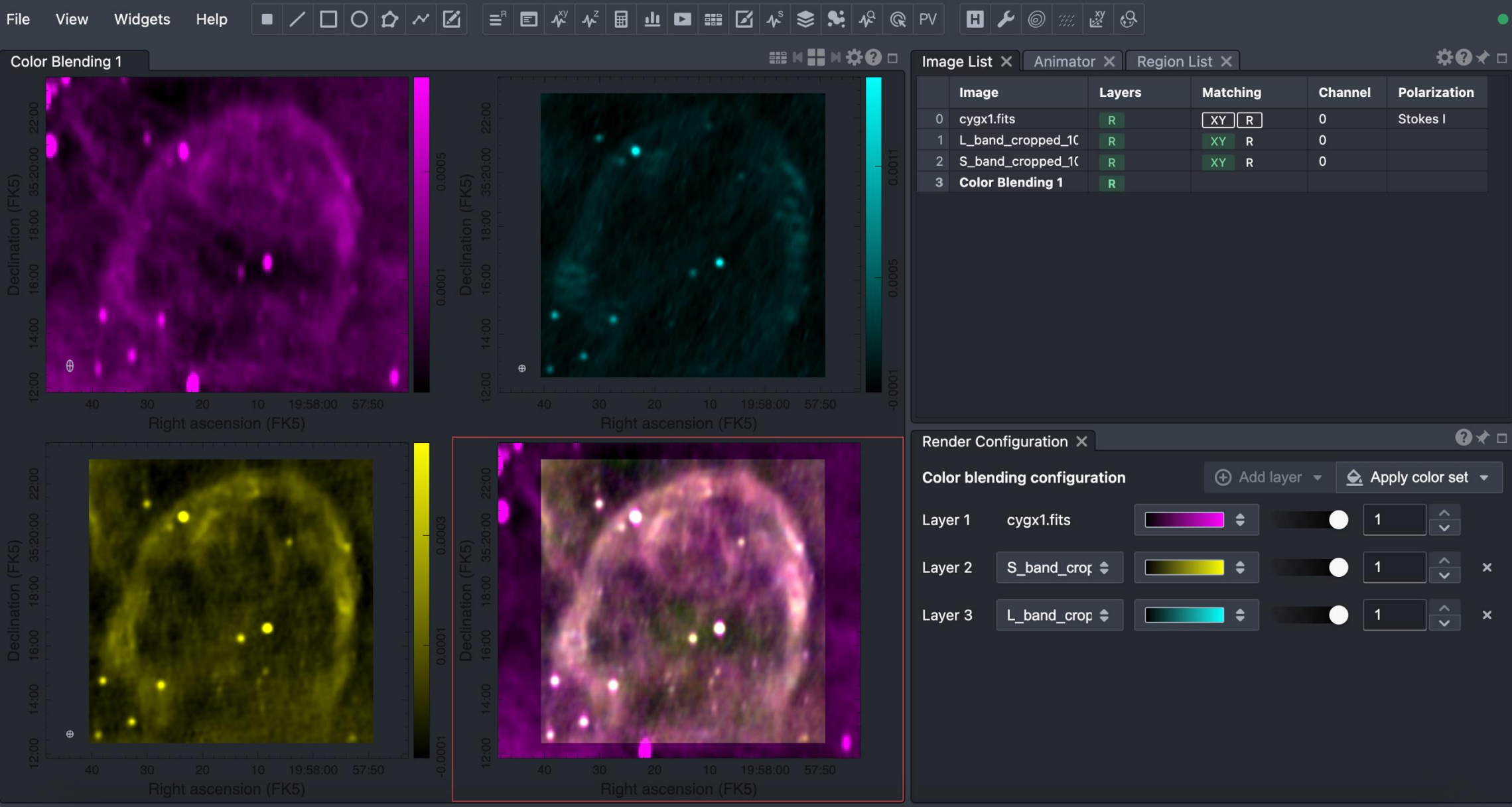


# Colour cocktail



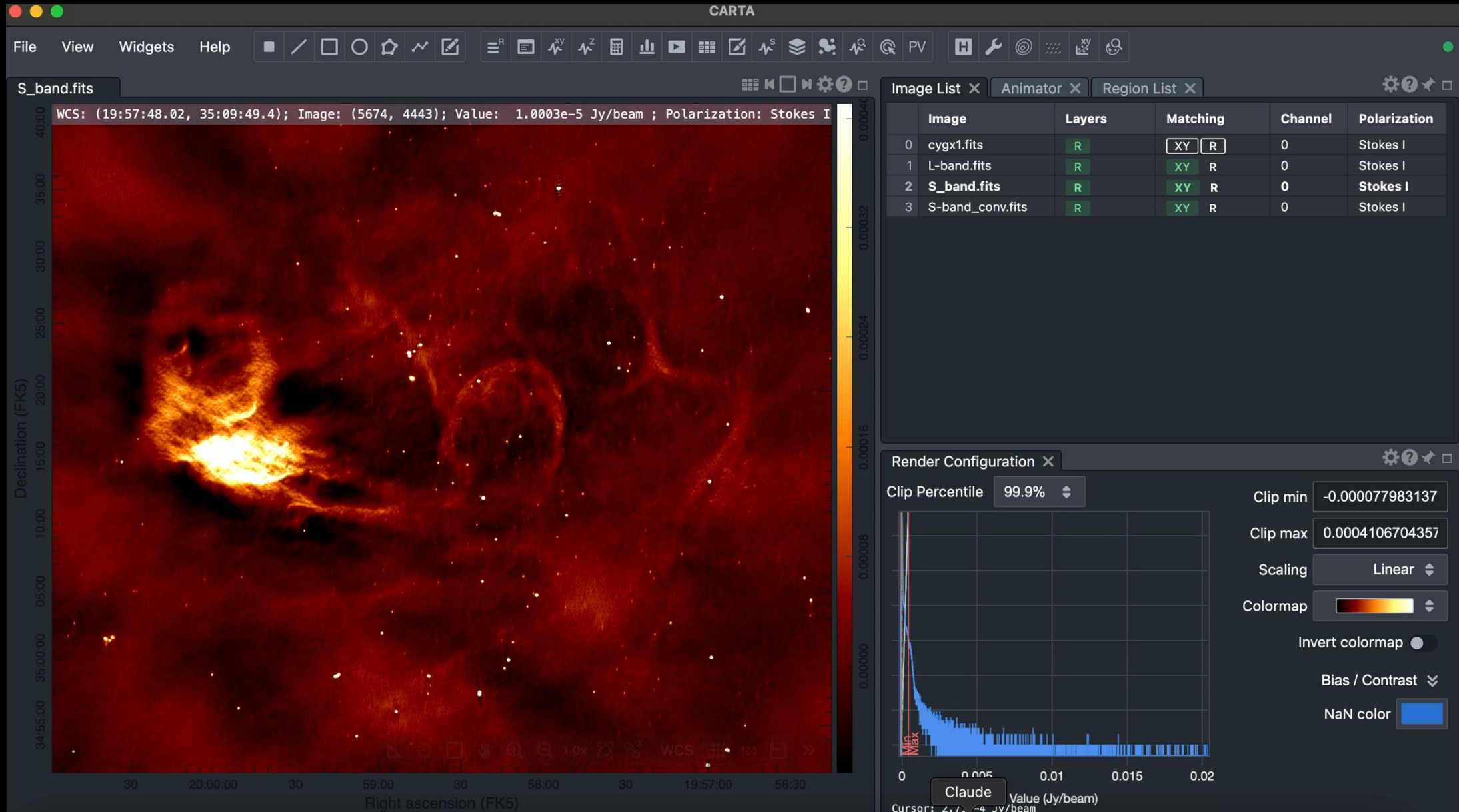


# Colour cocktail

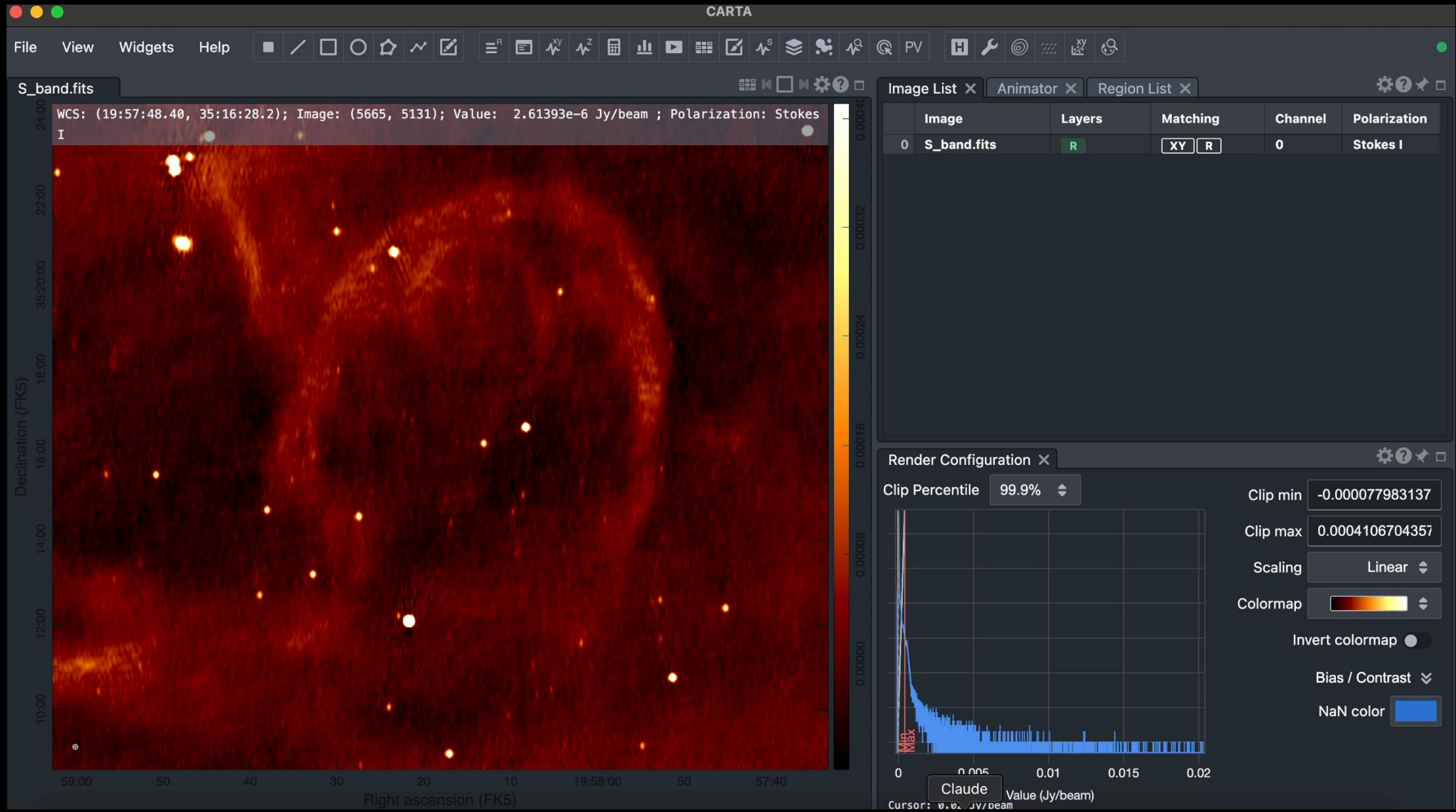




# Image arithmetic

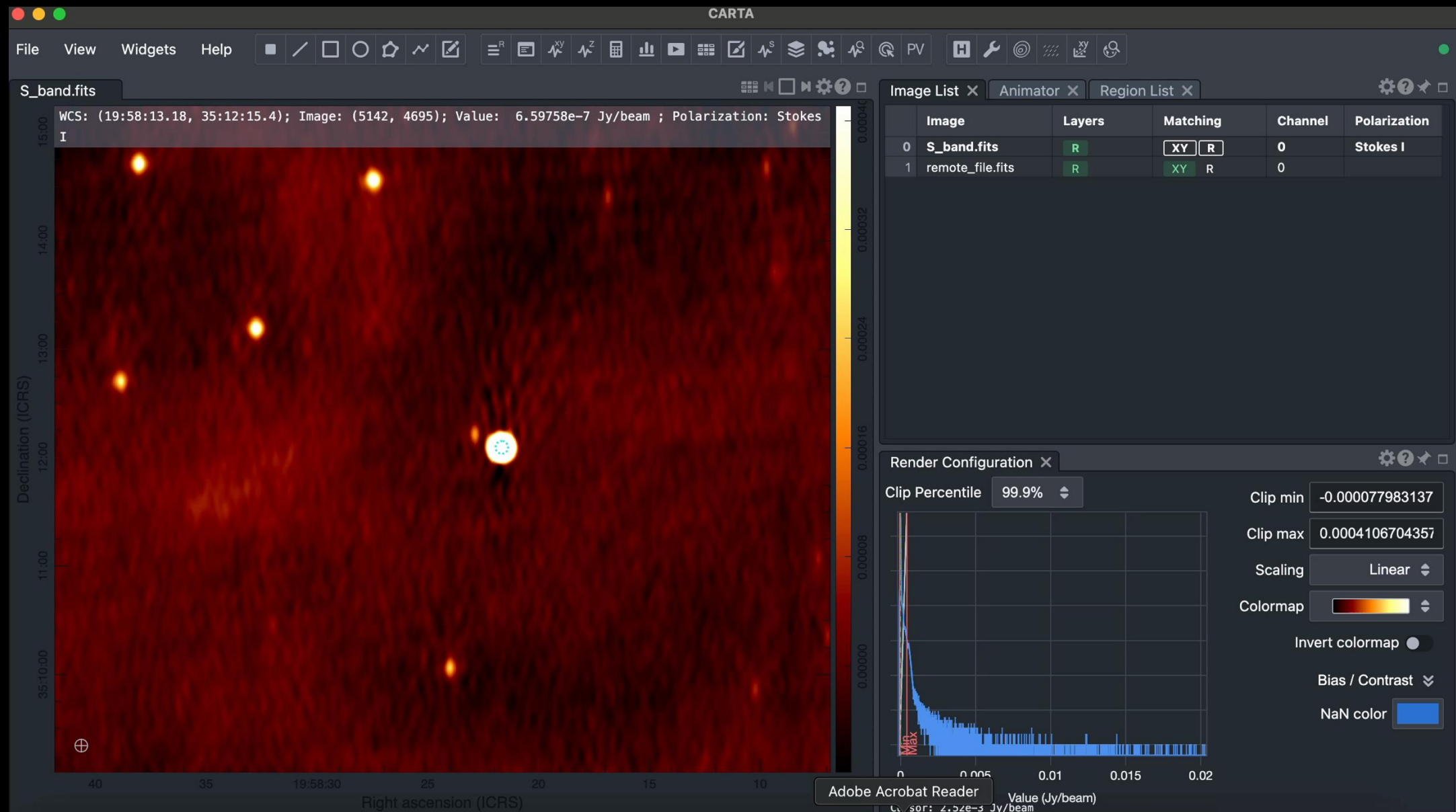


# Image fitting

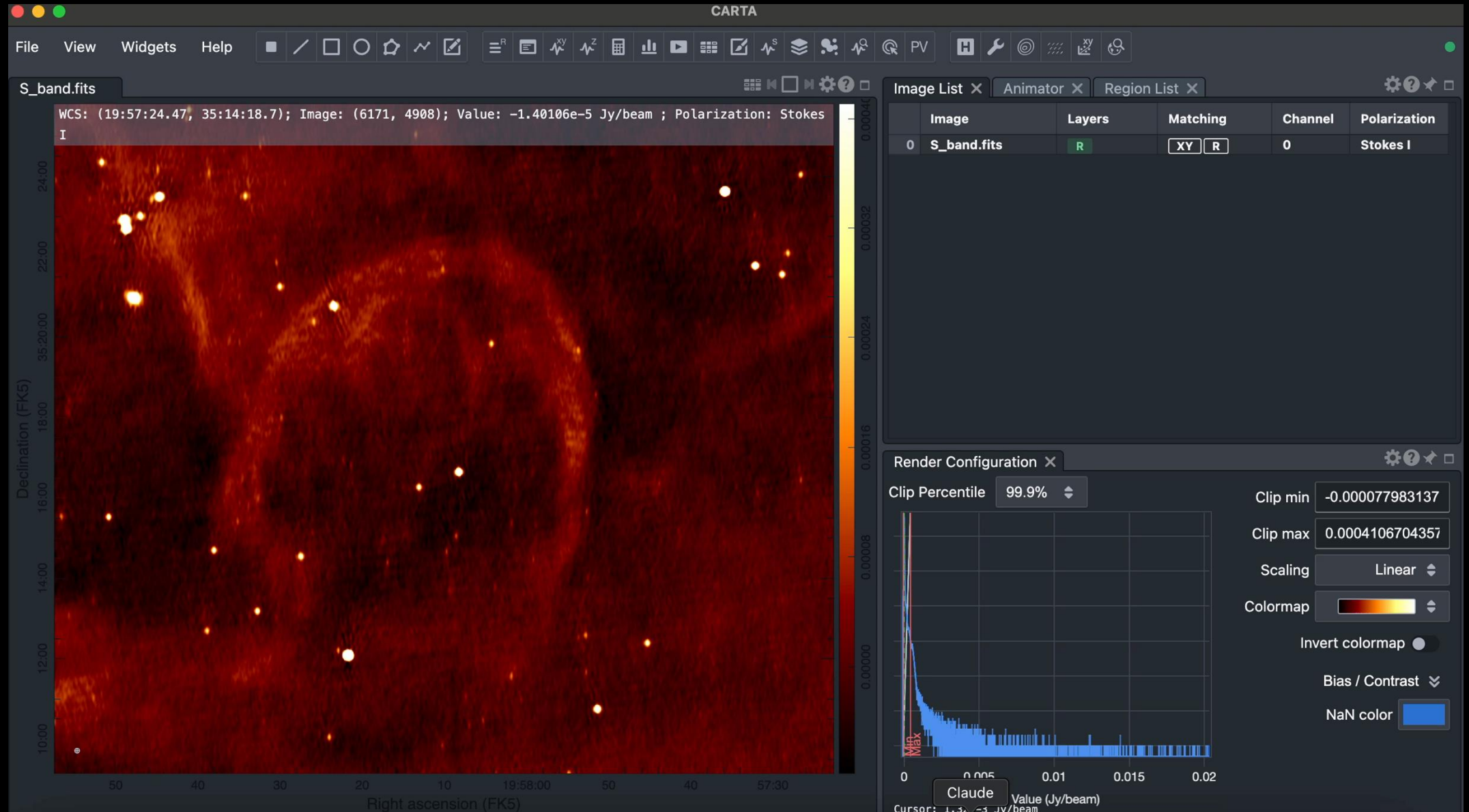




# Online database query

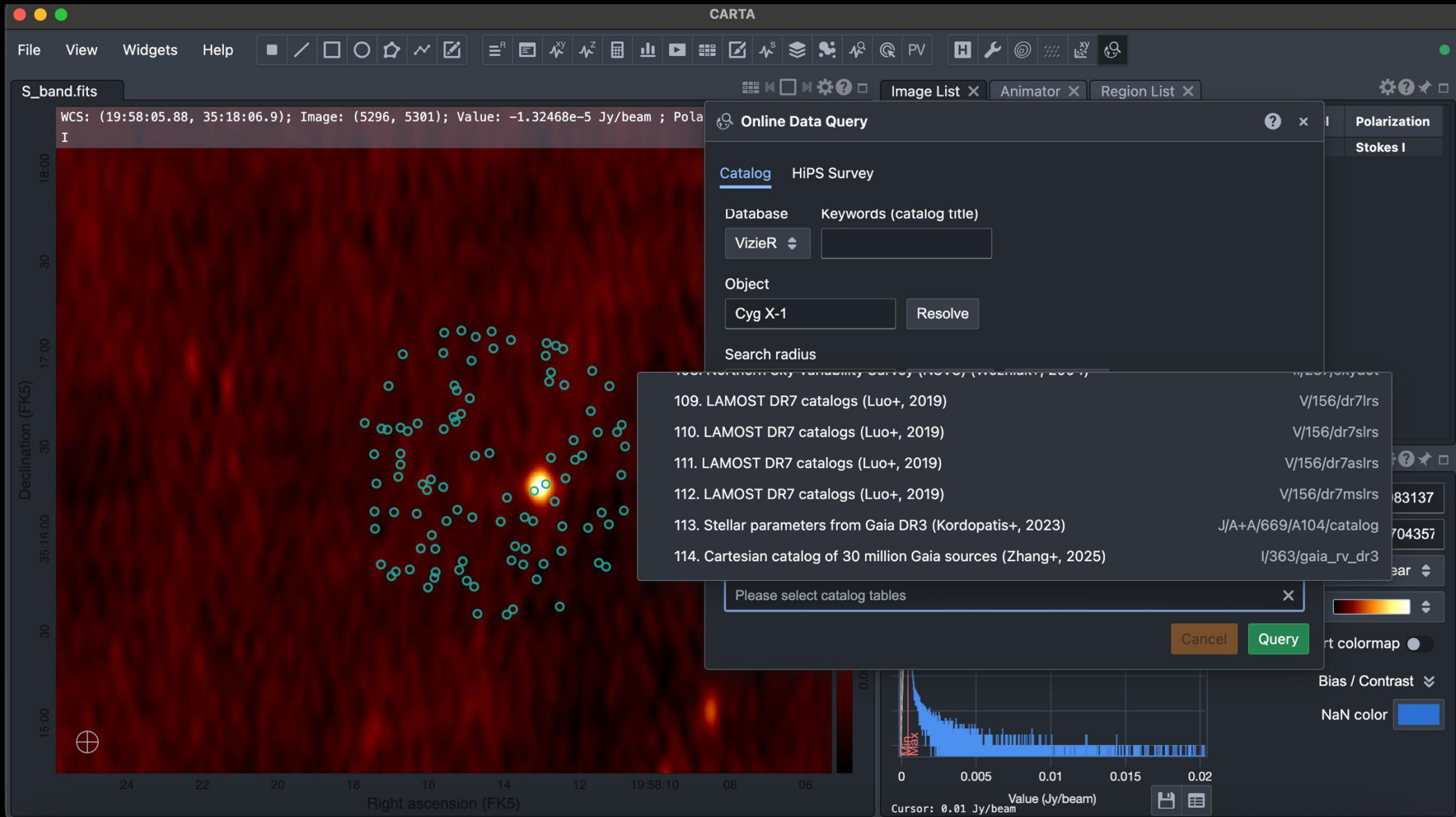


# Online database query - SIMBAD

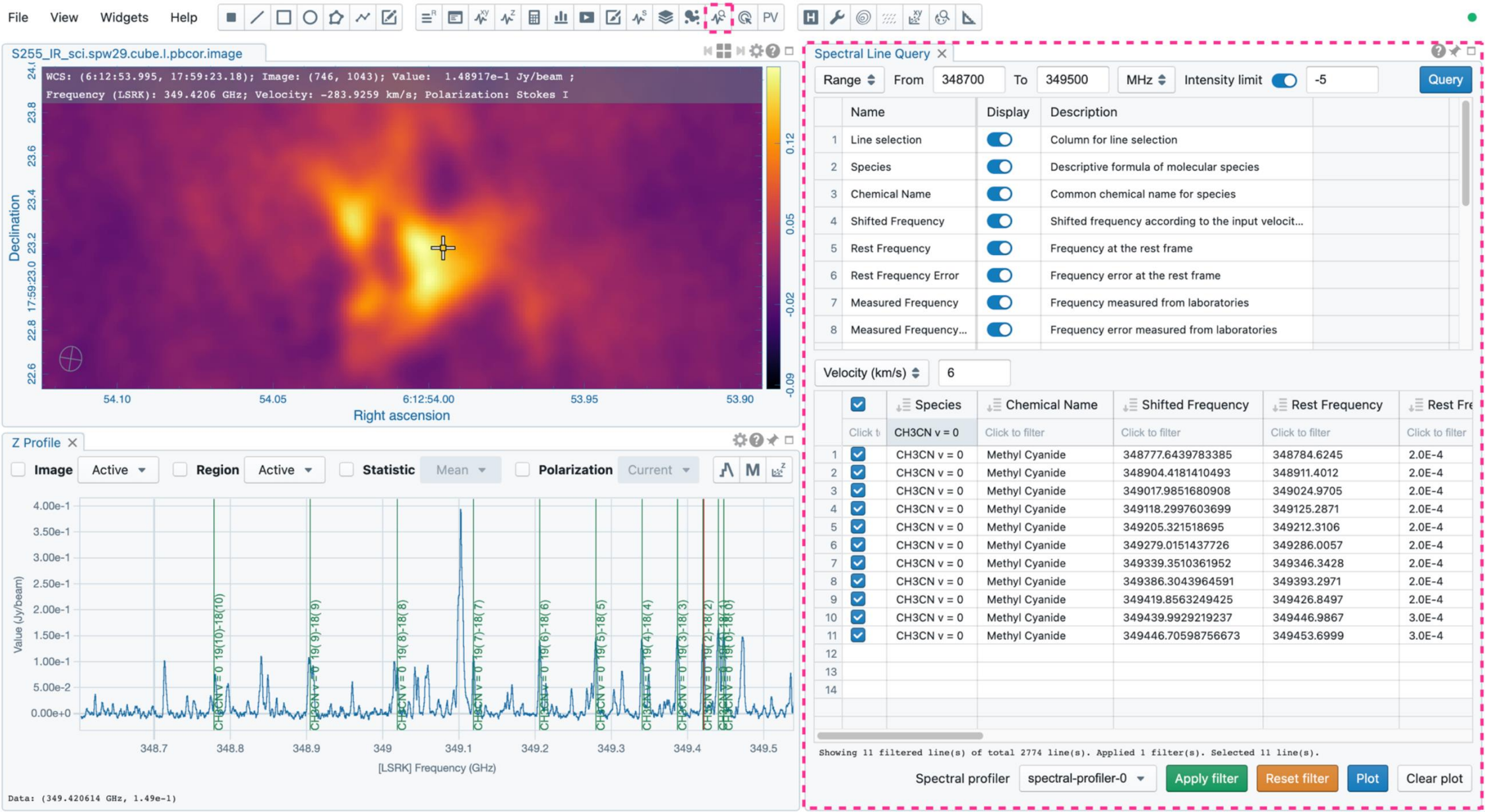




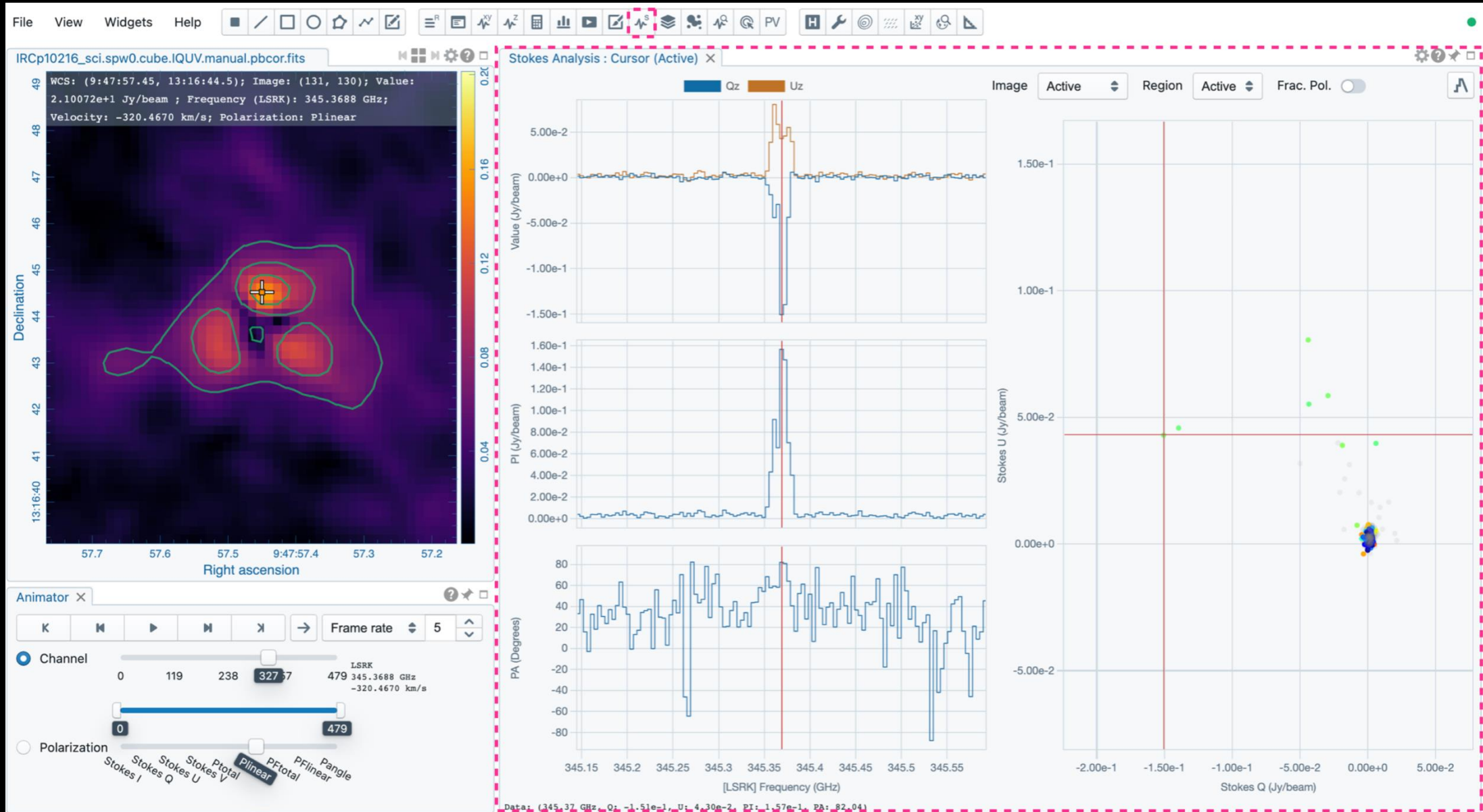
# Online database query - Vizier



# Other functionalities- spectral line query

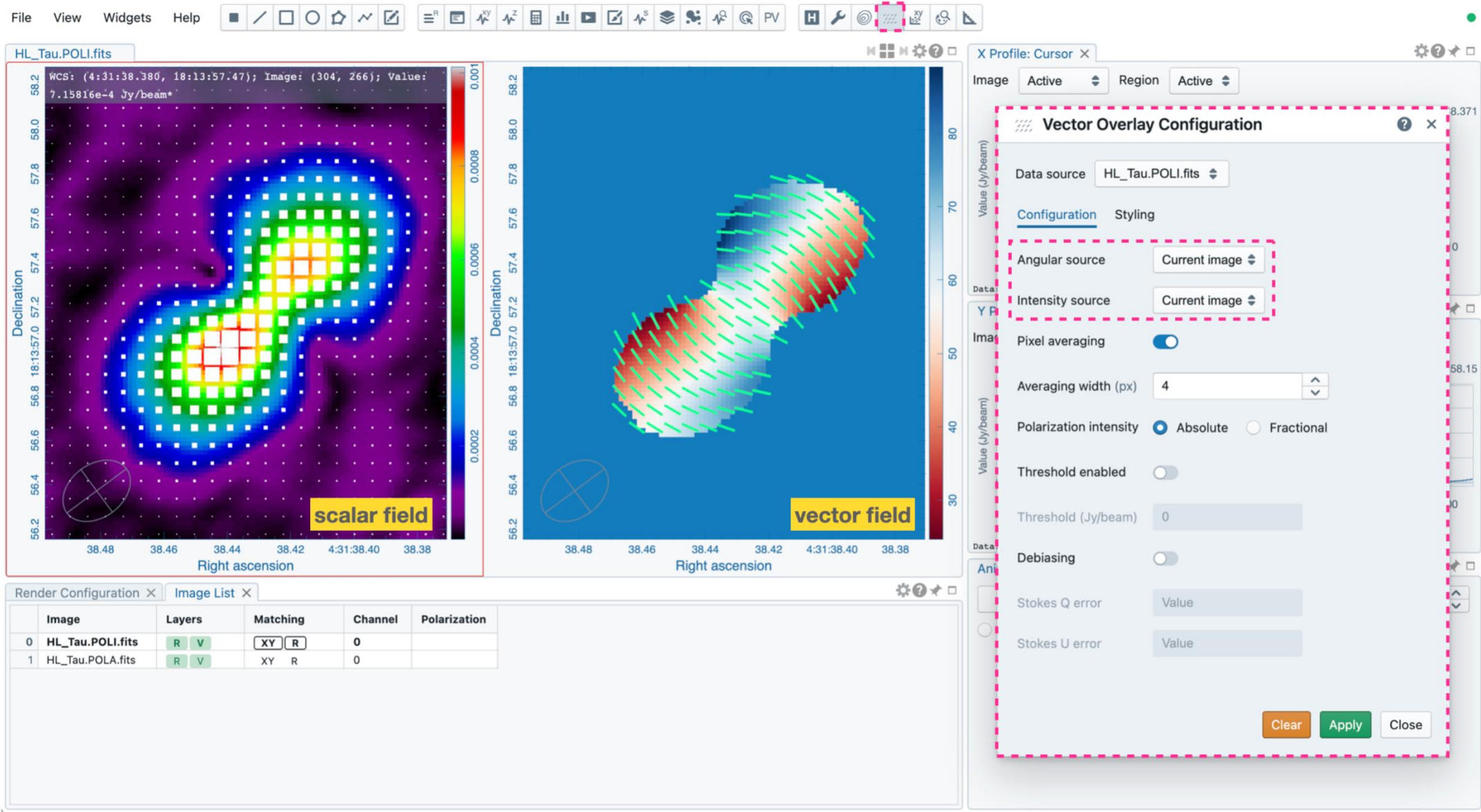


# Other functionalities- stokes





# Other functionalities- vectors in cubes





# Resources and summary

- Beautiful documentation <https://cartavis.org>
- Video tutorials on YouTube
- Easy Download for Mac/Linux/Windows
- One stop shop for data visualisation
- Can sometimes produce publication ready plots

