

My internship about filaments

By Aya Abden, EF

introduction

- 10th grade
- 3 weeks internship
- Supervisor: Dr. Dario Colombo
- Project: Filaments in the Milky Way

Stellar Formation

- Molecular clouds produce stars
 - very complex process
- Many stars form inside of Nessie, an elongated molecular cloud
 - Do elongated molecular clouds produce more stars than molecular clouds of other forms?

Filaments

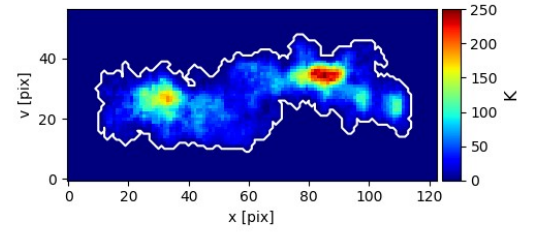
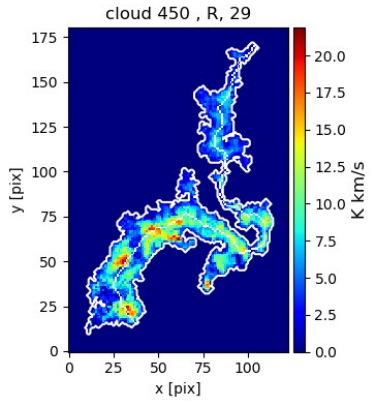
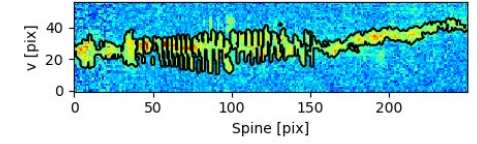
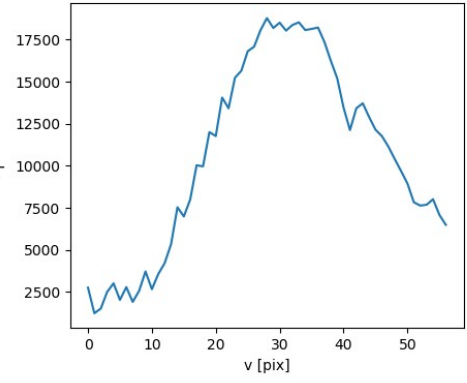
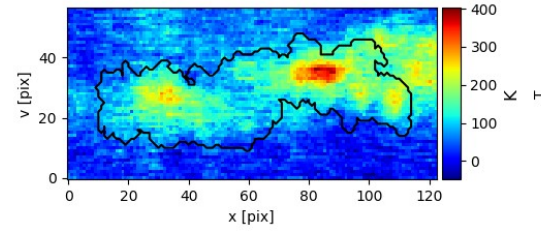
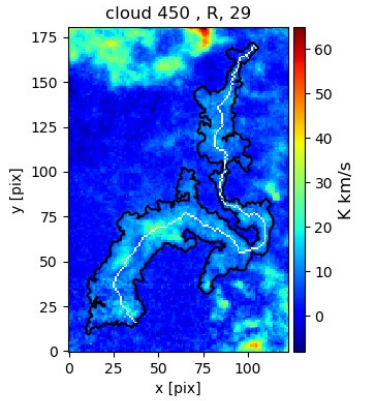
- Elongated molecular clouds = Filaments
- 1st Step: define what a filament is, e.g. properties and characteristics
- Filtered through data extracted from SEDIGISM, done by APEX.
 - hard and time consuming.

Method

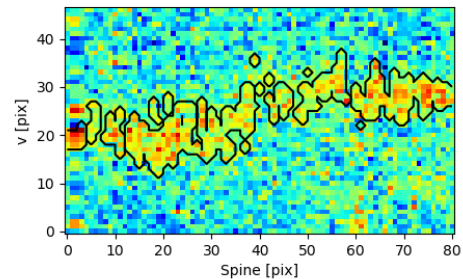
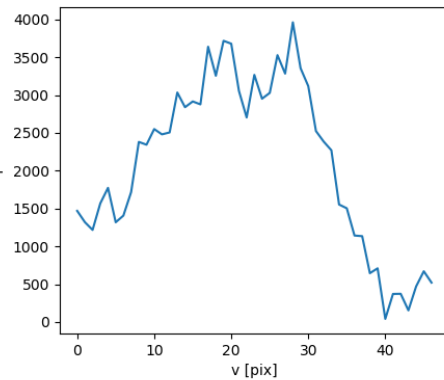
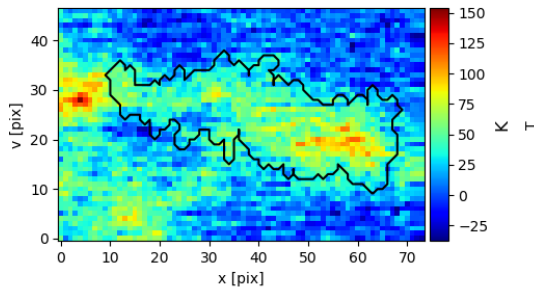
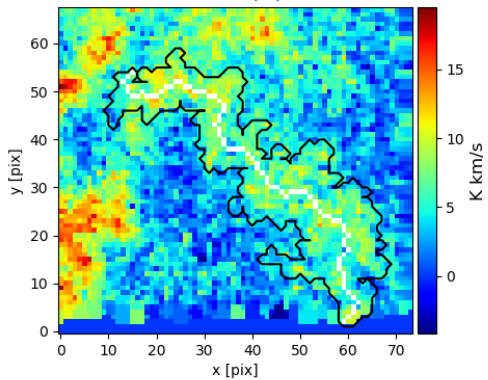
- Long aspect ratio is the key
aspect ratio = length of spine / average width
→ aspect ratio by itself isn't enough
- Four data cubes: two are close to the Galactic center, the other are further away
→ closer to the Galactic center = structure of molecular clouds gets more complex and a tendency to have a high velocity dispersion

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- Velocity dispersion is an important factor
 - has to be constrained within few channels + compact
 - We had to judge every single molecular cloud by eye
 - answers were either yes, no or maybe
-

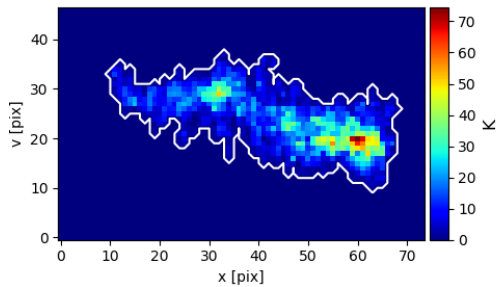
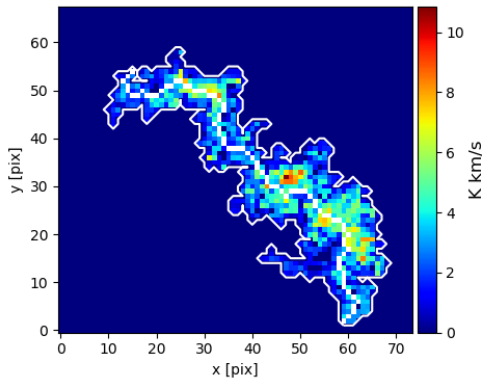
Ideal filaments

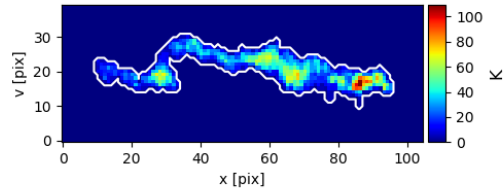
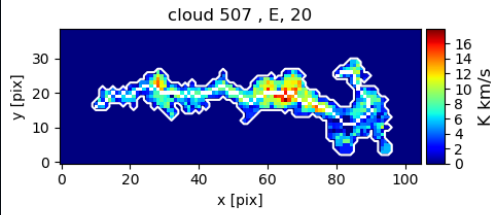
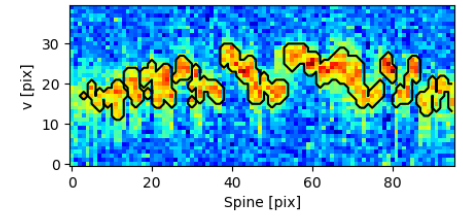
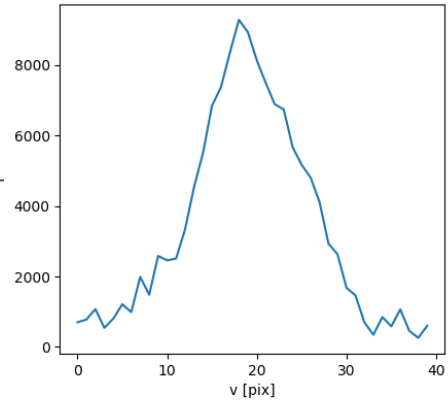
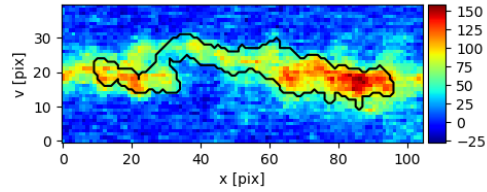
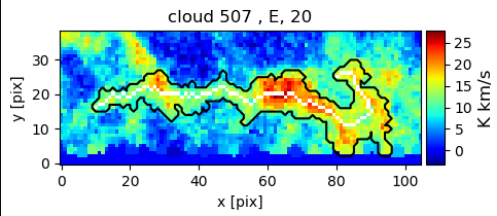


cloud 457 , E, 13

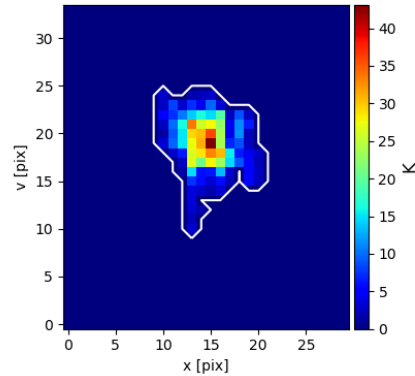
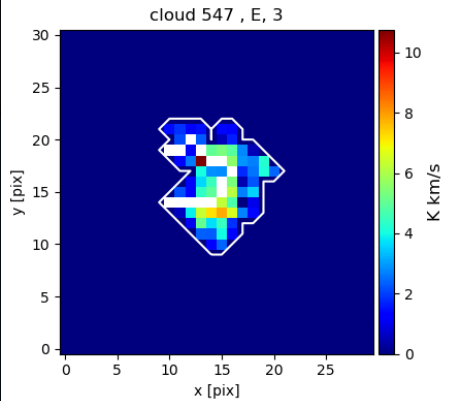
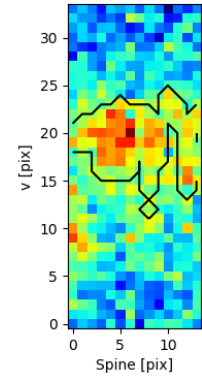
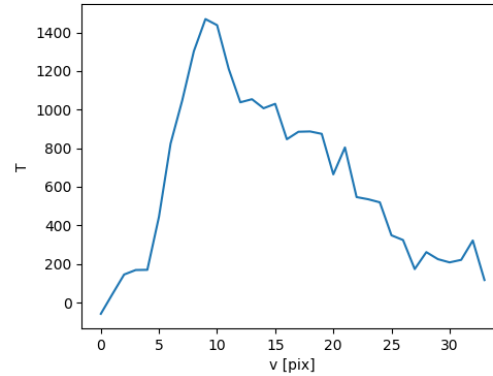
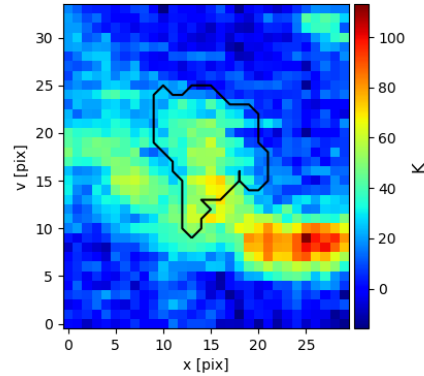
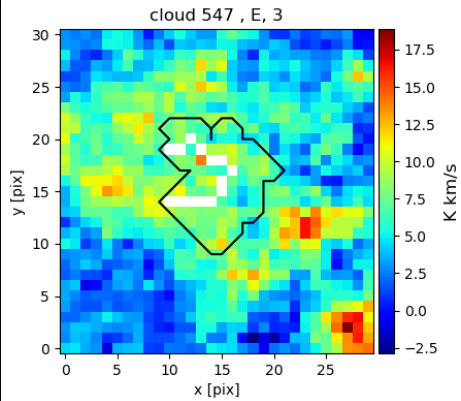


cloud 457 , E, 13

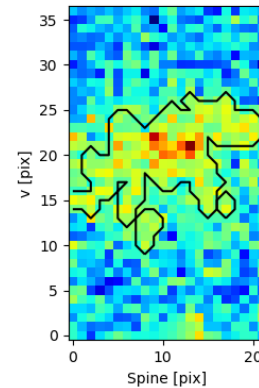
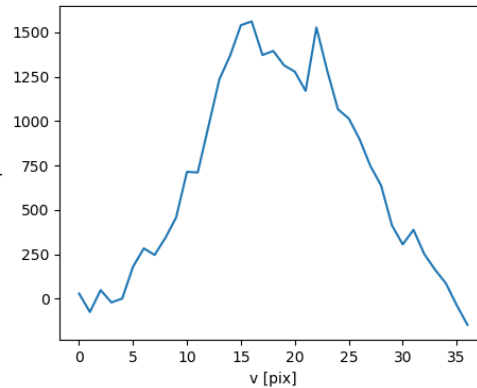
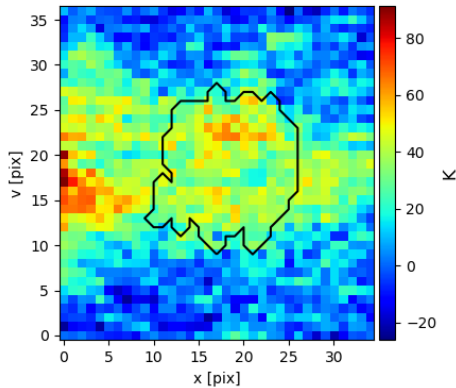
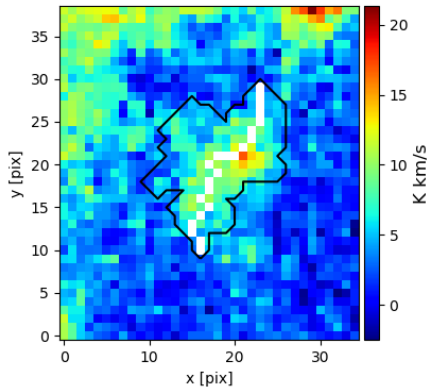




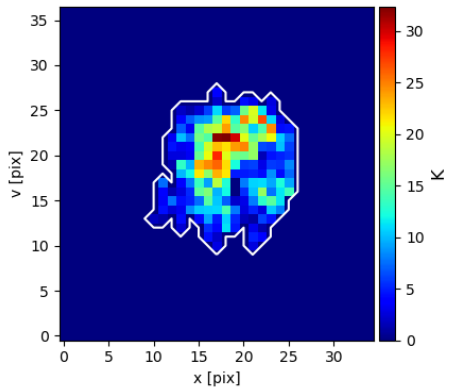
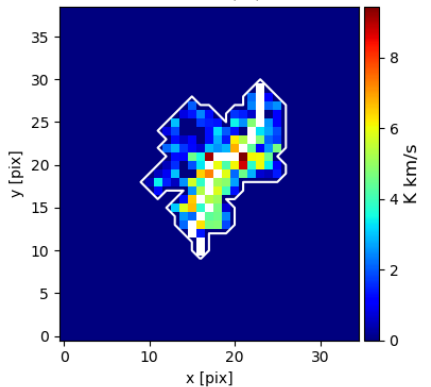
Molecular clouds that aren't filaments



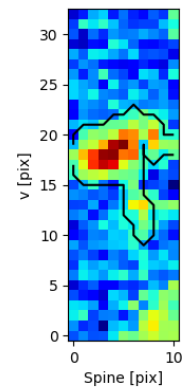
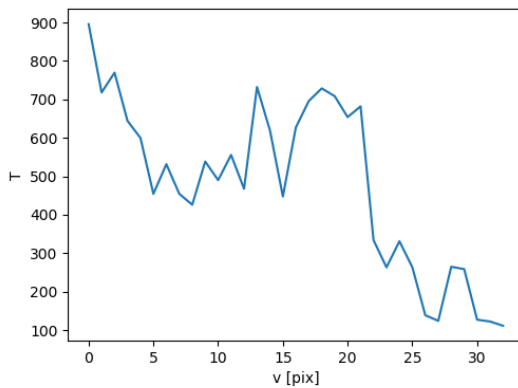
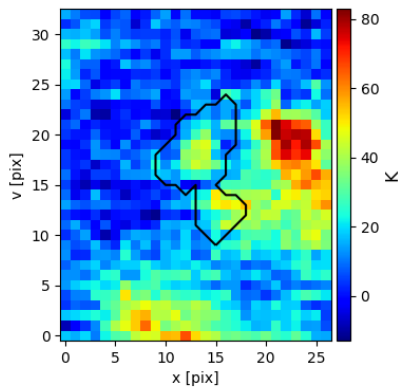
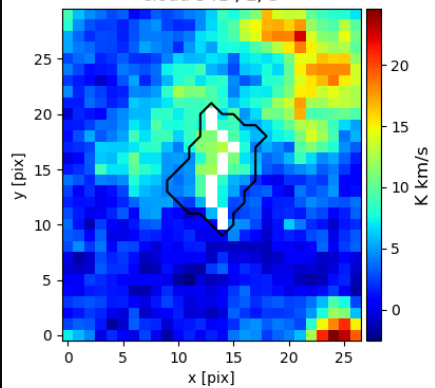
cloud 550 , E, 5



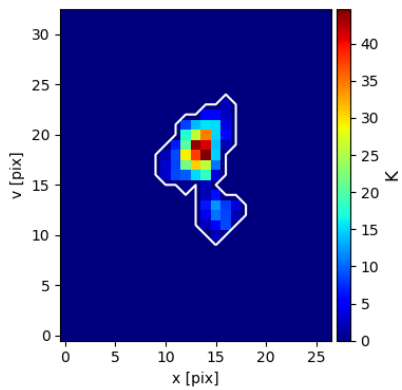
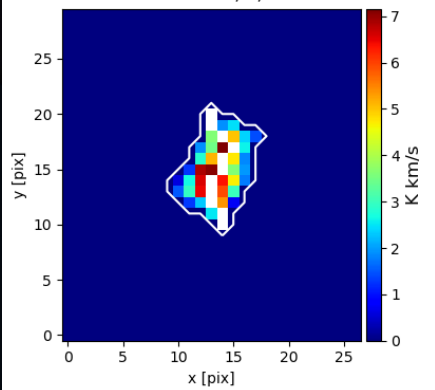
cloud 550 , E, 5



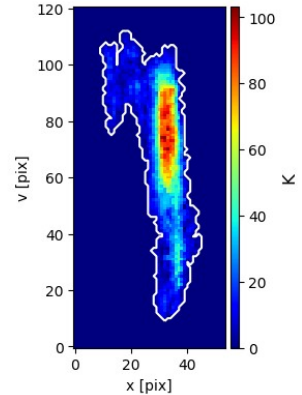
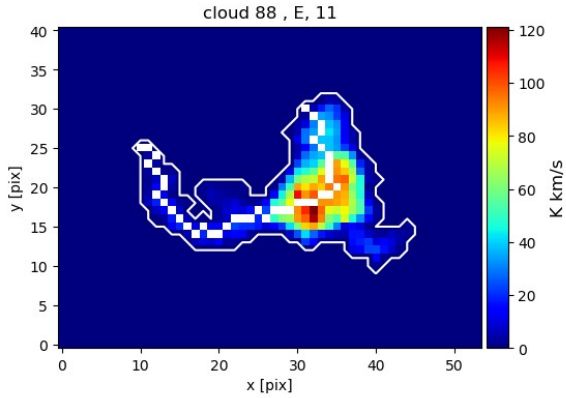
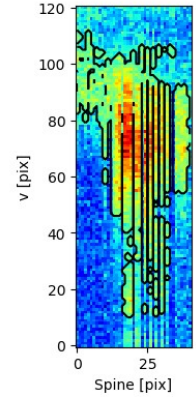
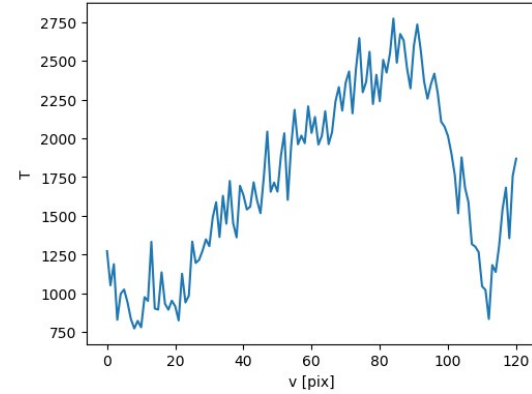
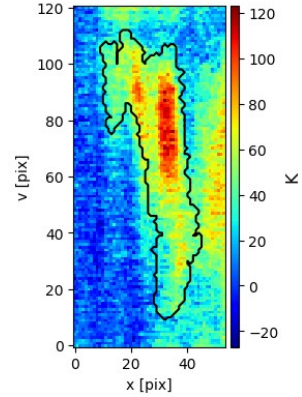
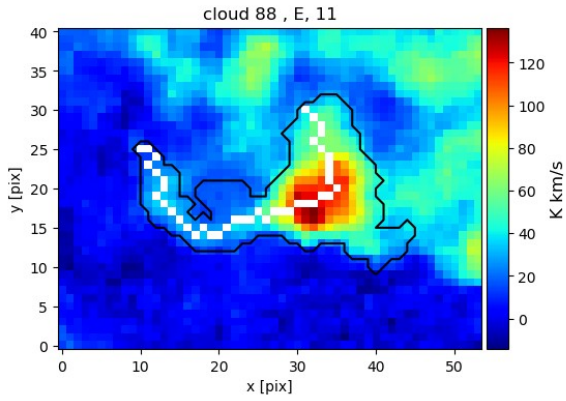
cloud 541 , E, 3

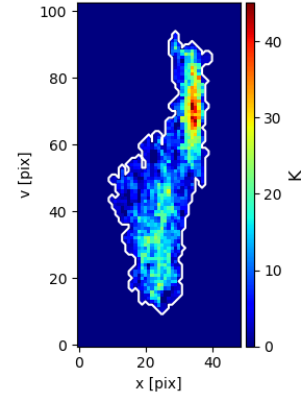
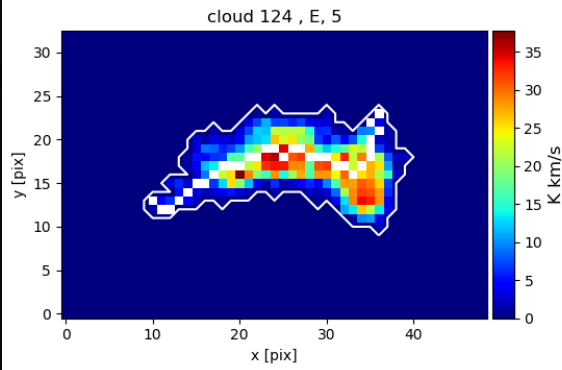
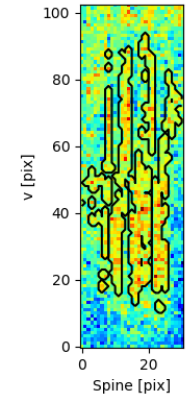
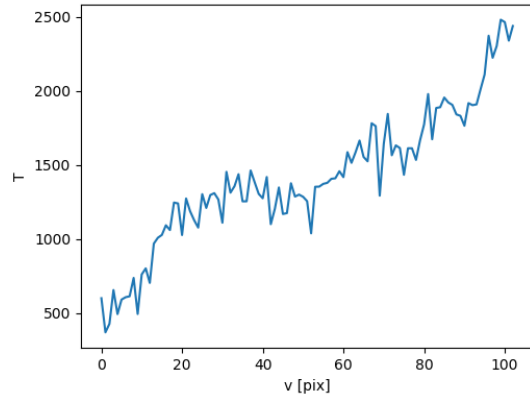
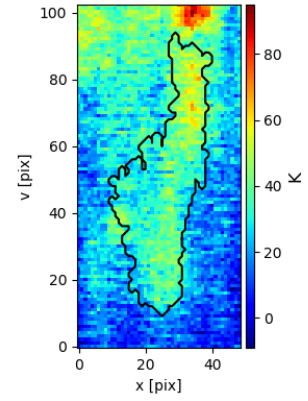
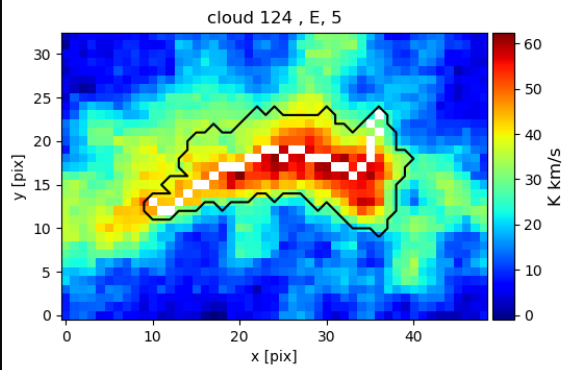


cloud 541 , E, 3

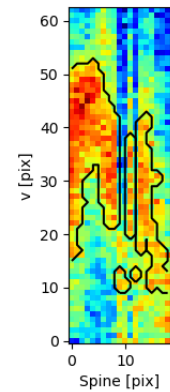
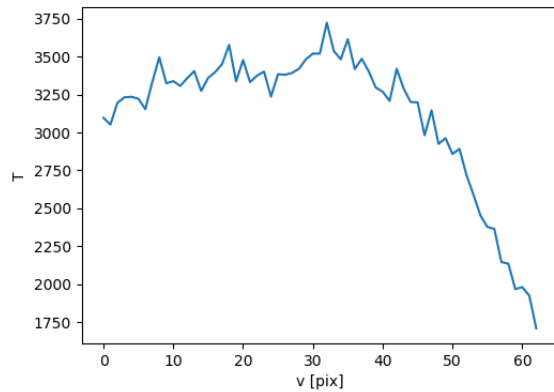
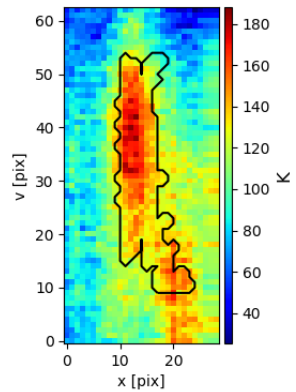
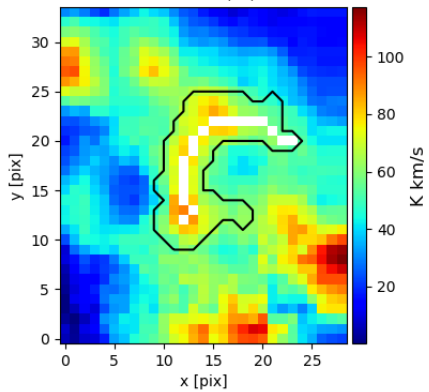


Molecular clouds with confusing structures

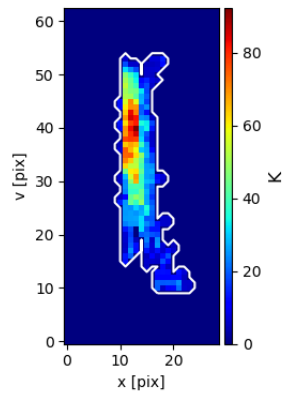
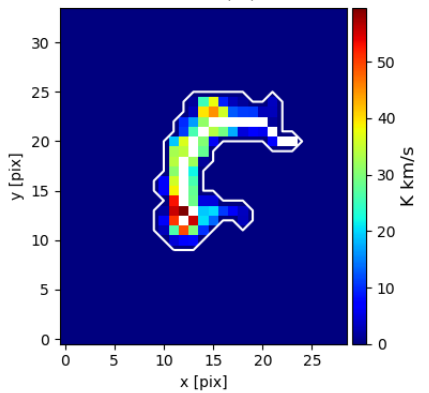




cloud 135 , E, 5

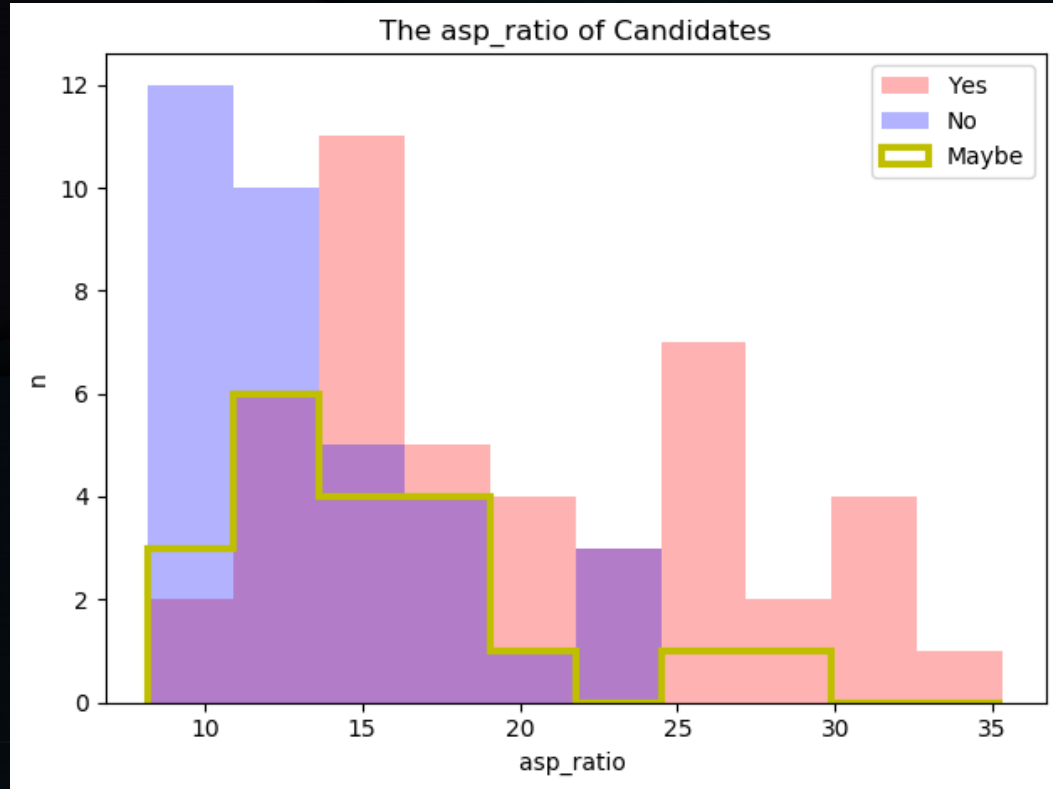


cloud 135 , E, 5

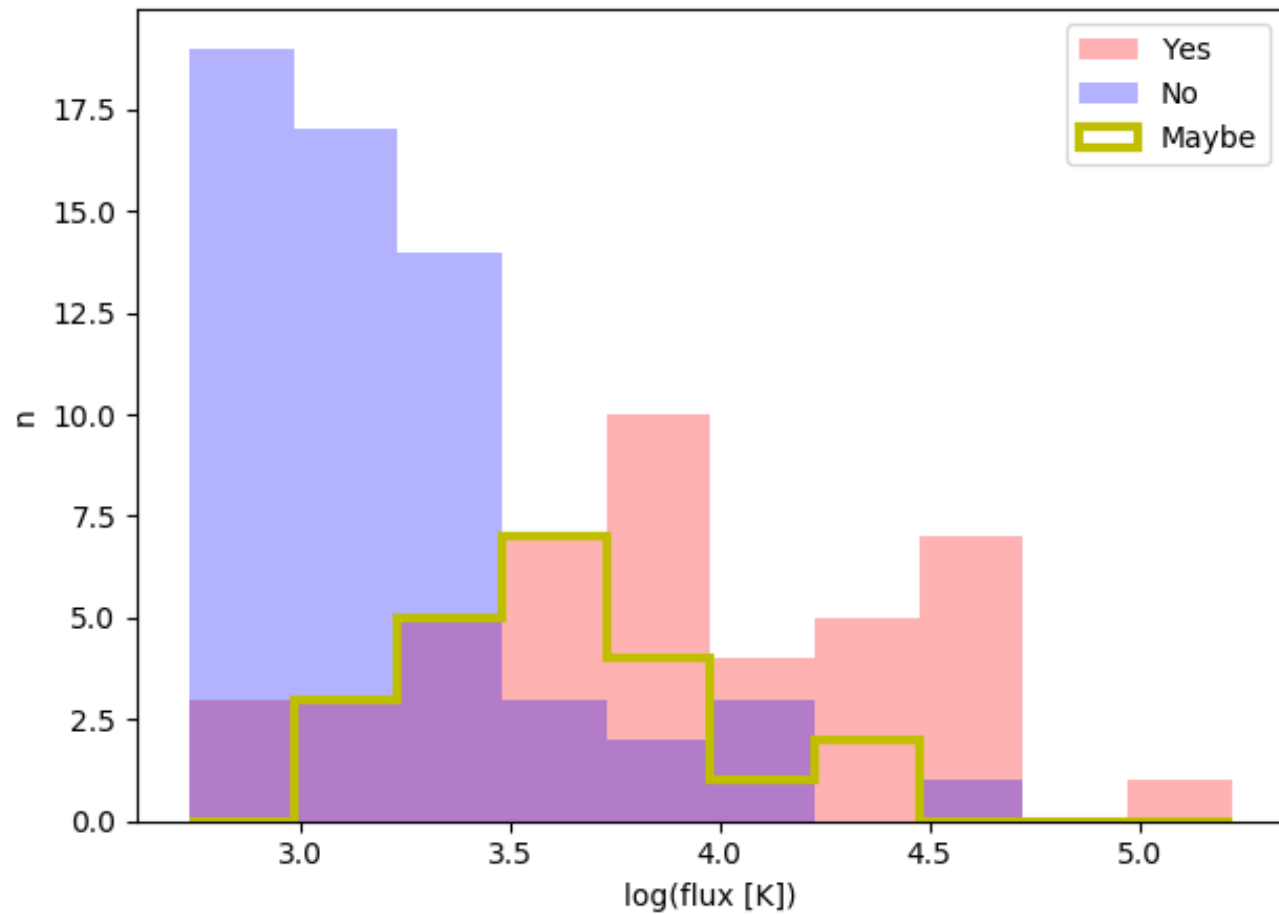


Histograms

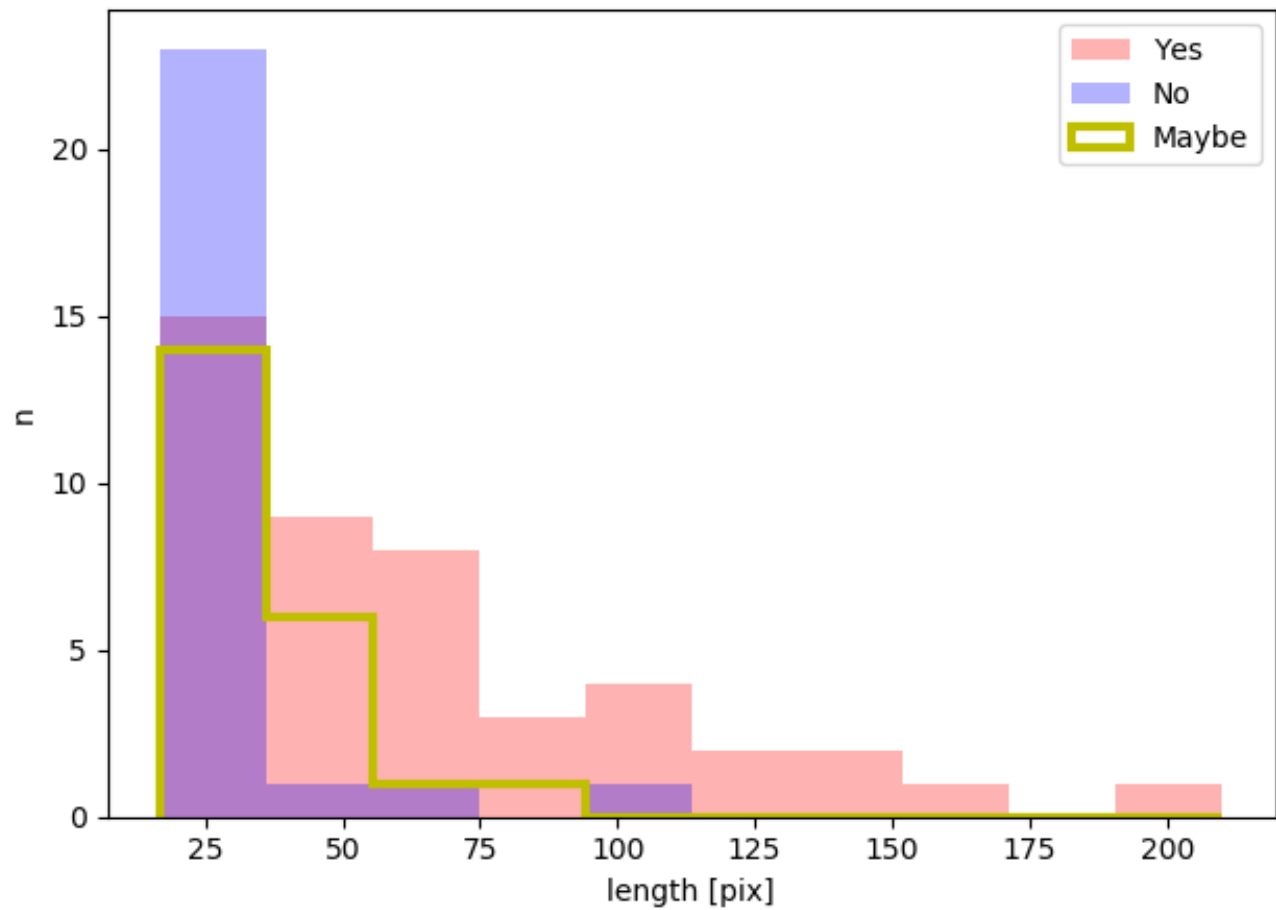
- Made to help us understand the properties of filaments + characteristics.



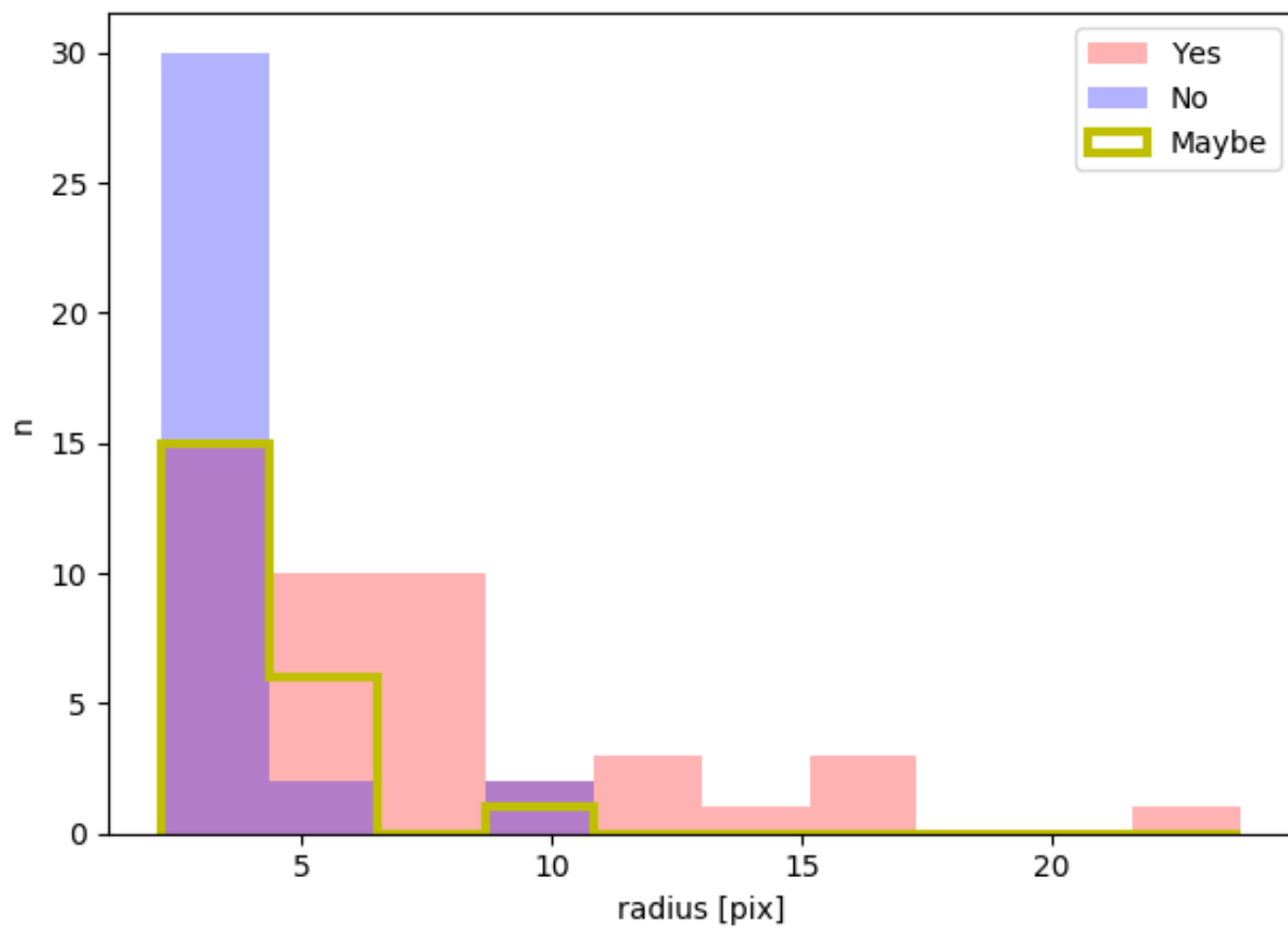
The flux of Candidates



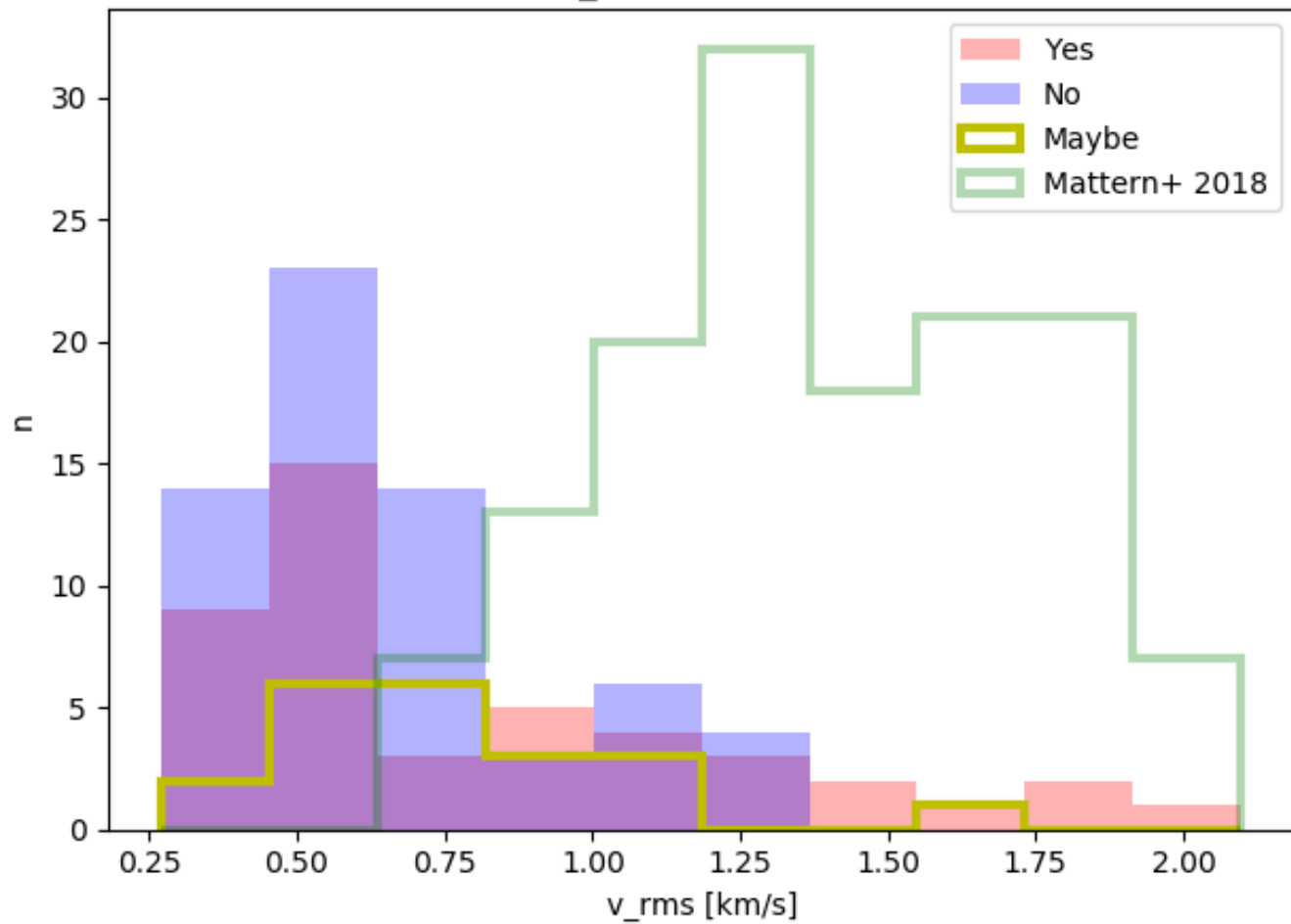
The length of Candidates



The radius of Candidates



The v_{rms} of Candidates



The width of Candidates

