

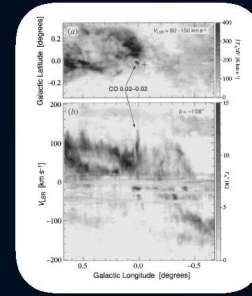
Automatic identification of High-velocity Compact Clouds

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HVCCs

High-velocity compact clouds (HVCCs) found in the central molecular zone of our Galaxy are a population of molecular clouds, which have compact appearance ($d < 10$ pc) and large velocity width ($\Delta V > 50 \text{ km s}^{-1}$).



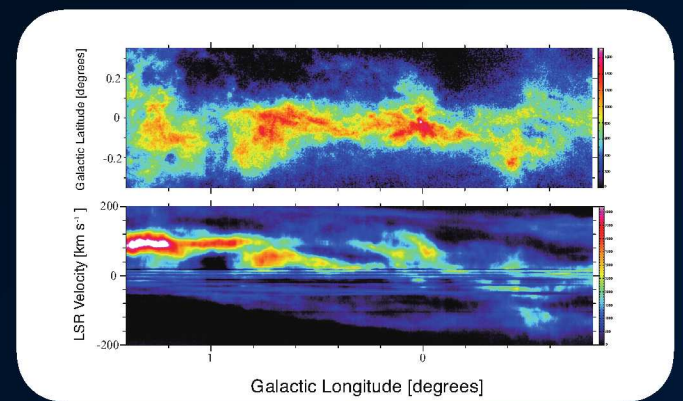
An example of HVCC
CO 0.02-0.02
Oka et al. (1999)

ANALYSIS

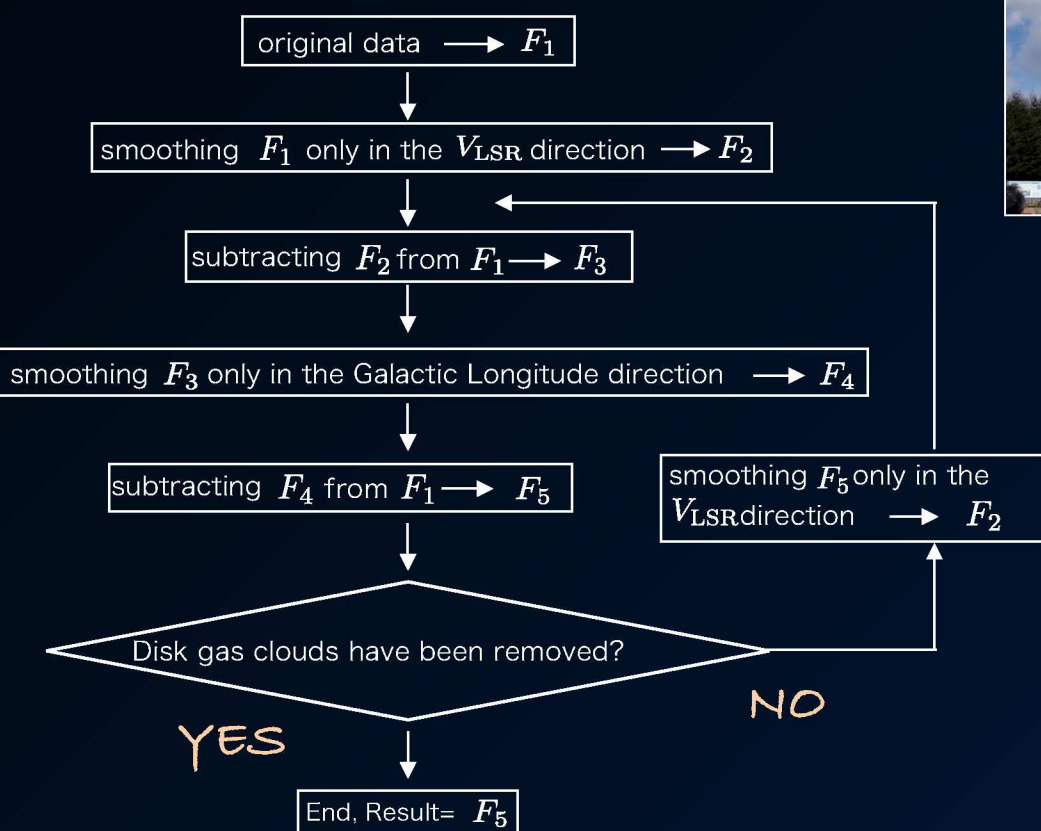
- Nobeyama Radio Observatory 45 m Telescope
- January 19-29, 2011
- $^{12}\text{CO}(J=1-0)$ ($\nu = 115 \text{ GHz}$)



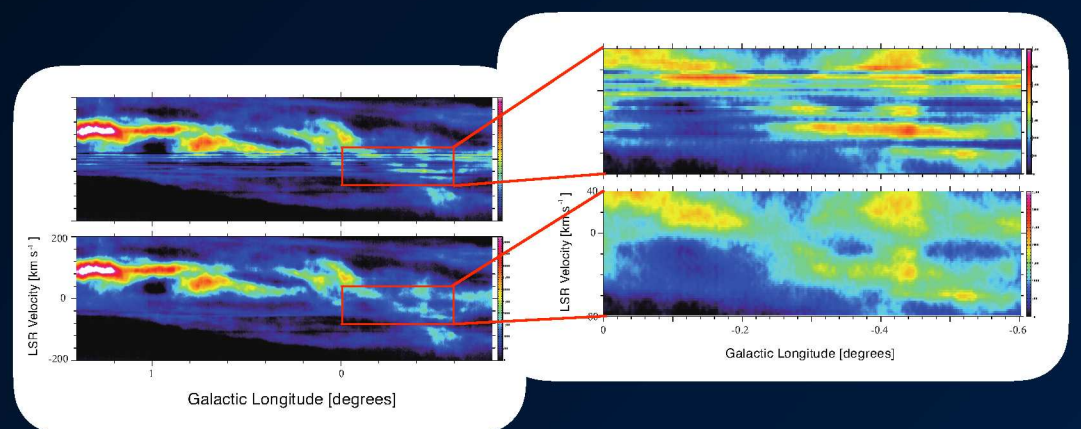
original data



1. Pressing method (Sofue 1995)



Result of Pressing method



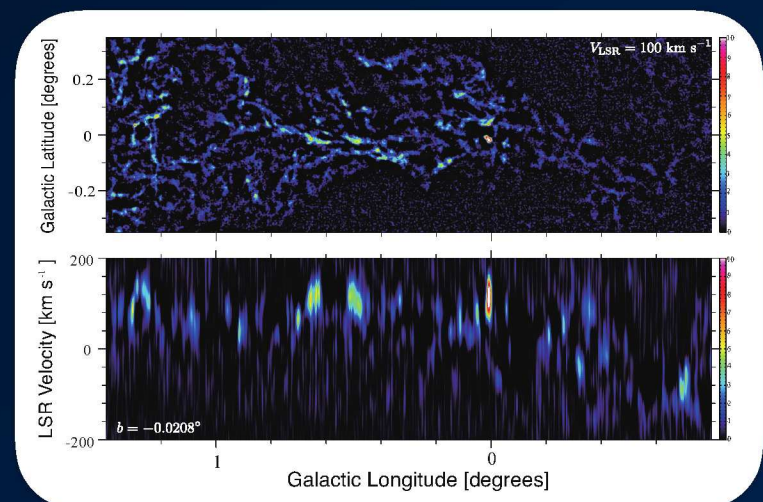
We succeeded to reduce the local gas contamination !

2. Unsharp mask

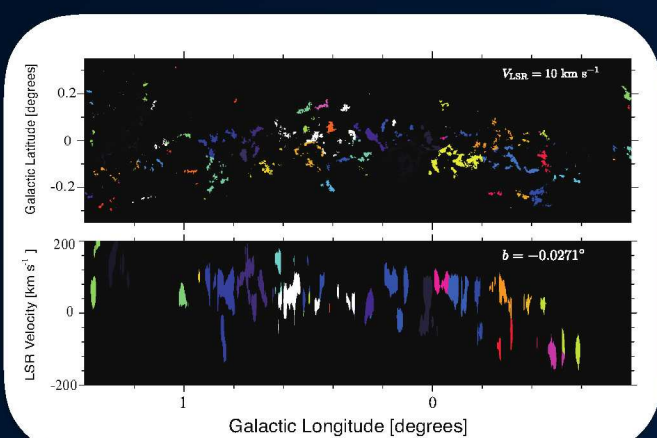
- smoothing F_5 which is the result of Pressing method in the V_{LSR} direction $\rightarrow F_6$
- smoothing F_6 in the Galactic Longitude and Latitude $\rightarrow F_7$
- subtracting F_7 from $F_6 \rightarrow F_8$
- F_8 is the result of Unsharp mask

result

Compact, broad-velocity-width features became prominent.



3. Modified CLUMPFIND



- We identified HVCCs candidates.
- Color shows identification numbers.

115 HVCC
candidates are Identified!

FUTURE

With $^{12}\text{CO}(J=3-2)$, $\text{C}^{18}\text{O}(J=1-0)$ and $^{13}\text{CO}(J=1-0)$, we are going to make a **complete HVCC list** and perform **statistical analysis!**