

# Earliest stages of star formation in the Orion Molecular Cloud Complex



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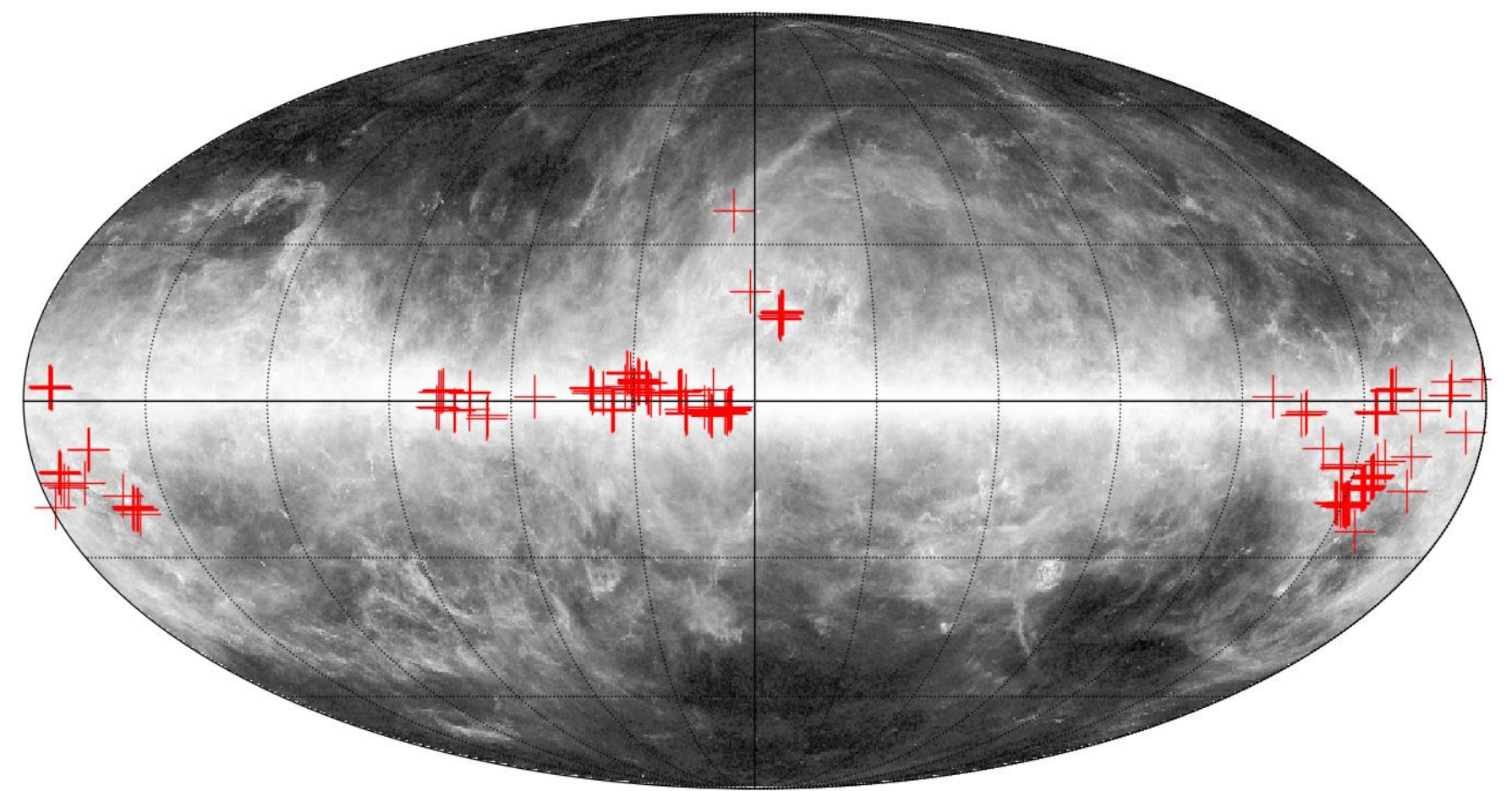
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## Abstract

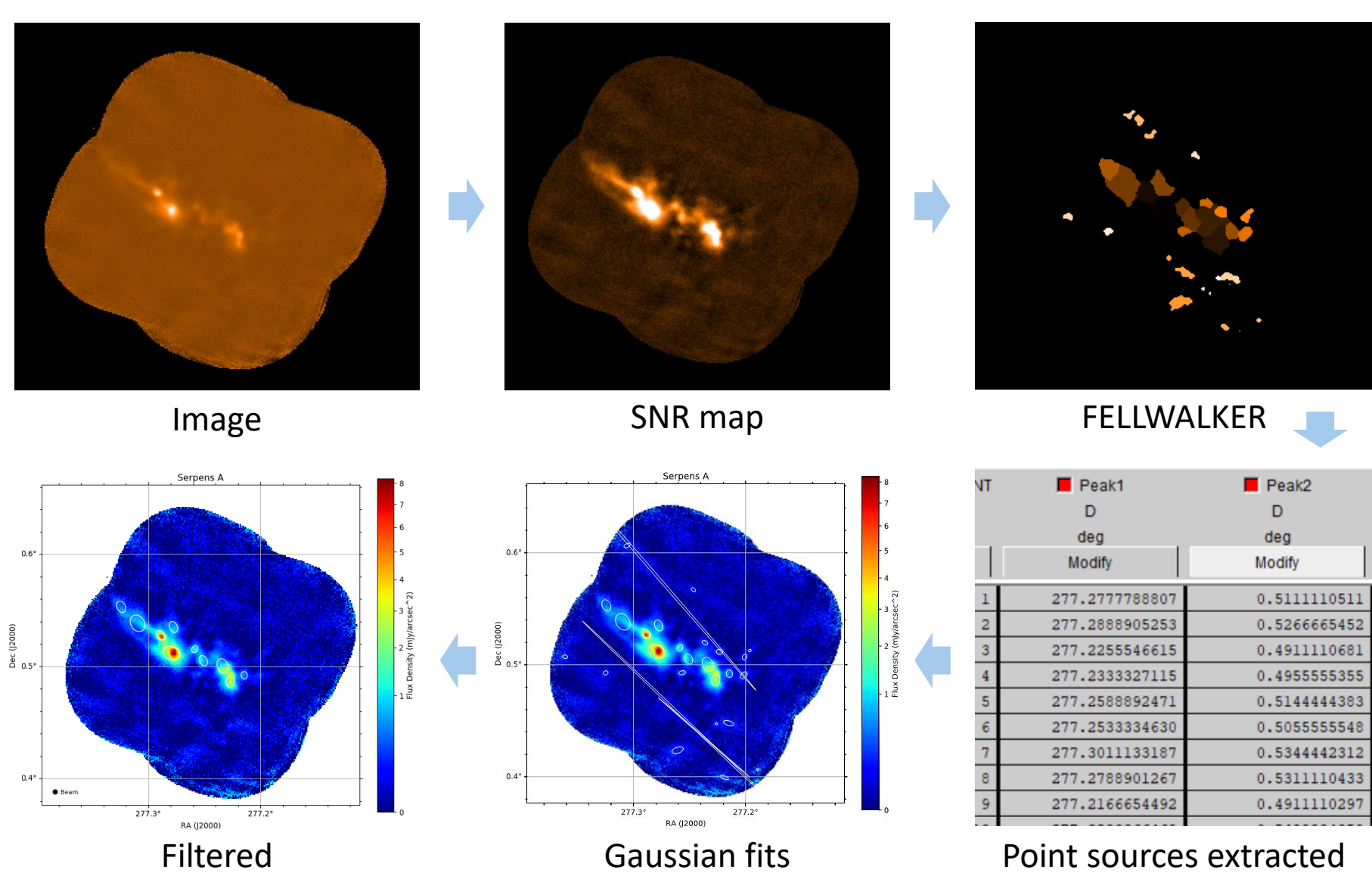
The Planck compact source [1] [2] catalogue provides excellent samples for studying the earliest phases of star formation. Covering all galactic longitudes and latitudes they can give an overview of how star formation varies throughout the Milky Way, enabling a better insight into star formation out of the Galactic plane, where our current understanding is restricted mostly to nearby clouds. We examined the 200 brightest Planck compact sources visible from the northern hemisphere using observations from the James Clerk Maxwell Telescope's SCUBA2 bolometer array. Its high resolution revealed diverse, mostly filamentary structures, and allowed the extraction of point sources from the maps. We classified more than 1500 of these point sources and compiled a catalogue with their positions, sizes, and we are in the process of calculating their physical parameters. In our statistical analysis, we investigate properties of star-forming regions at different latitudes, aiming to better understand the flow of interstellar matter in the Galaxy and thus refine our latest view of the Milky Way.

## Sample



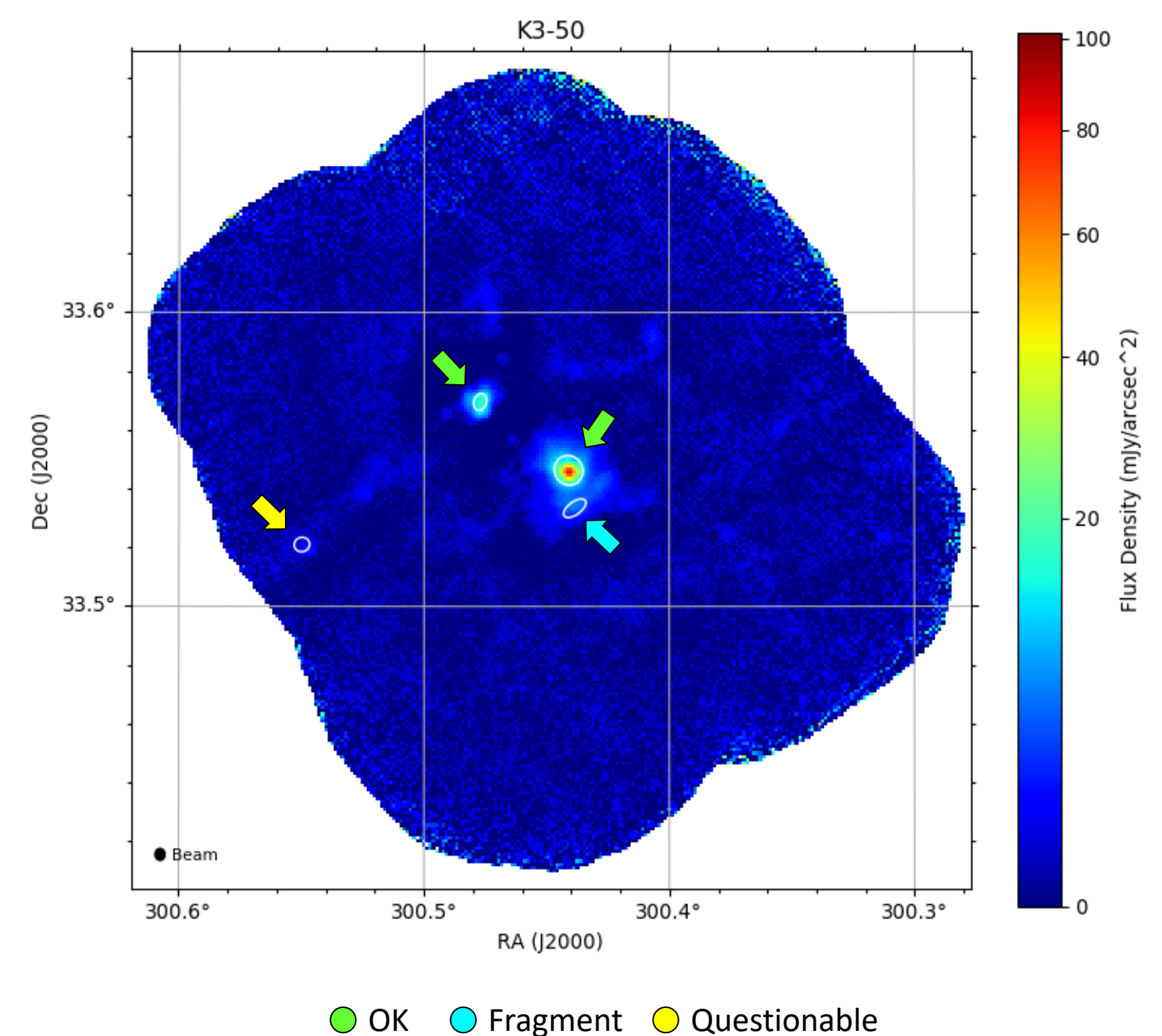
The 200 brightest Planck compact sources on the Planck 857GHz all-sky map. The sample contains molecular clouds in close star-forming regions.

## Point source extraction



The core extraction process following the method of Eden et al. (2019) [3]. We use CLUMPFIND algorithm on the SNR map created from the intensity and the variance of the image. The sources are fitted with ellipses, and then filtered for SNR and geometry to rule out false positives.

## Point source classification



The extracted point sources were inspected and classified to increase the robustness of the catalogue.

- [1] Planck Collab., “Planck 2013 results XXVIII. The Planck Catalogue of Compact Sources”, A&A 571, A28 (2014)  
 [2] Planck Collab., “Planck 2015 results XXVIII. The Planck Catalogue of Galactic cold clumps”, A&A 594, A28 (2016)  
 [3] Eden et al., “SCOPE: SCUBA-2 Continuum Observations of Pre-protostellar Evolution”, MNRAS, 485, 2895 (2019)

Background: Submm point sources (red dots) on DSS optical image of the Horsehead – Flame nebula region.