



The distribution of ^{26}Al gamma-ray sources in the Cygnus region can be inferred from astronomical measurements of massive stars (top left). Our population synthesis model predicts the history of ^{26}Al ejection into the ISM by a cluster of stars after their (assumed burst-like) formation (top right). If we combine these results, we predict a 1809 keV gamma-ray image which closely, but not quite, matches the observations (bottom left). Discrepancies may be attributed to the incomplete stellar census of the region and ISM morphology.

The COMPTEL image shows that ^{26}Al nucleosynthesis is not uniform over the Galaxy, and probably reflects the distribution of massive ($>10 M_{\odot}$) stars. The Cygnus region appears particularly prominent. OB associations are known to spread along distances between 300 and 2200 pc, partly occulted by the more nearby Cygnus rift molecular material.

We have used population synthesis estimates of the integrated ^{26}Al yield from the underlying massive-star clusters to compare to other products of these massive stars (ionization, cavities).

Although the model from massive stars can represent the observed ^{26}Al emission to first-order in total flux and (within instrumental uncertainties) in morphology, there are significant discrepancies. It appears that the massive star census in the Cygnus region may be incomplete, and that the morphology of the ISM with the Cygnus superbubble in particular plays a role. The Cyg OB2 association had been shown recently to be more massive than previously thought; our corresponding correction of the other associations based on the CO map better reproduces the total flux. The morphology suggests that ISM cavities and blow-out may result in ^{26}Al emission offsets from current locations of massive stars, tracing in particular the Cygnus Superbubble. We test and reject a proposed stimulated-star-formation scenario for the Cygnus superbubble.

References:

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