First Results from the Gould Belt *Spitzer* Legacy Program

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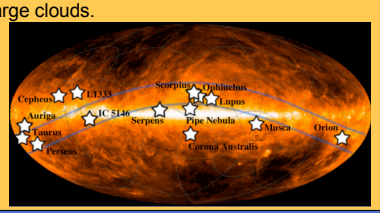
http://www.cfa.harvard.edu/gouldbelt/

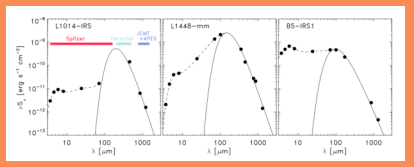
About the survey: The Spitzer Gould Belt survey will map ~32 sq. degrees of nearby (d<500 pc) molecular clouds at 3.6, 4.5, 5.8, 8.0, 24, 70, and 160 μm. Together with the clouds surveyed by the c2d legacy team and various GO/GTO investigators, these data will enable a complete census of star formation in nearby large clouds.



The Data Product: The survey will require 285 hours of Spitzer time to map clouds in Scorpius, Lupus, Musca, Chamaeleon, Serpens/Aquila, Cepheus and IC5146. Spitzer data obtained by other programs for the other clouds within 500 pc will be processed by the Gould Belt / c2d Legacy pipeline as they become available, resulting in a uniform database for all the nearby molecular clouds. Ultimately, these data will be merged with 2MASS (JHK), JCMT/SCUBA-2 (450, 850 μm) and Herschel/SPIRE (250, 350, 520 μm) surveys of the Gould Belt clouds, to produce catalogues with photometry from 1.2 to 850 μm. The Spitzer observations began in Fall 2006. IRAC data have been obtained for a few regions thus far; no MIPS data yet. The first photometry catalogues (Spitzer + 2MASS) are scheduled for delivery in June 2007.

Science Goals: Infrared observations from Spitzer combined with far-infrared and submillimeter observations provide complementary information about the distribution of star-forming material, from the inner envelopes and disks around protostars to the large scale, low extinction dust component of molecular clouds. Some questions this database will be used to address are:

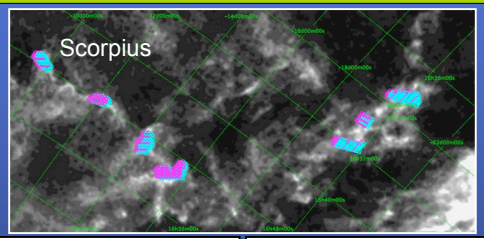
- **Which cores are truly starless?**
- **What are the timescales for the evolution of protostars?**
- **How does the evolution of young stars and protostars vary with environment?**
- **What is the fraction of young stars in clusters?**
- **What is the extended distribution of dust in molecular clouds?**

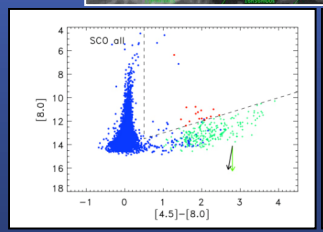


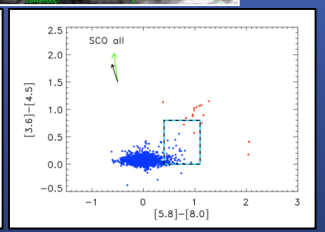
SEDs for a very low luminosity object (L1014-IRS), a Class 0 YSO (L1448-mm) and a Class I YSO (B5-IRS1)(symbols connected by dashed line). Also shown are greybody curves fit to the far-IR/submm parts of the SEDs with Teff = 13K,17K and 30K.

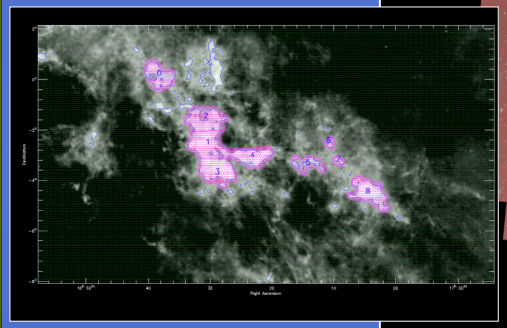
First Results: Below, the IRAC map boundaries for Scorpius are shown on an extinction image from Dobashi et al. (2005, PASJ, 57S). Regions with Av > 3 were targeted. All but one of these AORs has been obtained, and the YSO candidates are identified in the **plots below** (red symbols; for more on YSO identification and background contamination issues, see the c2d poster next door).

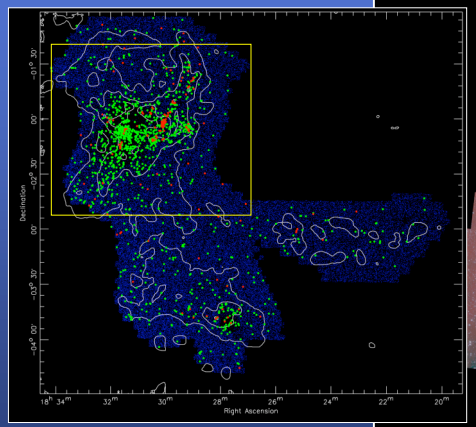
On the right is shown the mapping plan for the Serpens/Aquila region, projected on an extinction map from Cambresy (1999, A&A 345, 965). Time limitations dictated that we target only those areas here with Av > 6. IRAC data have been obtained for maps 1- 4. **Below right**, a preliminary distribution of Class I (red) and Class II (green) YSO is shown, projected on all IRAC 4-band detections (blue), with extinction contours made from 2MASS data overlaid. The yellow box outlines the color mosaic shown on the far right, centered on W40, made by combining IRAC 3.6 μm, 4.5 μm and 8 μm.

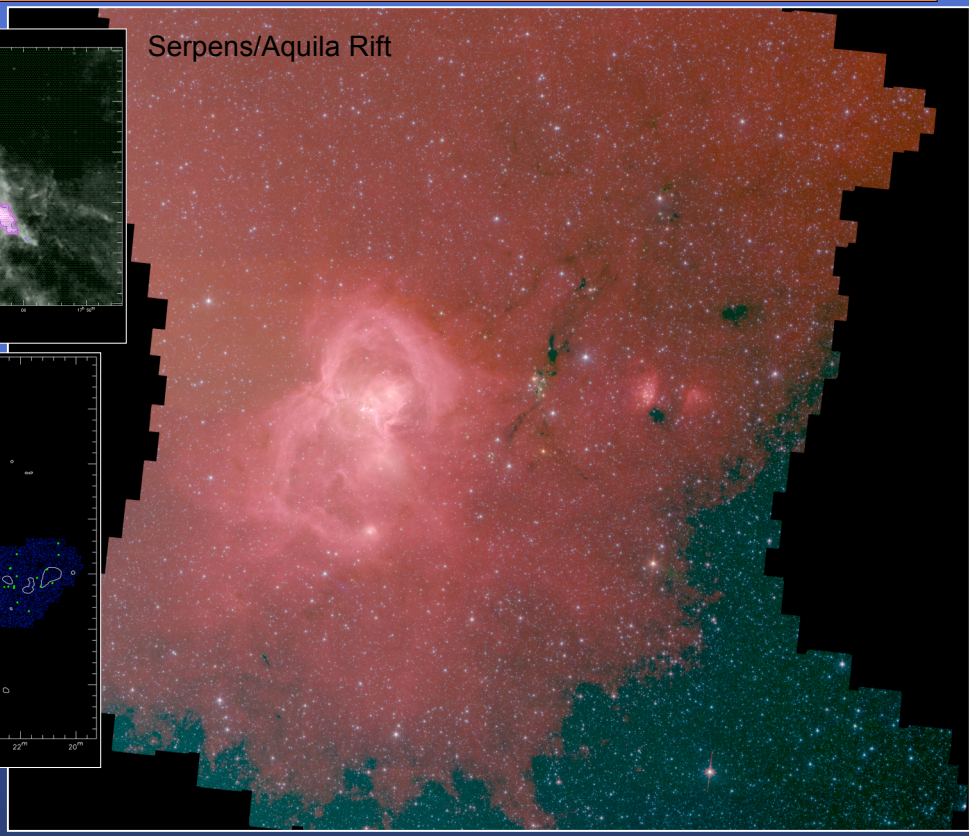












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