

Application of the Hypatia Catalog: Potentially Habitable Stellar Systems

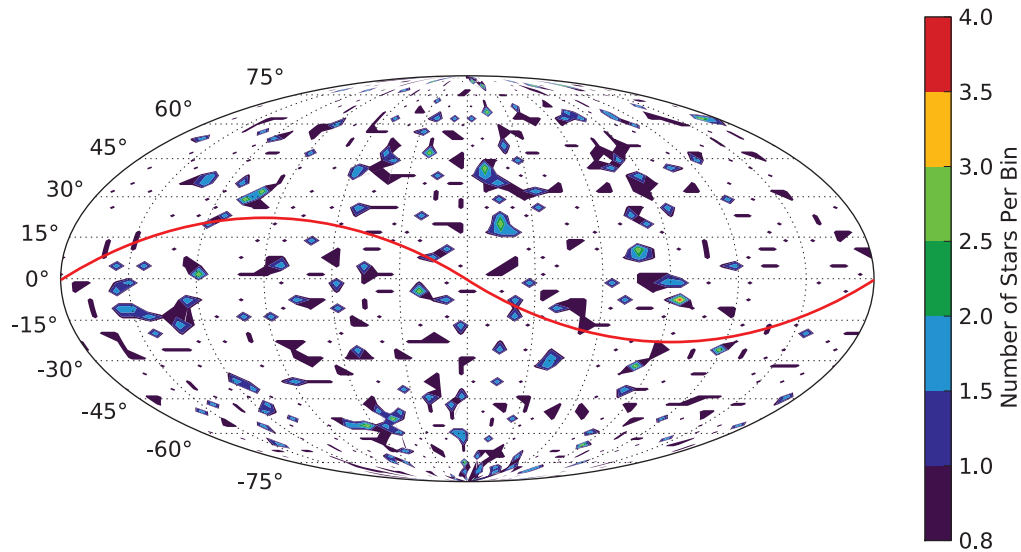


Fig. 1 - A Mollweide projection of the positions of stars in Hypatia in RA (horizontal from 0-24h) and Dec (vertical from $[-90^\circ, 90^\circ]$), where stars that lie in the same bin, or beam area equal to 3° , are grouped together. Overlaid on this map is the position of the Ecliptic plane for orientation. The stars in Hypatia are relatively uniform in RA and Dec since they all have a radial distance less than 150 pc and are, therefore, in the Galactic disk.

Turnbull & Tarter (2003) used the Hipparcos Catalogue along with data on age, variability, metallicity, Galactic kinematics, multiplicity and known giant planets to compile the *Catalog of Potentially Habitable Stellar Systems* (or HabCat). Their catalog includes stars whose physical characteristics are consistent with the existence of terrestrial planets in a stable habitable zone throughout the last 3 billion years. HabCat lists some 17,000 single main sequence stars of late F, G, K, and M-types.

We apply the Hypatia Catalog (Hinkel, Timmes & Turnbull, 2012) to locate “habitability windows” on the sky, specifically (20.6h, -4.8°) and (22.6h, -48.5°), that exhibit enhanced abundances of bio-essential elements and which may be of use in targeted or beamed searches.

Contact:

Natalie Hinkel,
Arizona State University,
natalie.hinkel@asu.edu

Researchers:

Natalie R. Hinkel (ASU)
Frank Timmes (ASU)
Margaret C. Turnbull (GSI)

Submitted: Astrophysical Journal

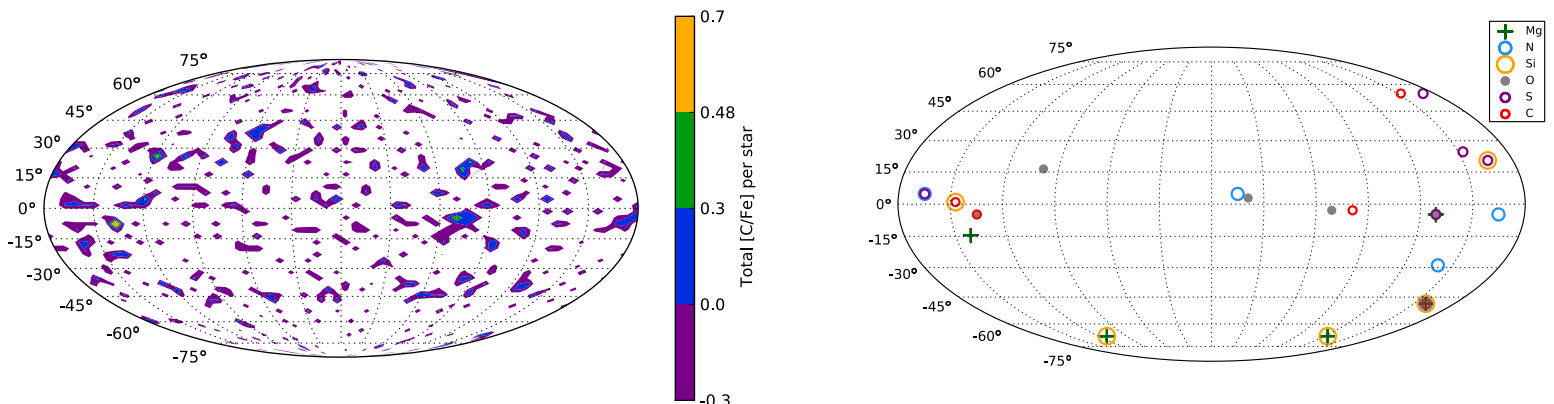


Fig. 2 - RA/Dec or the bio-essential element C/Fe (left), where the hotspots for carbon are shown in yellow (right). To the left is an RA/Dec map depicting the brightest 5 hotspots for all 6 bio-essential elements, as denoted by the legend on the right.