

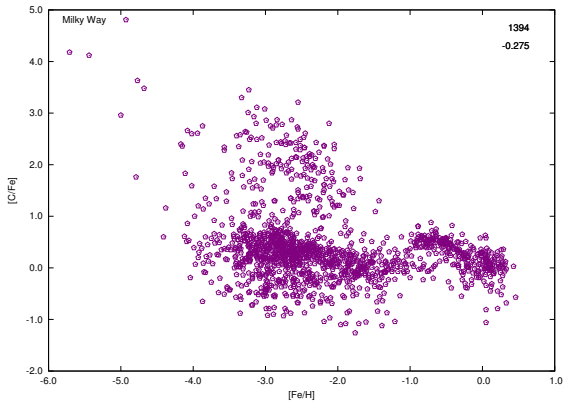
# CEMP Stars in Dwarf Galaxies - Carina

Terese T. Hansen

The Observatories of the Carnegie Institution of Science

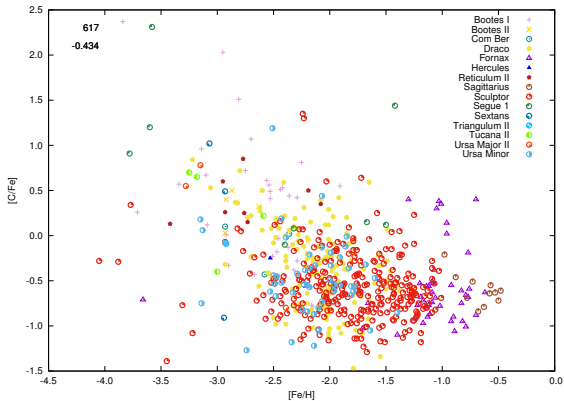
A Celebration of CEMP and Gala of GALAH  
Melbourne 2017

# Carbon in the Milky Way Halo



SAGA database C measurements of Milky Way stars

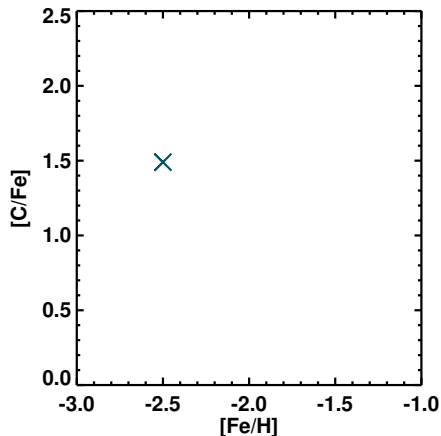
# Carbon in Dwarf Galaxies



SAGA database C measurements of dwarf galaxy stars

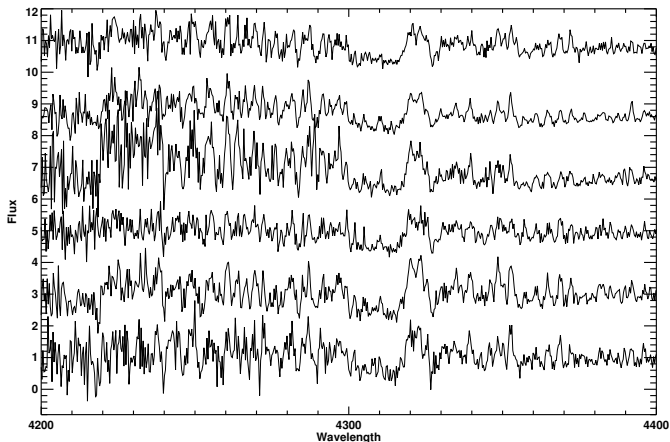
## Stars with Carbon Measurements in Carina

- 10 Carbon enhanced stars - Azzopardi et al. 1986
- 2 also show *s*-process enhancement - Abia et al. 2008
- Susmitha et al. 2017



# Looking for CEMP Stars in Carina

- Low resolution spectra around Ca H+K of large sample  
→  $[\text{Fe}/\text{H}]$
- Medium resolution to look for C features



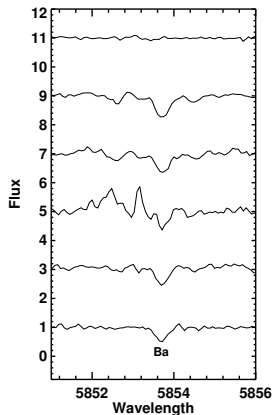
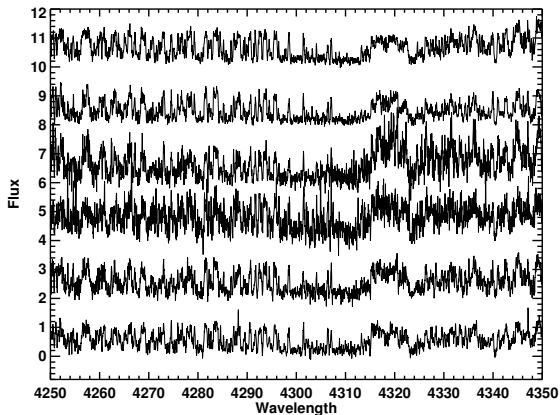
# Looking for CEMP stars in Carina



Magellan telescopes, Las Campanas Observatory

# Looking for CEMP stars in Carina

High resolution spectra to do full abundance analysis



## Six CEMP stars in Carina

19861 [Fe/H] = -2.8, [C/Fe] = 1.6, [Ba/Fe] = -1.0

43615 [Fe/H] = -2.5, [C/Fe] = 1.9, [Ba/Fe] = 2.4

37303 [Fe/H] = -2.4, [C/Fe] = 1.3, [Ba/Fe] = 2.6

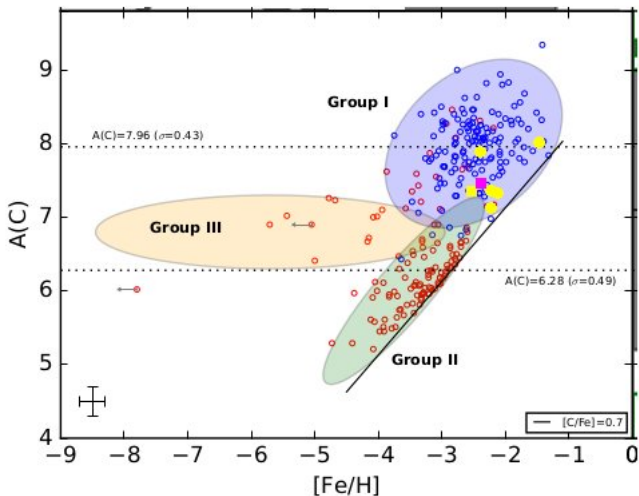
74198 [Fe/H] = -2.4, [C/Fe] = 1.0, [Ba/Fe] = 0.9

51686 [Fe/H] = -2.3, [C/Fe] = 1.1, [Ba/Fe] = 1.3

71017 [Fe/H] = -1.5, [C/Fe] = 1.1, [Ba/Fe] = 1.6

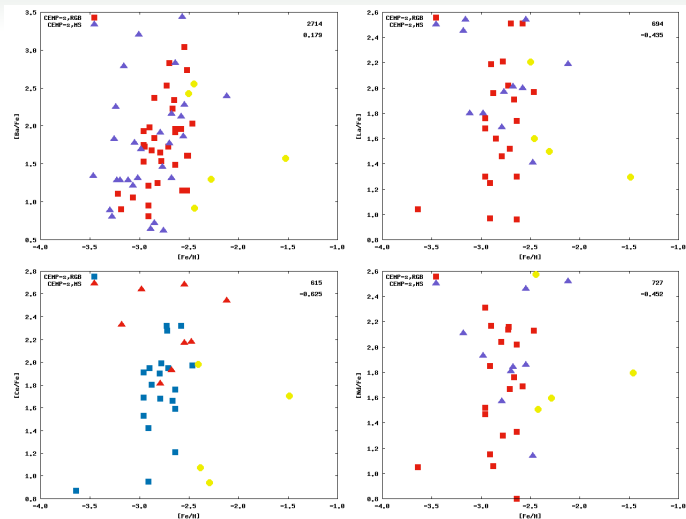


# Comparison to halo CEMP stars - absolute C abundance



Susmitha et al. 2017, Yoon et al. 2016, Hansen+ in prep

# Comparison to halo CEMP- $s$ stars



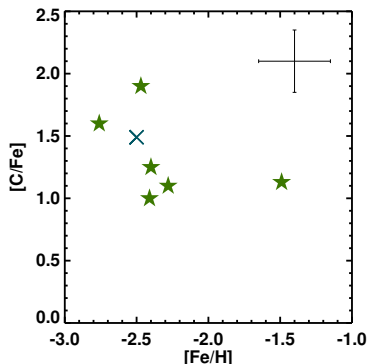
SAGA database, Hansen+ in prep

## Special abundance features for CEMP-no stars

- Halo CEMP-no stars with high Na, Mg, Al, Si and/or Sr abundances
- CEMP-no stars analysed in Carina and Sculptor show enhancement in light neutron-capture elements (Skuladottir 2015, Susmitha 2017)
- 19861 - show high Mg abundance, but no enhancement in Sr

# More to come

- Seven CEMP stars in Carina



Susmitha et al. 2017, Hansen+ in prep

- Ongoing work on to find more CEMP star in Carina, Fornax, Sextans, Sculptor