Cataloguing Asymptotic Giant Branch Stars in the "Andes"

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BACKGROUND

- The Andromeda galaxy (M31) offers a nearby opportunity to examine resolved stellar populations and test fundamental concepts in galaxy evolution.
- M31 satellite galaxies exhibit a wider variety of star formation histories than those around the Milky Way, implying that their formation may be a complex process, sensitive to the specific history of the host galaxy.
- We use Near-IR WFCAM data to investigate the Asymptotic Giant Branch (AGB) populations in 18 satellite galaxies and halo fields.

Insert image of M31 with sample circled here (the one I'm going to put in paper)

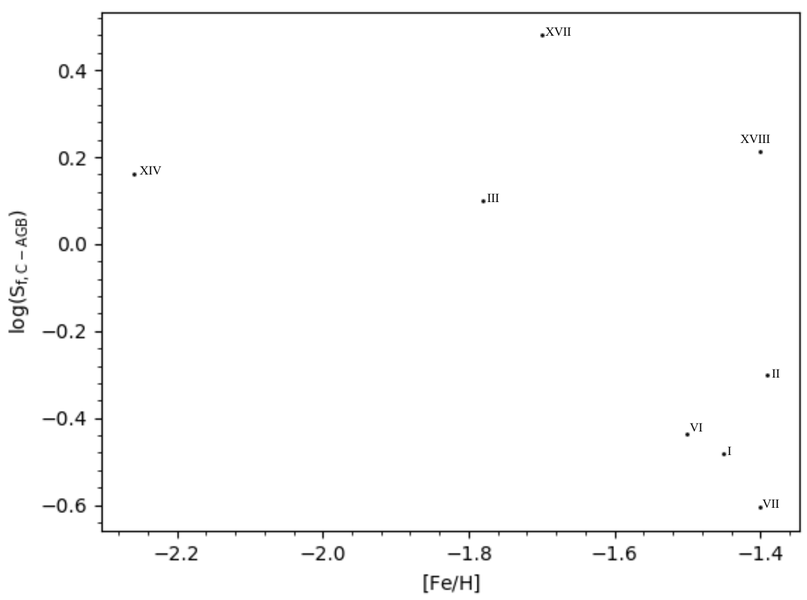
LEVERAGING AGBS

- Very bright in Near-IR, AGB stars trace epochs of intermediate-age star formation (from ~ 100 Myr to 5 Gyr[1]).
- A change in chemical composition from Carbon-rich to Oxygen-rich enables them to be used to estimate metallicity.
- We produce a catalogue of C- and M-type AGB stars within the satellites and halo of M31.

Insert image of AGBs classified in CMD & colour-colour diagram – redo with grey scatter points

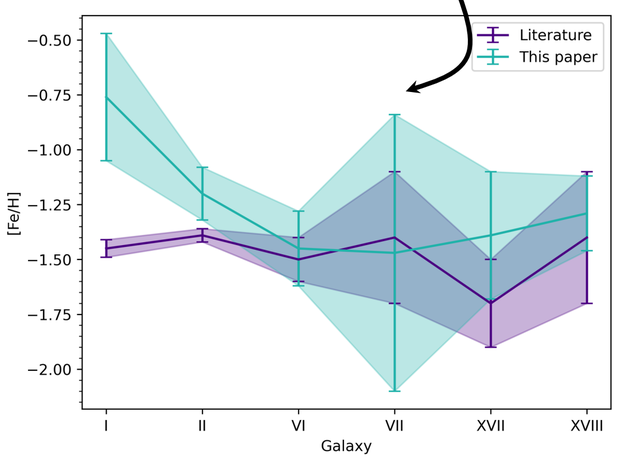
C- & M-TYPE AGBS

Dwarf Spheroidals (dSphs)

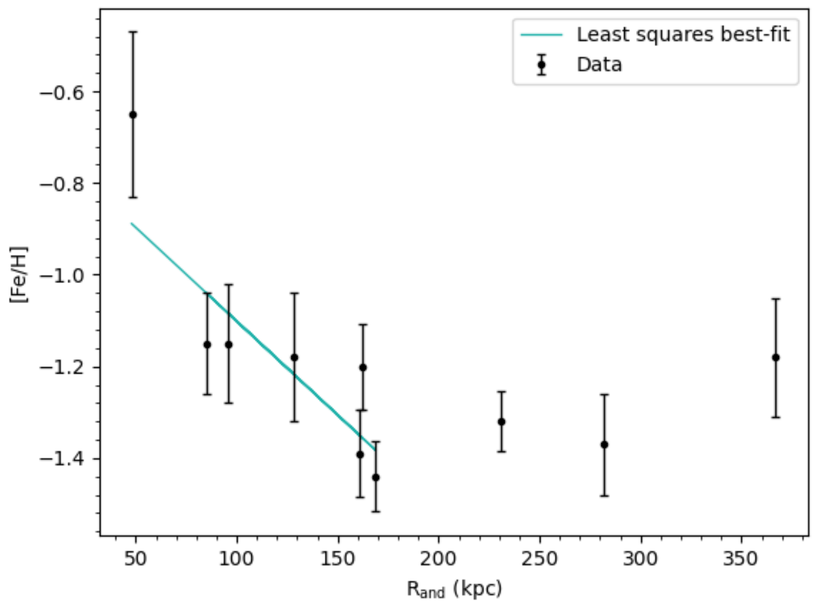


- A significant fraction (66%) of dSphs contain C-type AGBs

We show good metallicity agreement with previous studies, using relationship from Cioni (2009)[2].

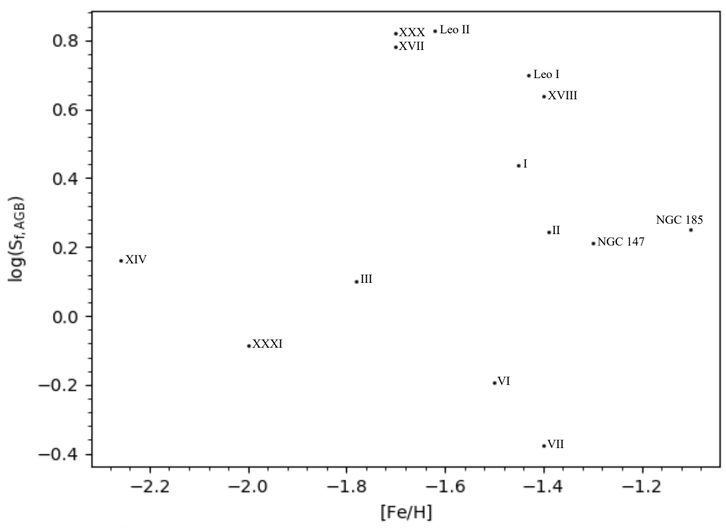


M31 Halo



- Metallicity gradient out to ~170 kpc, in agreement with the SPLASH survey[3].

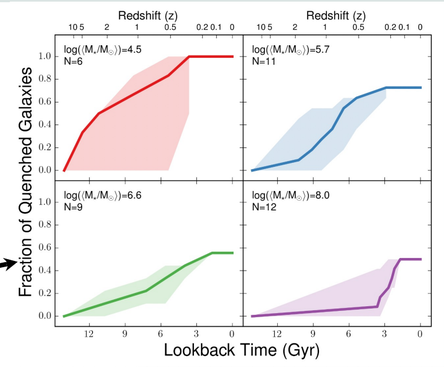
TRACING STAR FORMATION

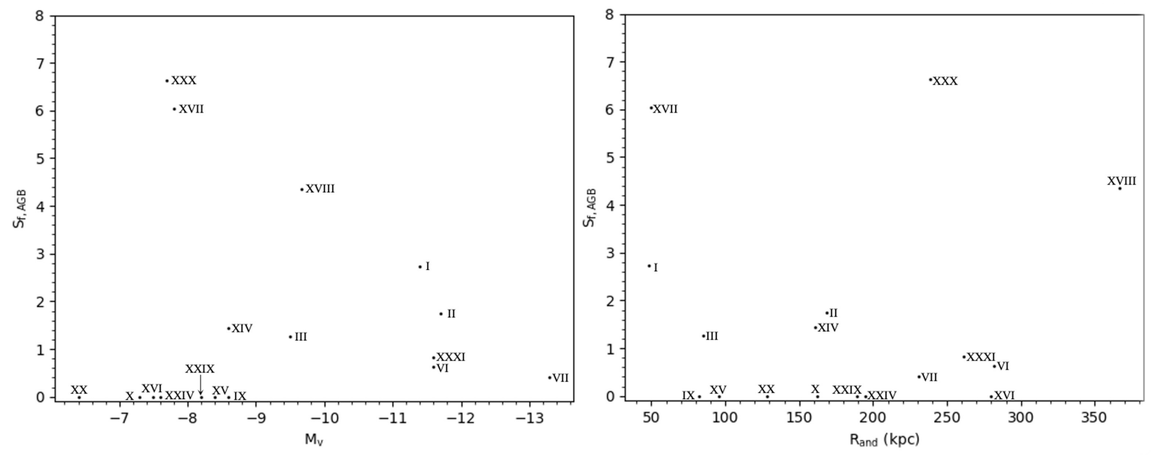


M31 dSphs display a wide variety of SFHs:

- Some consistent with the recent star formation of Leo I.
- ~50% show signs of very little to no star formation over the last ~10 Gyr.

- Lower-mass satellites show more evidence of star formation over the last ~10 Gyr than higher-mass satellites, contrary to what we might expect[4].
- It also appears to not be explained by environmental effects.





References:
[1] Cook K. H., Aaronson M., Norris J., 1986, ApJ, 305, 634
[2] Cioni M. R. L., 2009, A&A, 506, 1137
[3] Gilbert K. M., et al., 2014, ApJ, 796, 76
[4] Weisz D. R., Dolphin A. E., Skillman E. D., Holtzman J., Gilbert K. M., Dalcanton J. J., Williams B. F., 2015, ApJ, 804, 136