

WALLABY Memo 16

Galaxy overdensity in 6dFGS towards potential WALLABY early science target fields

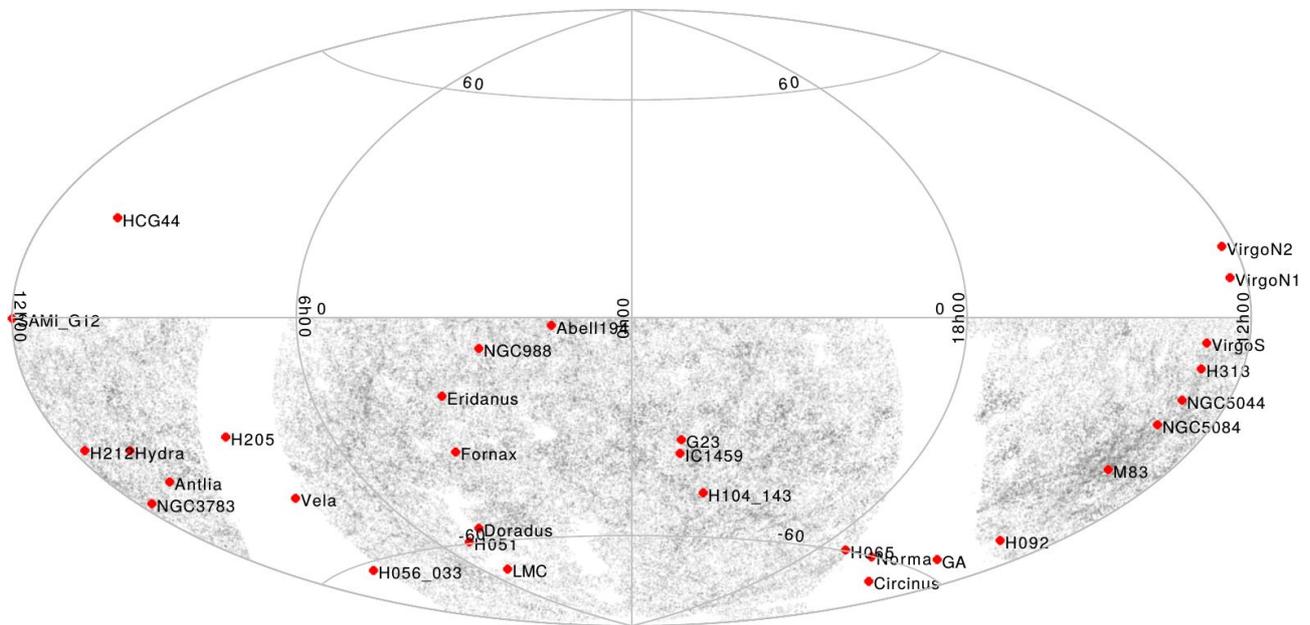
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Version 2 – 1 March 2016

Introduction

This memo presents statistical information on the density of galaxies detected in the **6dF Galaxy Survey** ([Jones et al. 2009, MNRAS, 399, 683](#)) in the direction of potential WALLABY early science target fields. Each field is assumed to be circular with a diameter of 8° and centred on the agreed reference positions of early science fields.

Overview map

The following map shows an all-sky view of the 6dFGS catalogue (in grey-scale) with the locations of all proposed WALLABY early science target field centres overlaid and labelled.

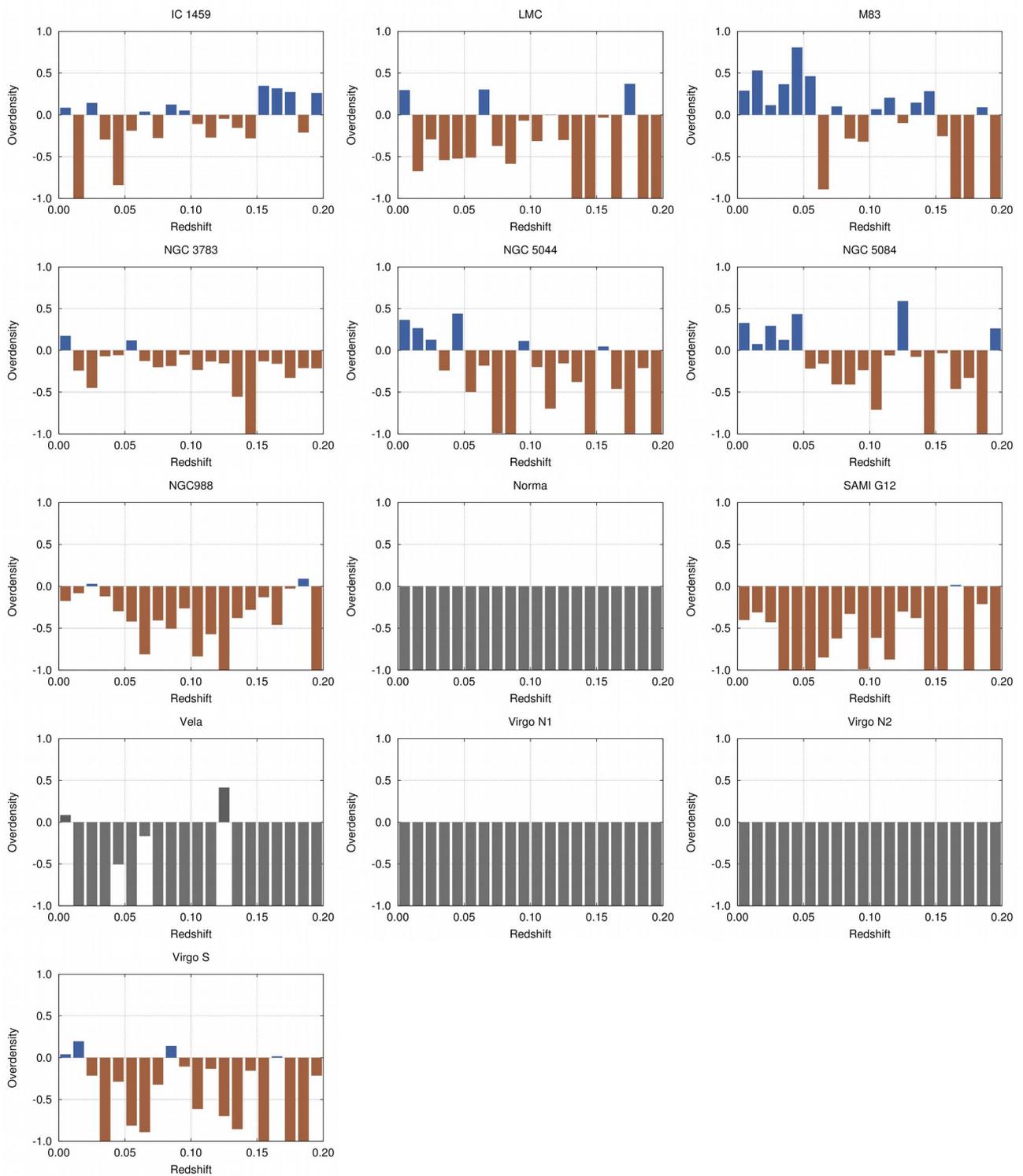


Note that several target fields are in the zone of avoidance, the northern hemisphere, or in other locations of **incomplete 6dFGS coverage** (e.g. the LMC), and reliable statistics are therefore only available for a limited number of fields. Also note that a significant fraction of our target fields (in fact, all fields at $\alpha \gtrsim 12$ h) are located in the **supergalactic plane**.

Overdensity redshift histograms

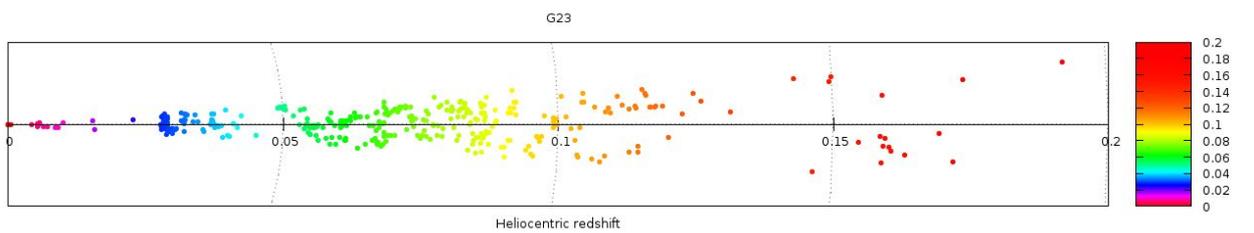
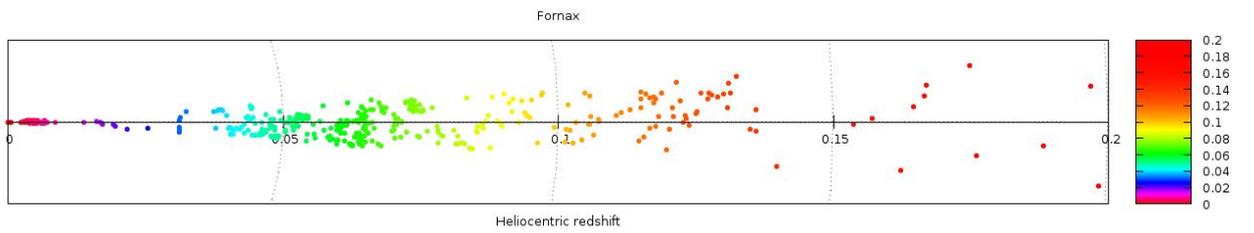
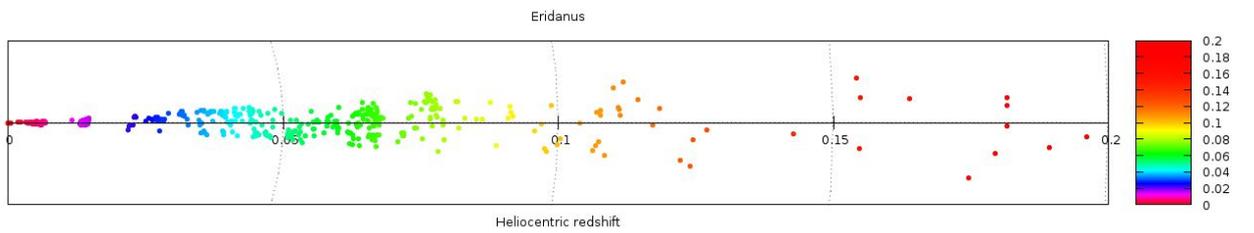
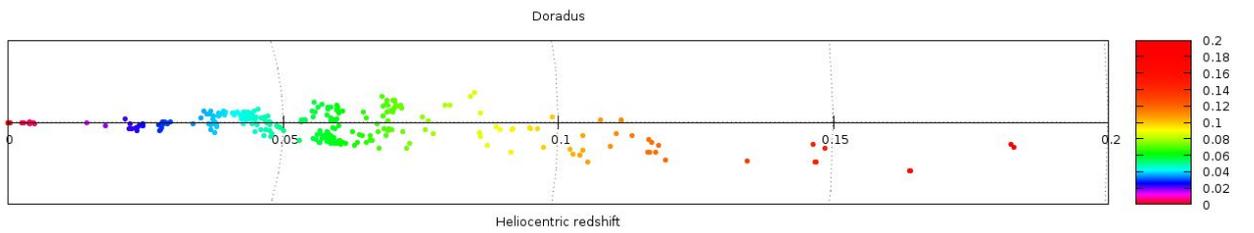
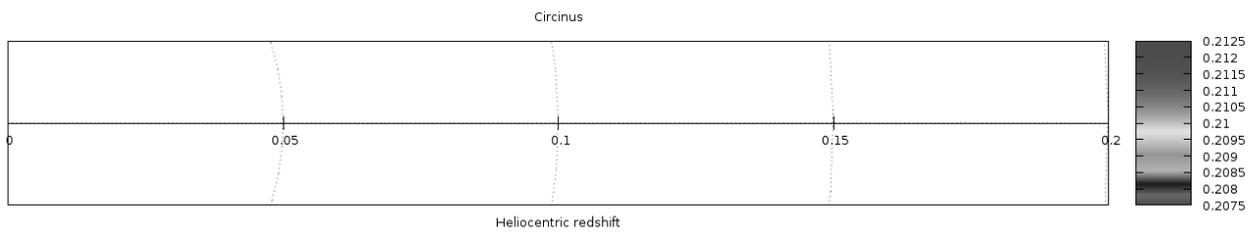
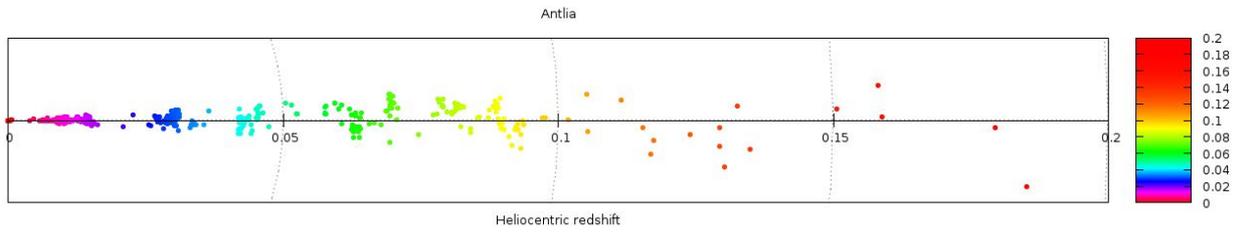
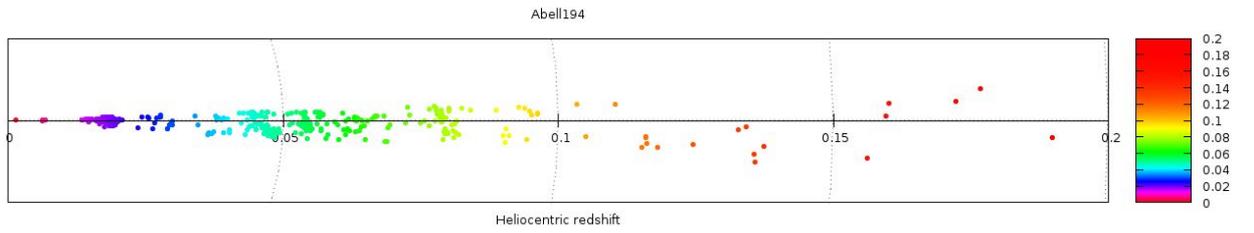
The following histograms show the overdensity of galaxies, $\log_{10}(N_{\text{gal}}/\langle N_{\text{gal}} \rangle)$, in 6dFGS as a function of redshift in the range of $z \leq 0.2$ in steps of $\Delta z = 0.01$. Overdensity is defined with respect to the **average** galaxy density, $\langle N_{\text{gal}} \rangle$, across the sky in any particular redshift bin and has been corrected for 6dFGS completeness. Note that the histograms are presented on a **logarithmic** scale, ranging from -1 (underdense by a factor of 10) to $+1$ (overdense by a factor of 10). Thus, underdense histogram bins appear more significant than overdense bins.

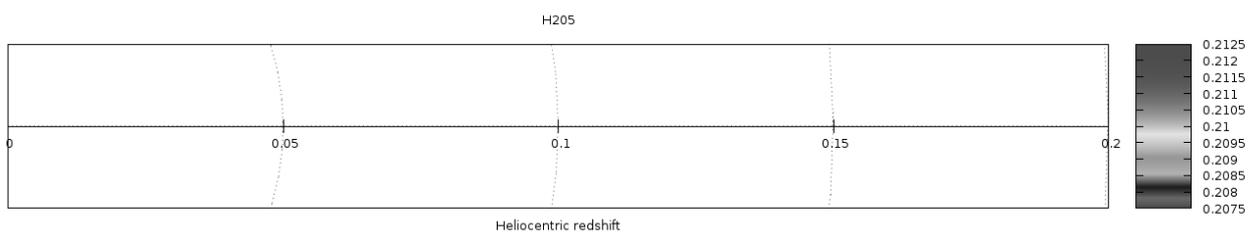
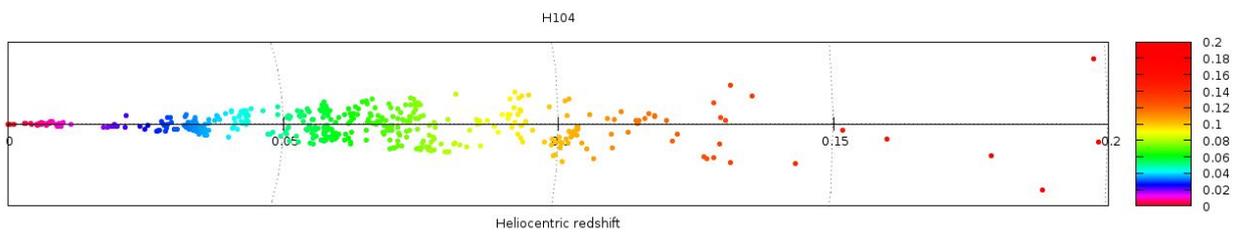
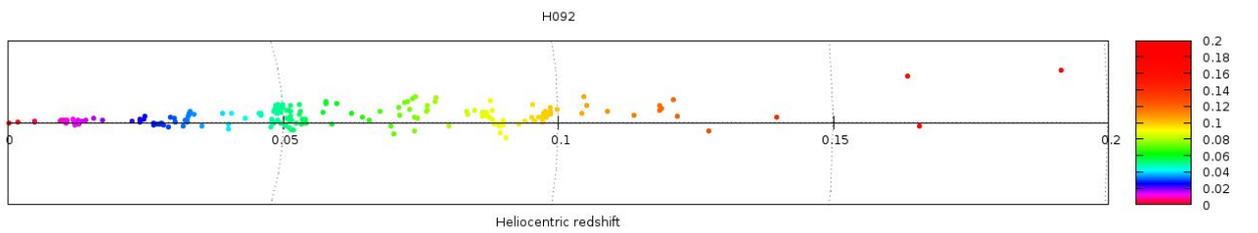
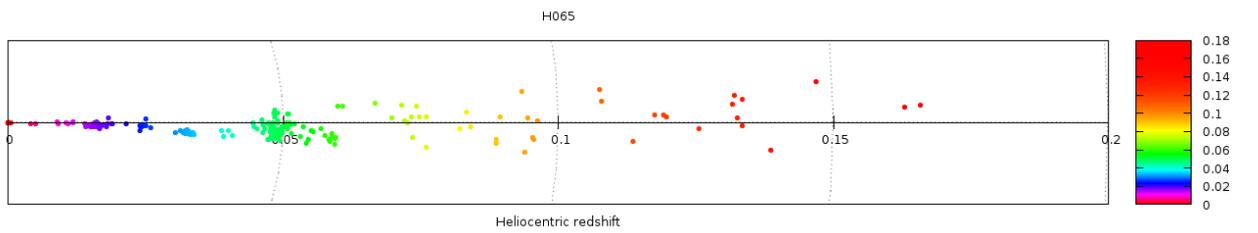
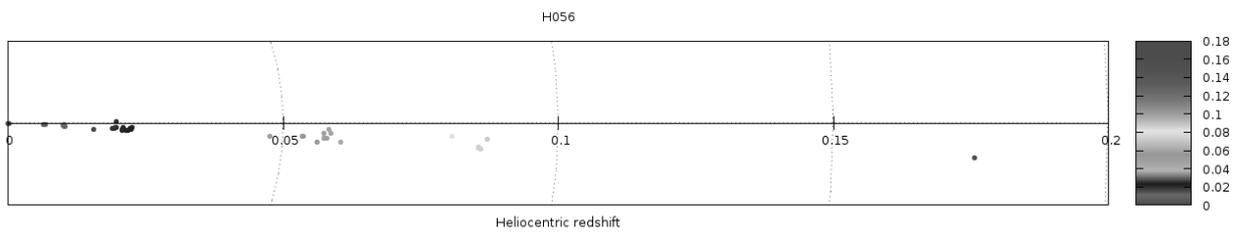
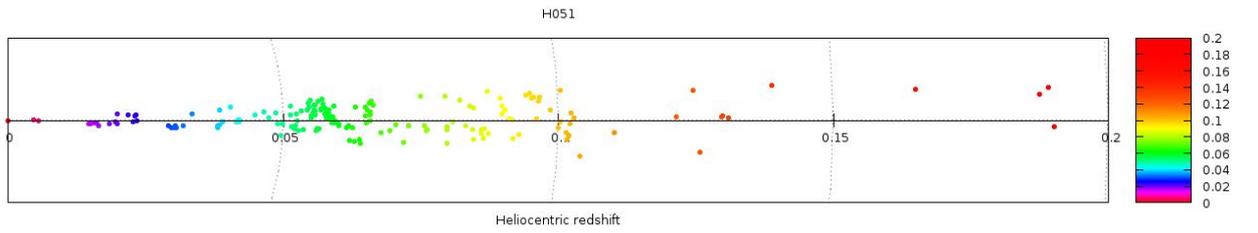
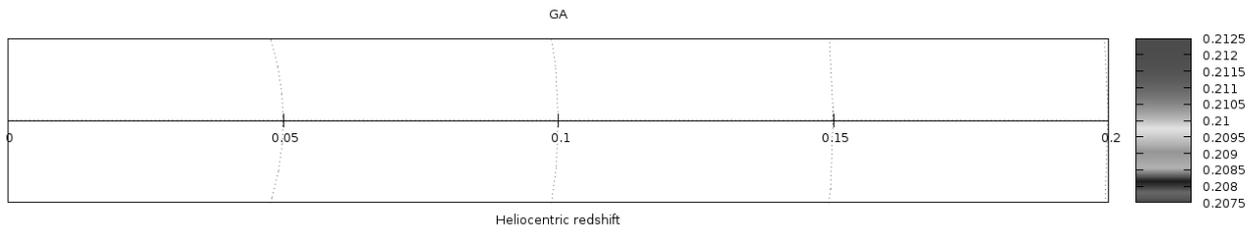
Each circular field measures 8° in diameter and is centred on the agreed position of each target. Note that several fields are located outside the main sky coverage area of 6dFGS, and reliable statistical information on these fields is therefore unavailable. *The most severely affected fields are shown in greyscale below, but note that a few additional fields may be affected by low-number statistics because they are located near the edge of the area covered by 6dFGS.*

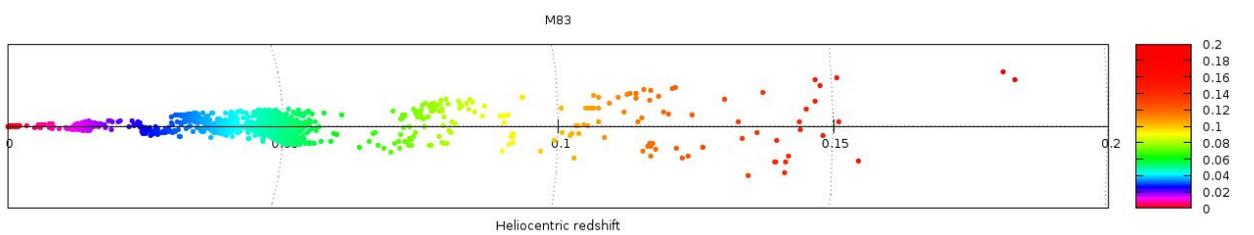
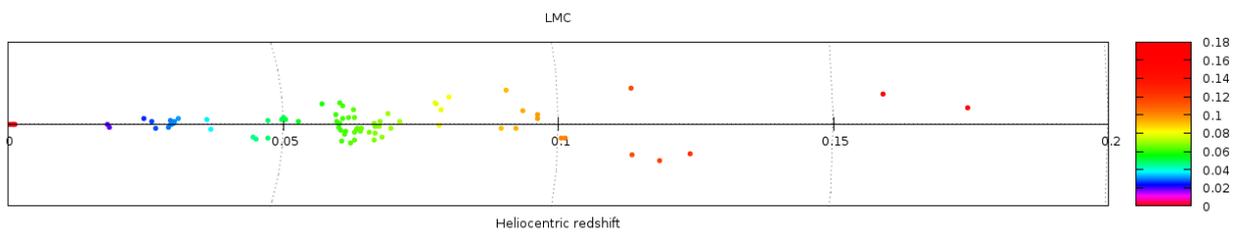
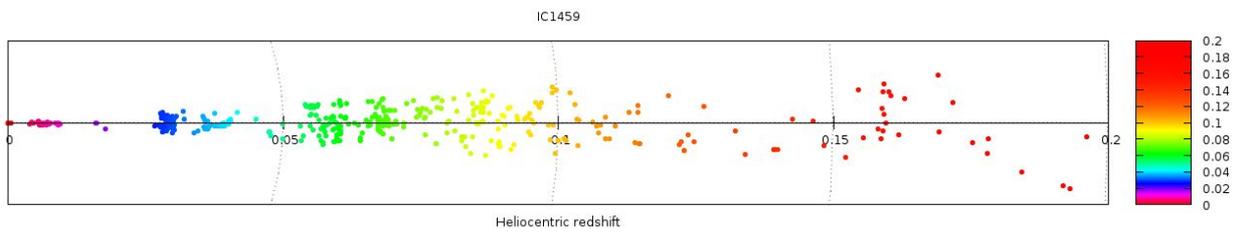
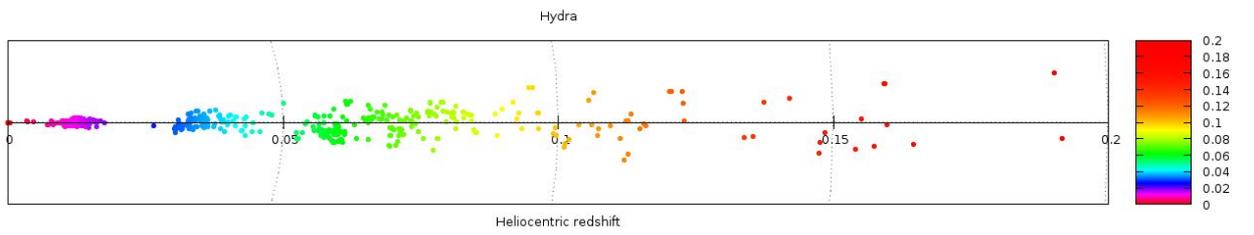
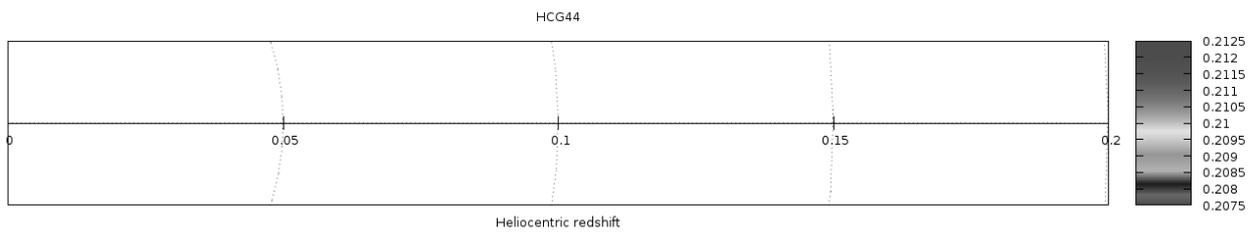
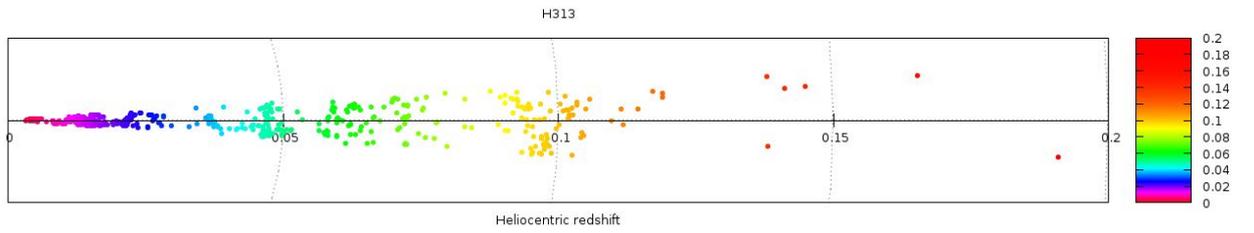
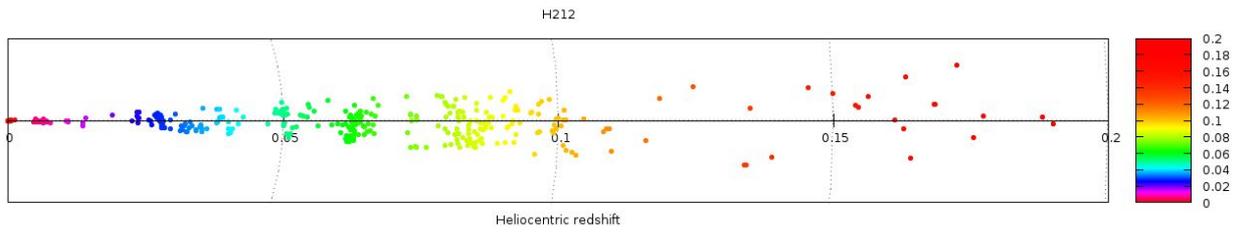


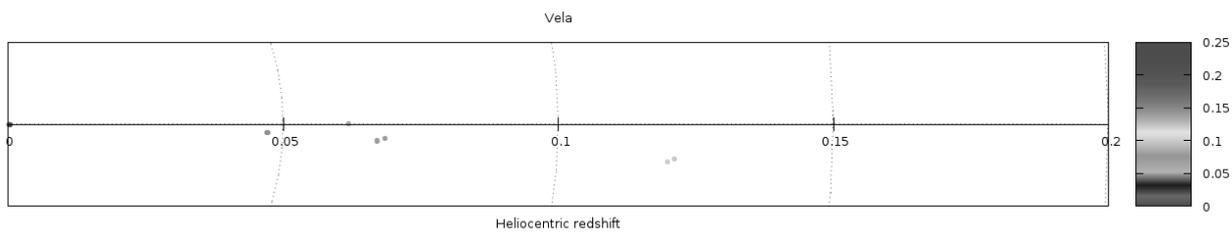
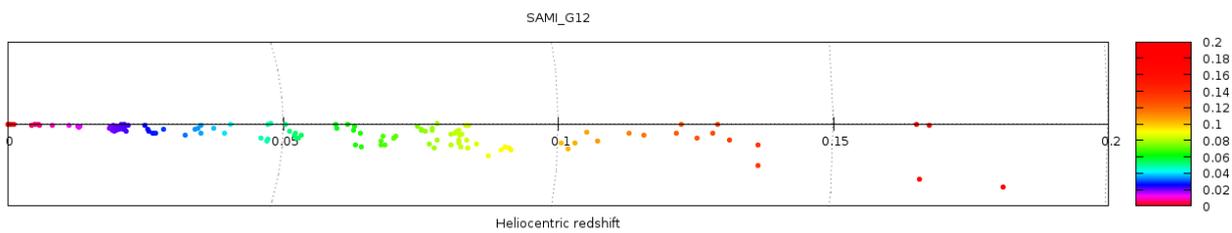
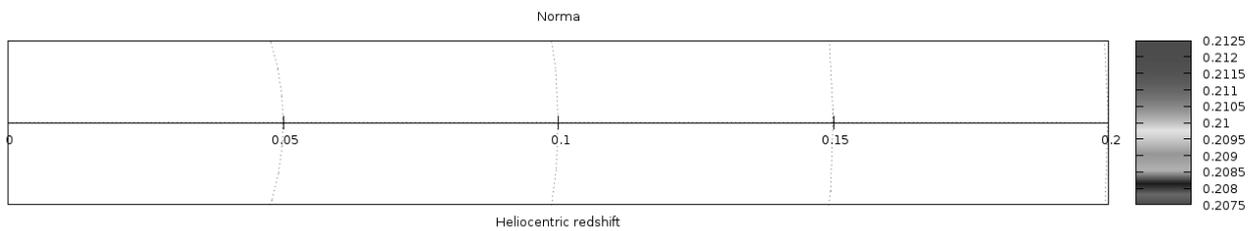
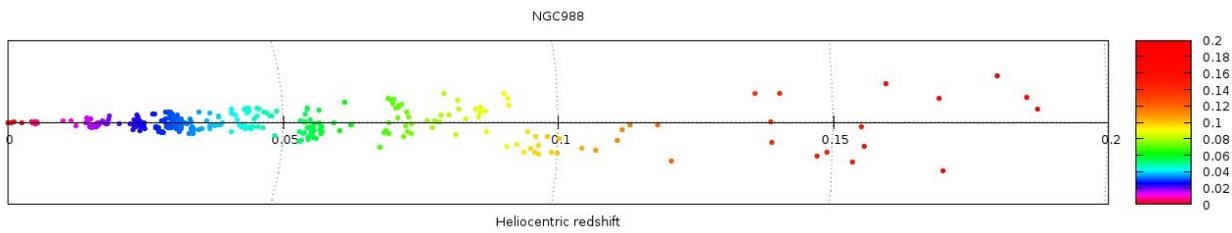
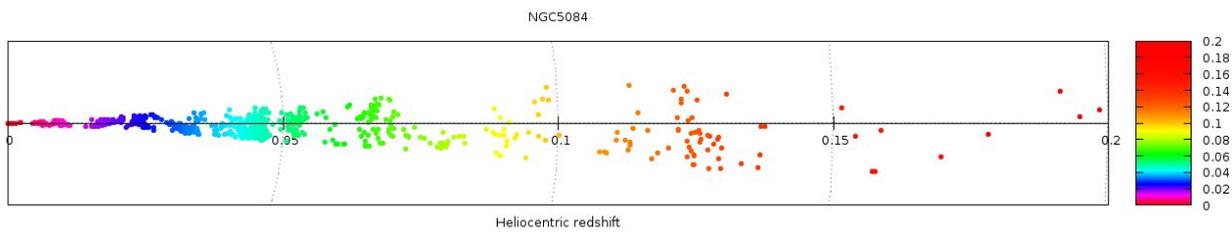
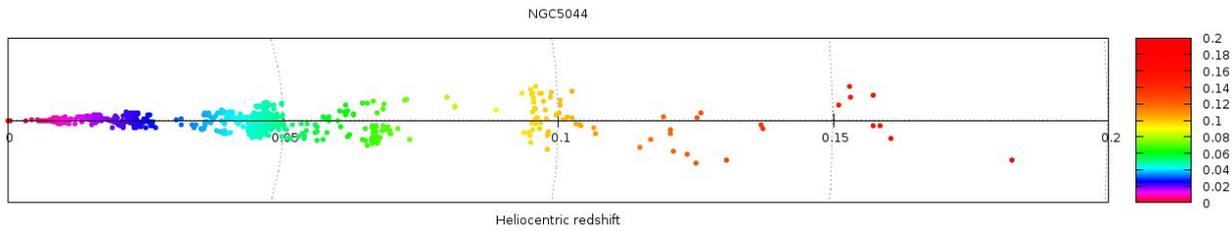
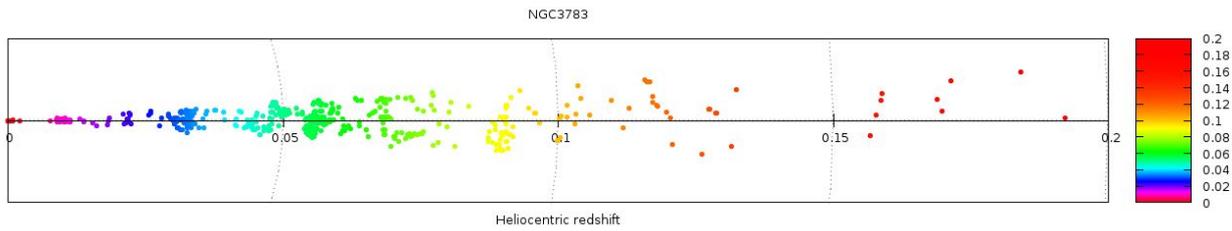
Wedge plots

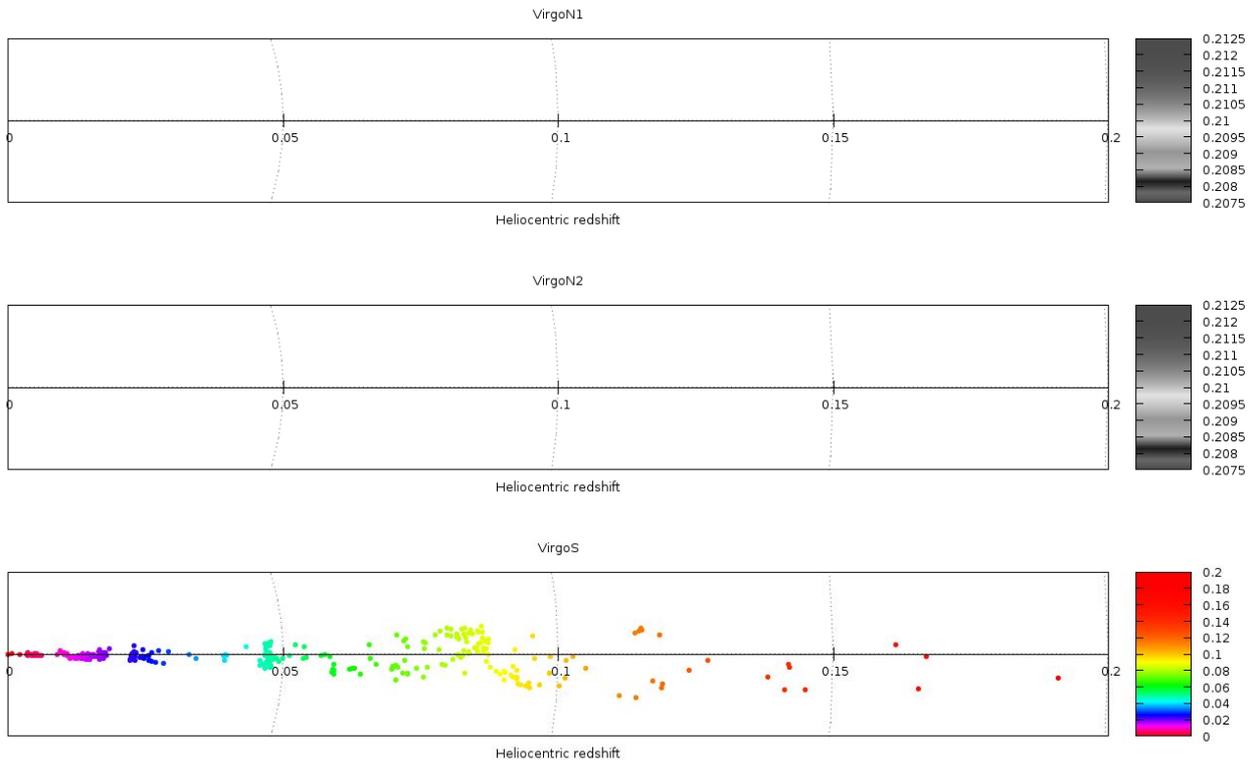
The following plots show the distribution of **declination** versus **redshift** in polar coordinates for all potential WALLABY target fields. Again, a circular field of 8° diameter is assumed, and the redshift range of $z = 0.0$ to 0.2 is considered. All galaxies are colour-coded by their redshift. Fields with virtually no 6dFGS coverage are shown in greyscale. *Note that several additional fields have limited sky coverage and are therefore affected by low-number statistics.*











Sky maps

The following maps show the distribution of 6dFGS galaxies on the sky across the WALLABY early science target fields. Again, circular fields of 8° diameter are shown (note that the **RA axis is flipped** here), and offsets relative to the agreed centres of the potential target areas are shown. Galaxies are **colour-coded** by redshift, and the **size** of the data points also varies with redshift (large = low z , small = high z). Fields with little or no 6dFGS coverage are again shown in greyscale, as they contain no statistically useful information. *Note that several other fields have incomplete 6dFGS coverage as well.*

