



The *Chandra* Deep Wide Field Survey of the Bootes Field

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Motivation. Deep X-ray observations on a large contiguous area, in combination with the excellent *Chandra* angular resolution, allow precise studies of large scale structure of the Universe using AGNs as tracers, as well as studying their host galaxies and evolution.

The *Chandra* Deep Wide Field Survey (CDWFS, Fig. 1) pushes the central 6 deg² of the 9 deg² Bootes field from ~5 ks to ~30 ks of depth, for a total of 1.6 Ms of exposure.

Goal. In order to reach the scientific goals outlined above, we will release a robust and reliable X-ray catalog providing rich information on X-ray properties and, where available, on the optical-NIR counterparts.

Dataset. The CDWFS adds 63 observations in the Bootes field of the NOAO Deep Wide Field Survey. We collected and re-analyzed the whole *Chandra* dataset (281 observations, spanning ~15 years, ~3.4 Ms of time).

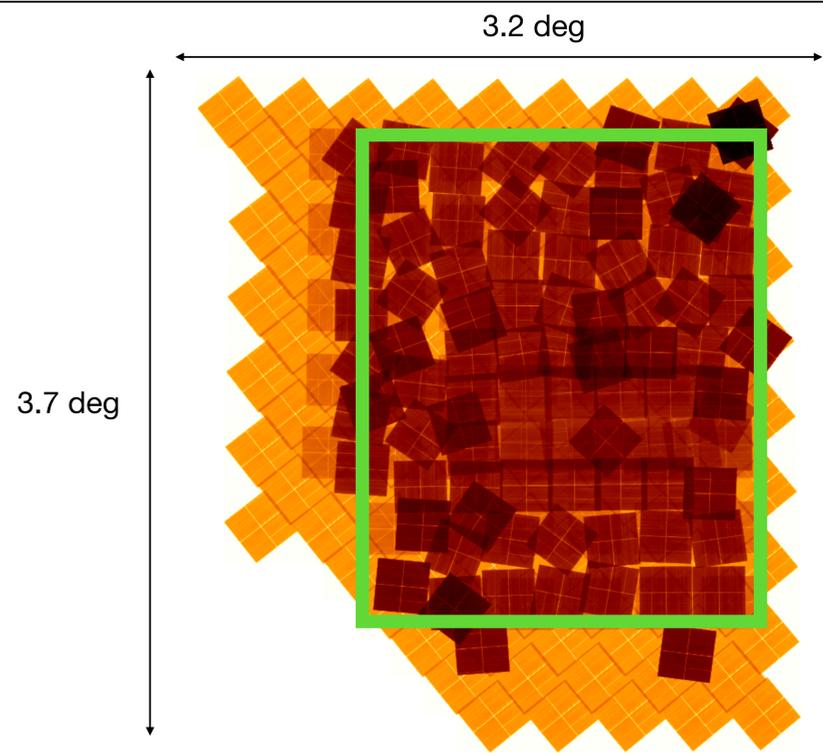


Figure 1. Exposure map of the survey field; the new CDWFS observations are the darker exposures in the green rectangle.

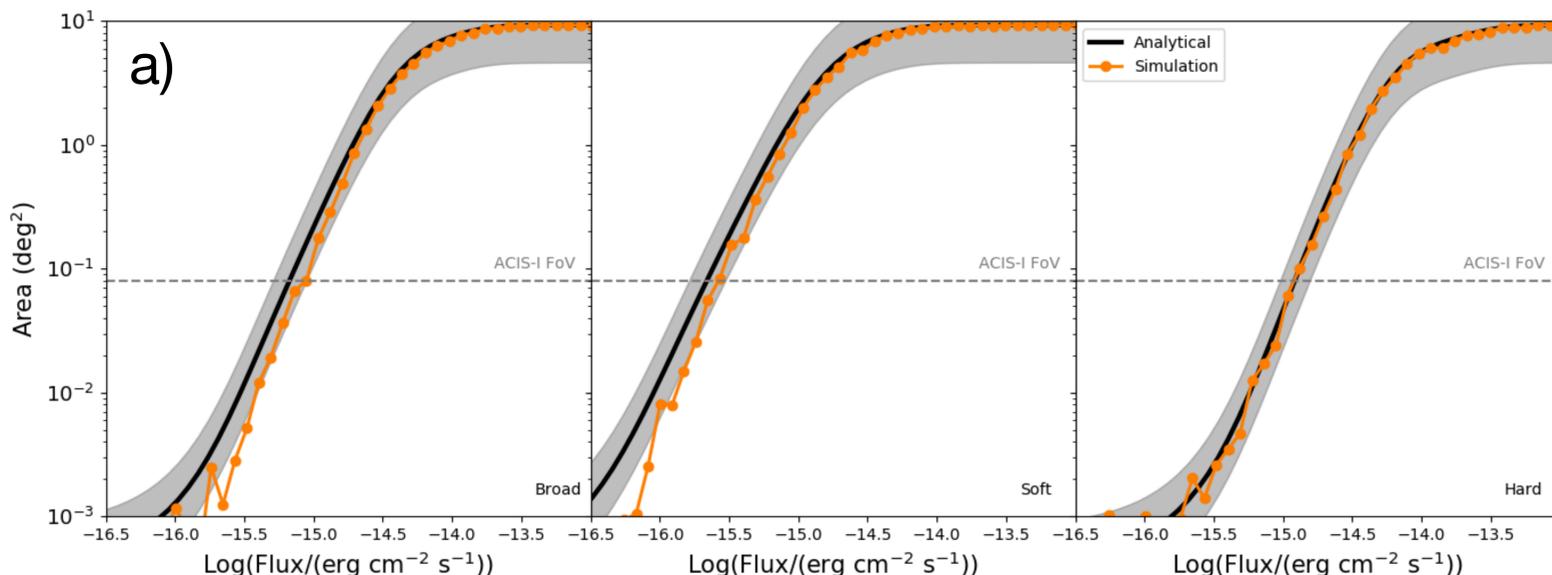
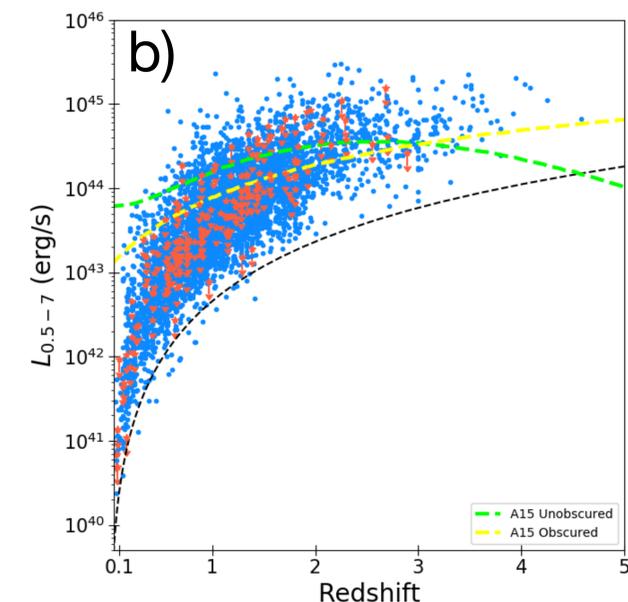


Figure 2.

a) Sensitivity of the survey as a function of flux, for the three bands adopted. The simulations agree very well with the theoretical expectations based on Georgakakis et al. (2008). The small deviation at low fluxes in the broad and soft band is due to the detection process employed (wavdetect threshold).

b) Redshift - Luminosity plane for the 4589 X-ray sources with a redshift. The plot shows that we are able to probe below the knee of the luminosity function of both obscured and unobscured AGNs (Aird et al. 2015) up to $z \sim 3$.



Simulations. An extensive array of simulations of the whole field has been carried out, with different input distributions of point sources.

Taking into account the spatial variations of the PSF and the behavior of the *Chandra* background has allowed us to keep under control the spurious fraction and completeness of our catalog, to choose well-motivated probability thresholds, and to reliably assess the sensitivity of the survey in each band (Figure 2a).

The X-ray catalog. The full catalog contains 7232 AGNs reliably detected in at least one band, 86% of which have been assigned a robust optical-NIR counterpart. Redshifts are available for 63% of our sample (46% spec-z and 54% photo-z), and allow us to probe the AGN population well below the knee of the luminosity function up to $z \sim 3$ (Figure 2b).

Acknowledgements

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References

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