

# The Garching-Bonn Deep Survey (GaBoDS) Wide-Field-Imaging Reduction Pipeline

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# Outline

- 1 The reduction pipeline THELI
- 2 The ESO Deep Public Survey as a testcase for THELI
- 3 Application: Photometric redshifts in comparison
- 4 Conclusions

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# Overview



- wide-field imaging data (WL applications)
- instrument independent (including near-IR imagers)
- publicly available, widely used by community
- well-tested on many architectures
- easy to use, nearly fully automatic
- parallelised
- GUI available
- Erben et al. 2005, AN, 326, 432

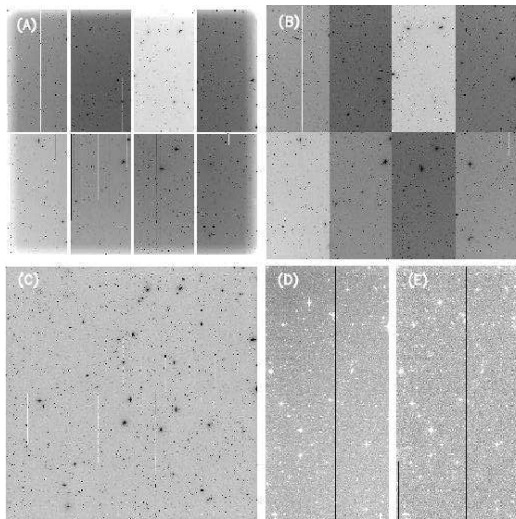
# Structure

- based on excellent existing software (only open source)

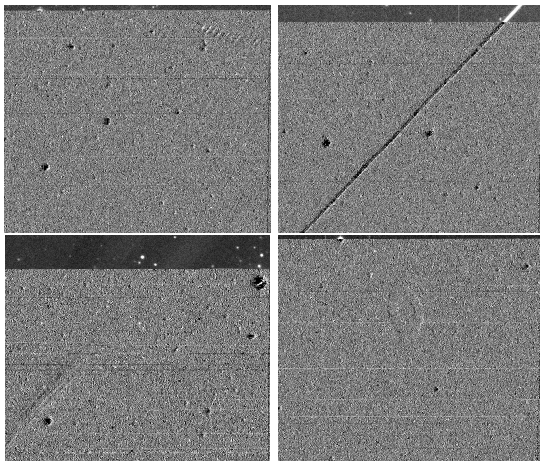
# Disadvantages

- limited control on data flow
- limited error handling
- no underlying database
  - ⇒ not optimal for very large survey projects
- lower speed than homogeneous pipelines

# Pre-processing



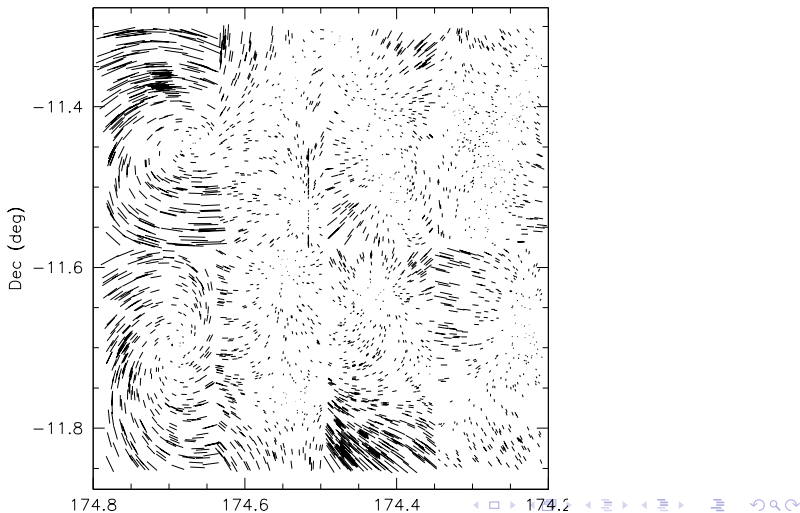
# Masking of image defects



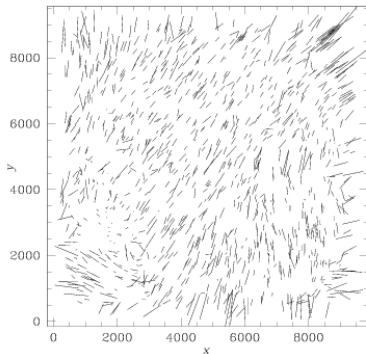
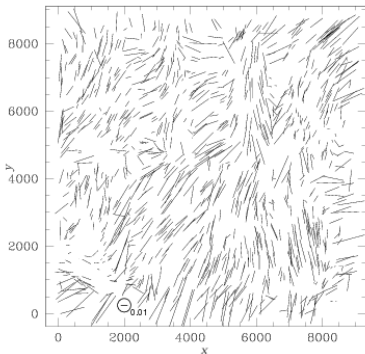
from Erben et al. 2005, AN, 326, 432



# Astrometry



# Astrometry

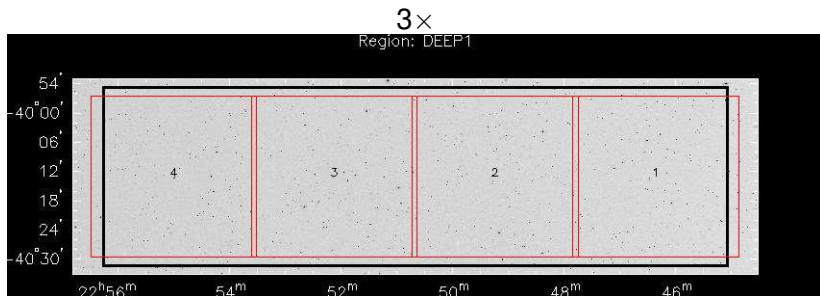


from Dietrich et al. 2006, A&A, 449, 837

# Outline

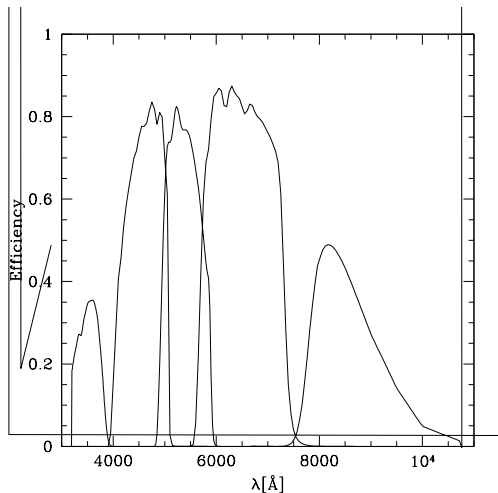
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# Survey geometry



in *UBVRI*

# WFI filter-set

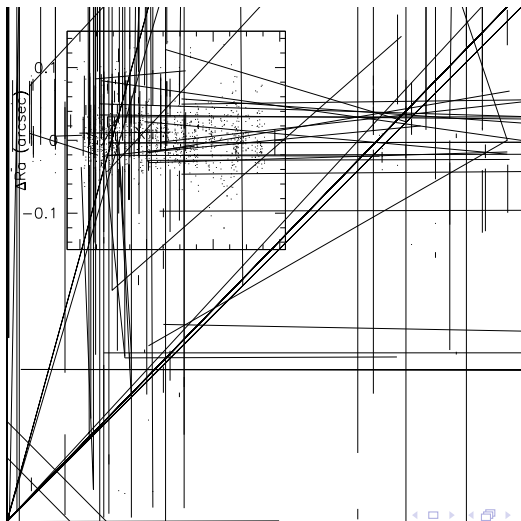


from Hildebrandt et al. 2005, A&A, 441, 905

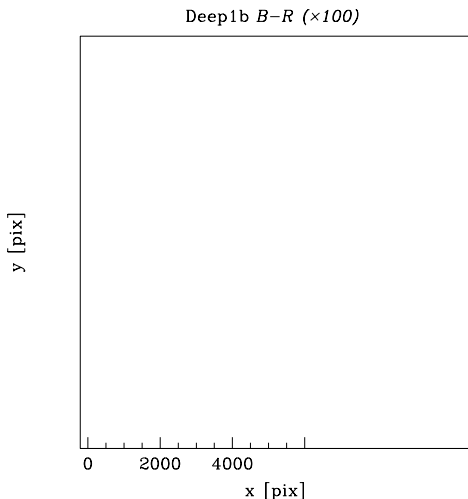
# Reduction of the ESO Deep Public Survey

- first application to a large dataset
- > 3000 raw science images
- debugging, optimisation

# Astrometric accuracy



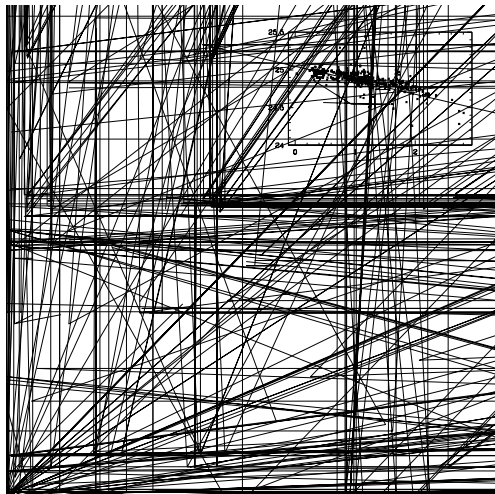
# Astrometric calibration



from Hildebrandt et al. 2006, A&A, 452, 1121



# Photometric calibration of a night

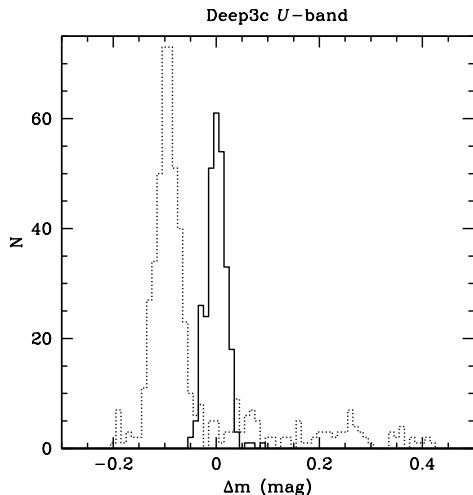


from Hildebrandt et al. 2006a, A&A, 452, 1121

# Corrected zeropoints

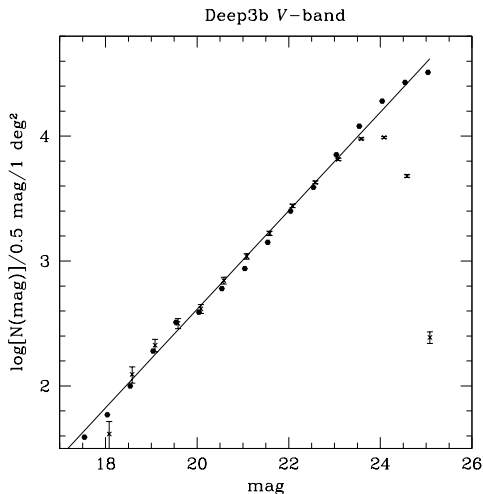
- Relative zeropoints from overlap objects
- $\sum_i ZP_{\text{rel},i} = 0$
- $ZP_{\text{corr},i} = ZP + \text{Airmass} \cdot \text{EXT} + ZP_{\text{rel},i}$
- $ZP_{\text{coadded\_image}} = \langle ZP_{\text{corr}} \rangle$
- no illumination correction
- ZP accuracy of 0.05-0.1 mag

# Check of corrected zeropoints



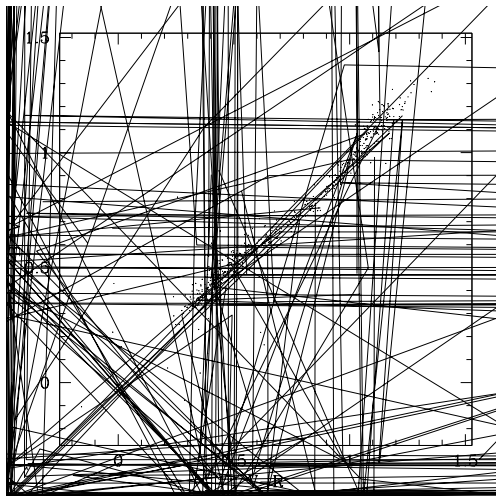
from Hildebrandt et al. 2006a, A&A, 452, 1121

# Check of absolute photometric calibration



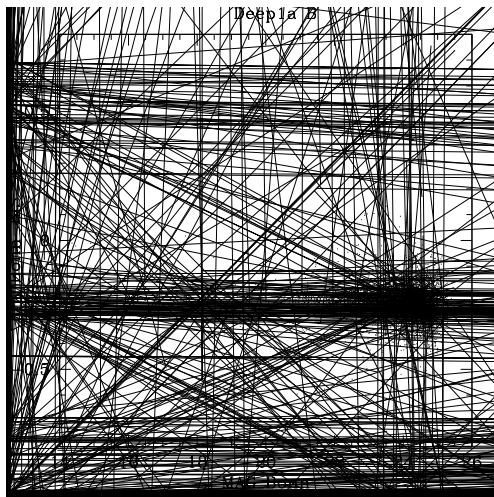
from Hildebrandt et al. 2006a, A&A, 452, 1121

# Check of absolute photometric calibration



from Hildebrandt et al. 2006a, A&A, 452, 1121

# Photometric comparisons to other reductions



# Data release

Fully reduced and stacked images available at

<http://marvin.astro.uni-bonn.de/DPS/>

and via the ESO archive “Advanced Data Products”-section

[http://archive.eso.org/archive/eso\\_data\\_products.html](http://archive.eso.org/archive/eso_data_products.html)

Hildebrandt et al. 2006, A&A 452, 1121

# Outline

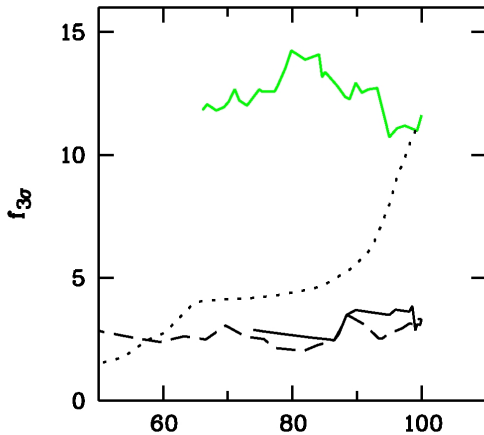
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# Photometric redshifts in comparison

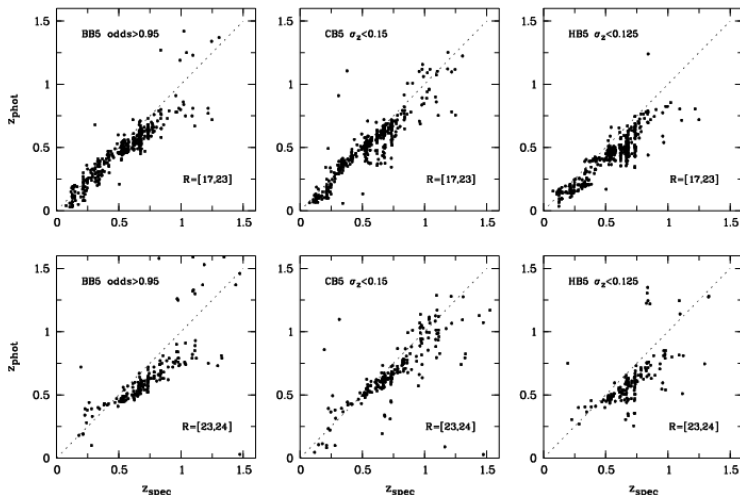
- Collaboration with C. Wolf (Oxford) and N. Benítez (Granada)
- 3 different imaging data sets
- 2 large spectroscopic catalogues
- 3 photo-z codes
- Blind use & Re-calibration of photometry

# Photo-z error estimation



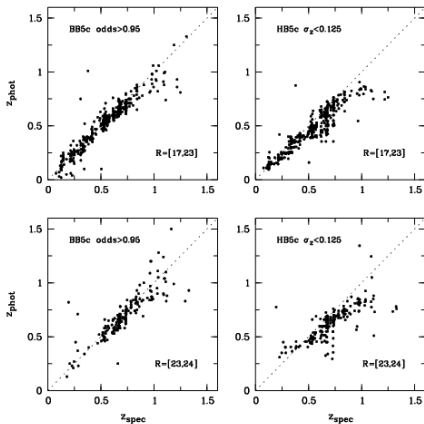
from Hildebrandt et al. 2007, A&A submitted

## Blind-use results, GaBoDS data



from Hildebrandt et al. 2007, A&amp;A submitted

# Re-calibrated results, GaBoDS data



from Hildebrandt et al. 2007, A&A submitted

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# Conclusions

- **THELI:** <ftp://ftp.ing.iac.es/mischa/THELI/>
- **DPS:** [http://archive.eso.org/archive/eso\\_data\\_products.html](http://archive.eso.org/archive/eso_data_products.html)
- **Further information:** Poster No. 28 by M. Schirmer