Photometric Redshifts in the Hawaii-Hubble Deep Field-North

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Abstract. We derive $z_{\rm phot}$ for sources in the entire (~ 0.4 deg^2) H-HDF-N field with the EAzY code, based on PSF-matched broad-band (U band to IRAC 4.5 μm) photometry. Our catalog consists of a total of 131,678 sources. We find $\sigma_{\rm NMAD} = 0.029$ for non-X-ray sources. We also classify each object as a star or galaxy through SED fitting. Furthermore, we match our catalog with the 2 Ms CDF-N main X-ray catalog. For the 462 matched non-stellar X-ray sources, we improve their $z_{\rm phot}$ quality ($\sigma_{\rm NMAD} = 0.035$) by adding three additional AGN templates. We make our photometry and $z_{\rm phot}$ catalog publicly available.

Keywords. catalogs — galaxies: distances and redshifts — galaxies: evolution — surveys

There are > 3000 $z_{\rm spec}$ and enormous multiwavelength data in the ~ 0.4 deg^2 H-HDF-N field (see Fig.(a)), which covers HDF-N, GOODS-N, CANDELS, and CDF-N. We utilize the EAzY code to derive $z_{\rm phot}$ with PSF-matched broadband photometry, adopting 8 galaxy templates for non-X-ray sources (see Fig.(b)), 3 additional AGN templates for X-ray sources, and a linear combination of these templates. Our $z_{\rm phot}$ quality shows overall improvements over relevant previous works, with $\sigma_{\rm NMAD} = 0.029$ (0.035) and an outlier fraction of 5.5% (12.5%) for non-X-ray (X-ray) sources (see Figs.(c–e)). We release photometry and $z_{\rm phot}$ catalog of 131,678 sources publicly.

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