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Title: Characterization and Validation of Small HZ Planet Candidates in the Kepler SOC Pipeline
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Abstract: The Transiting Planet Search (TPS) and Data Validation (DV) components of the Science Operations Center (SOC) Processing Pipeline were run with the SOC 9.1 codebase on the Q1-Q16 Kepler data set in August 2013. This represents nearly all of the photometric data that were acquired before science data collection was halted due to the loss of a second reaction wheel in May 2013 (Q17). Pipeline results (Threshold Crossing Event details and Data Validation products) will be delivered to the Exoplanet Archive at the NASA Exoplanet Science Institute (NExSci) following a review by the Kepler Data Analysis Working Group. Long cadence light curves for the vast majority of Kepler targets are searched for transiting planet signatures in the TPS component of the SOC Pipeline. Those targets for which the detection threshold is exceeded are subsequently processed in the DV Pipeline component. The primary functions of DV are to (1) characterize planets identified in the transiting planet search, (2) search for additional transiting planet signatures in light curves after transit signatures have been removed, and (3) perform a powerful suite of diagnostic tests to aid in discrimination between true transiting planets and false positive detections. We describe the characterization and validation of transiting planets in the Q1-Q16 data set with emphasis on small Habitable Zone (HZ) planet candidates that were not identified in earlier Pipeline runs with shorter data sets. We present planet model fit results for some new candidates and examples of the diagnostics utilized to validate them. We also present examples of false positive detections most common in the region of planet radius/equilibrium temperature parameter space occupied by HZ Earths and Super-Earths. The Exoplanet Archive is located at exoplanetarchive.ipac.caltech.edu. Funding for the Kepler Mission has been provided by the NASA Science Mission Directorate.

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