COMET SCIENCE WITH THE REACTIVATED NEOWISE MISSION. J. M. Bauer[1], A. K. Mainzer[2], E. A. Kramer[2], T. Grav[3], J. R. Masiero[2], Y. R. Fernandez[4], C. R. Nugent[5], T. Spahr[6], K. J. Meech[7], R. M. Cutri[5], E. L. Wright[7] and the NEOWISE Team. [1]Dept. Of Astronomy, University of Maryland, [2]Jet Propulsion Laboratory, California Institute of Technology, [3]Planetary Science Institute, [4]Dept. of Physics, University of Central Florida, [5]IPAC, [6]NEO Sciences, [7]Univ. of Hawaii, Institute for Astronomy, [8]Dept. of Physics and Astronomy, University of California, Los Angeles.

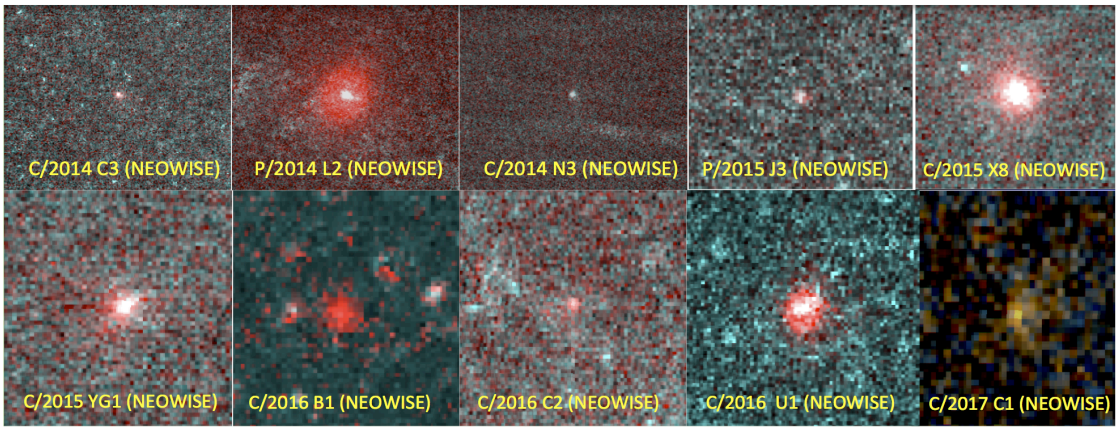

Figure. 1: The 10 comet NEOWISE discoveries show the 3.4 μm band mapped to green and blue, and the 4.6 μm band mapped to red. The very red appearance of coma in some of the images is often due to the presence of CO or CO_2.

Introduction: The WISE spacecraft was launched on December 14, 2009, and from January 20 through August 4 of 2010, during the "fully-cryogenic" phase of the WISE mission, the spacecraft conducted a survey the entire sky at 3.4, 4,6, 12, and 22 μm. Continuing in the three lowest wavelength bandpasses, the 3-band phase of the WISE survey ended in late September of 2010, but the survey continued in its post-cryo phase until the spacecraft was placed in hibernation on February 1, 2011, completing the second full pass of the sky for the WISE prime mission. Over the course of the prime survey conducted in 2010 and 2011, over 164 comets were surveyed, providing flux measurements that yielded values of $CO+CO_2$ production, dust production, and comet nucleus sizes for the majority of comets observed [1].

In November of 2013, the WISE spacecraft was reactivated, renamed NEOWISE, and began again to survey the sky at roughly 6 month intervals. The survey continues to the present, now in its 5th year of the reactivated mission. As it continues into its 9th coverage of the sky at 3.4 and 4.6 μm, the reactivated NEOWISE spacecraft has detected over 135 comets, approaching a comparably large census number of cometary bodies as the prime mission.

Reactivated Mission Data: The reactivated mission data differs in several key aspects from the kind of comet data provided over the course of the cryo phases of the prime mission. Though nearly as sensitive as the post-cryo mission phase [2], the reactivated NEOWISE data span 8 complete sky coverages and provide multiple visits of most of the comets observed. Less sensitive to large-grained dust and the thermal signal of the nucleus of quiescent comets, the comet detections in the reactivated survey tend to be when the objects are at closer observational and heliocentric distances, and more active. Furthermore, owing to the activity, while the fraction of nucleus size measurements are more difficult to extract from the reactivated mission data than from the fully-cryogenic phase, the fraction of the detections that provide constraints on $CO+CO_2$ production is larger [3,4].

We will provide an overview of the reactivated mission's comet data, including the status of the $CO+CO_2$ production rate analyses. We will also provide preliminary results for the dust analyses, and constraints on activity of particular comets of interest that have been detected by NEOWISE, and what future analyses will provide. Finally, we will provide an update of the recent mission milestones, and highlight the newest NEOWISE results of other small body analyses [5].

References:

[1] Bauer et al. 2017. AJ, .154, 53 [2] Mainzer et al. 2014. ApJ 792, 30. [3] Rosser et al. 2017, AJ, Submitted. [4] Bauer et al. 2015. ApJ, 814, 85. [5] Masiero et al. 2017. AJ 154, 168.