THE DIVERSITY OF CARBON IN COMETARY REFRACTORY DUST PARTICLES. D. H. Wooden[1], [1]NASA Ames Research Center (diane.h.wooden@nasa.gov).

Introduction: When comparing the dark icy surfaces of outer solar system small bodies and the composition of carbonaceous chondrites derived from dark asteroids we find a significant discrepancy in the assessed amounts of elemental carbon: up to 80% amorphous carbon is used to model the dark surfaces of Kuiper Belt Objects and Centaurs whereas at most 5% of elemental carbon is found in carbonaceous chondrites. If we presume that regimes of comet nuclei formation are analogous to disk regimes where other outer solar system ice-rich bodies formed then we can turn to comet dust to gain insights into the diversity in the concentration and forms of carbon available in the outer disk.

Diversity of carbon, abundance and composition: Comet dust offers important insights into the diversity in the amounts and forms of carbon that were incorporated into aggregate dust particles in the colder parts of the protoplanetary disk out of which comet nuclei accreted. Comet nuclei are amongst the most primitive bodies because they have remained cold and unequilibrated. Comet dust particles reveal the presence of forms of elemental carbon and of soluble and insoluble organic matter, and in a great diversity of concentrations from very little, e.g., Stardust samples of comet 81P/Wild 2, to 80% by volume for Ultra Carbonaceous Antarctic Micro Meteorites (UCAMMs). Cometary outbursts and/or jet activity also demonstrate variations in the concentration of carbon in the grains at different grain sizes within a single comet.

We review the diversity of carbon-bearing dust grains in cometary samples, flyby measurements and deduced from remote-sensing to enrich the discussion about the diversity of carbonaceous matter available in the outer ice-rich disk at the time of comet nuclei formation.