Comparing Radiation Chemical Results - A Multi-dimensional Problem. R. L. Hudson[1] and P. A. Gerakines[1], [1]Astrochemistry Laboratory, NASA Goddard Space Flight Center, 8800 Greenbelt Road, Greenbelt, MD 20771, USA, reggie.hudson@nasa.gov.

Introduction: Our research group has studied molecular formation and destruction by ionizing radiation and vacuum-UV photons for over 30 years. However, the quantification of radiation-chemical and particularly photochemical changes has been a continuing challenge, in part due to the many sets of units and variables that are in use by and of interest to researchers. Among the dose measurements and typical units found in the literature are incident particle fluence (ions cm^{-2}, electrons cm^{-2}), absorbed dose per mass (eV $gram^{-1}$, MGy, Mrad), absorbed dose per molecule (eV $molecule^{-1}$, eV 1-amu-$molecule^{-1}$, eV 16-amu-$molecule^{-1}$), absorbed dose per volume (eV cm^{-3}), absorbed energy (eV, Joules), photon fluence (photons cm^{-2}), and, chiefly with photolysis experiments, exposure time (sec). Without clarity on units and doses it can be impossible to reproduce and verify, or not, published results.

Results: This presentation will demonstrate how to lie (or not) about molecular stability by using a careful choice of units. More positively, this presentation will show how units of radiolytic and photolytic doses can convey unintended impressions. Examples will be given both from the authors' recent publications and from the literature, and a few interlaboratory comparisons will be attempted. See especially references [1-3] below and our research group's web pages at http://science.gsfc.nasa.gov/691/cosmicice/ for examples of our radiation-chemical and photochemical work. This presentation also will serve to introduce this particular AbSciCon session on investigations into radiation and habitability.

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References: [1] Gerakines, P. A. and Hudson, R. L. (2015) *Icarus*, in press. [2] Gerakines, P. A. and Hudson, R. L. (2013) *Astrobiology*, 13, 647-655. [3] Gerakines, P. A., Hudson, R. L., Moore, M. H., and Bell, J-L. (2012) *Icarus*, 220, 647-659.

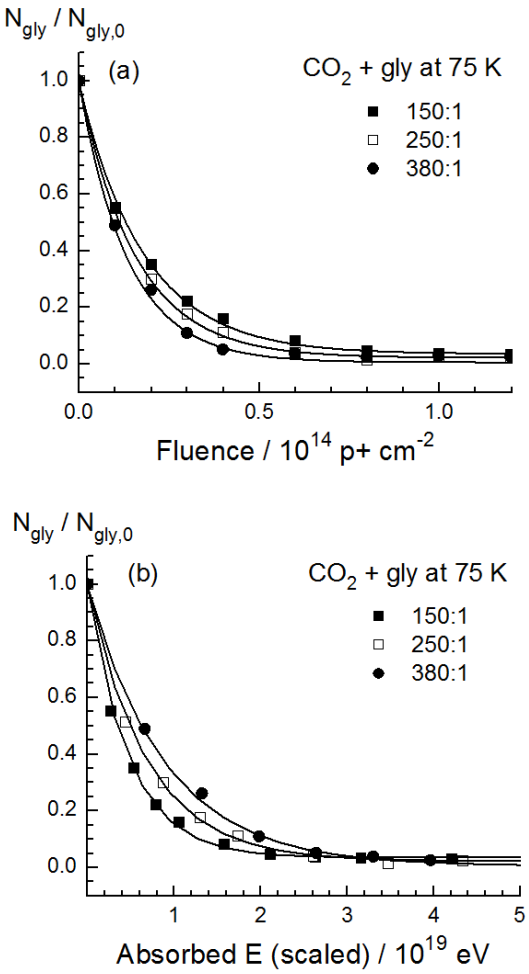

Fig. 1. *Examples of curves showing radiolytic destruction rates for glycine in CO_2-rich ices at 75 K. Note the different x-axis units.*