Stratospheric Ozone Reactive Chemicals Generated by Space Launches Worldwide

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Abstract: We report quantities of inorganic chlorine compounds and **aluminum oxide** particles (Al203) deposited in the stratosphere and troposphere by solid rocket propelled launch vehicles. Totals are presented by launch vehicle type, summarized on an annual basis, and projected to the year 2010 using standard mission models. Data are given for Air Force, NASA (shuttle and expendable vehicles), the European Space Agency (ESA) (Ariane 5), and the Japanese Space Agency (H-1 and H-2). Whereas inorganic chlorine compounds released by solid rockets are directly related to stratospheric ozone depletion, much uncertainty surrounds reactivity of **aluminum oxide** particles. We also compare current and future effects of space launch on stratospheric ozone depletion with those of Ozone Depleting Chemicals (ODCs). As a baseline, we use projections of future ODC use by SMC, Air Force Materiel Command (AFMC), and the world. Relevant stratospheric chemistry is considered to make a legitimate comparison of ODC and solid rocket exhaust. (jg)

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