other three cloudless days, it was calculated that this energy flux should have been 1.6% greater on July 30. The actual measurements showed it to be 5.9% greater, however, implying that the dust suspension of July 30 was responsible for a 4.3%increase in atmospheric thermal radiation.

That this figure is probably a very conservative estimate of the potential long-wave aerosol effects may be shown by use of the concept of effective atmospheric emittance, defined as incoming thermal radiation received per calculated blackbody radiation at measured screen level air temperature. For the three normal cloudless days the mean effective atmospheric emittance over the 1000-1500 period was 0.955. As 1.000 represents the theoretical upper limit of this parameter, it is seen that dust effects could only have increased it by 4.7%. The measured value of 4.3% differs from this potential value by an amount that is of the order of the resolution of the instrumentation employed in obtaining it. Thus, it may be concluded that the dust suspension of July 30 transformed the atmosphere into an effective blackbody, limiting any further increases in the atmospheric thermal radiation and prohibiting the experimental determination of its full potential for longwave radiation interaction.

This point is significant in that the effective atmospheric emittance is temperature dependent, and the mean value for the Earth as a whole is much lower than that prevailing at Phoenix on the days of this study. In particular, the effective atmospheric emittance appears to have a minimum value of about 0.74 in the region of 0° C, tending towards unity at both higher and lower temperatures¹⁵ to yield a mean value of about 0.88¹⁶. Thus, the long-wave effects of an atmospheric aerosol could be much greater than the 4.3% increase they effected in the atmospheric thermal radiation in this study. Indeed, measurements I made during a winter dust storm indicated that an increase in atmospheric thermal radiation of 12 to 13%may be brought about by low level dust⁷.

Notwithstanding this greater potential effect, just the basic 4.3% increase in effective atmospheric emittance discovered in this study is sufficient to alter vastly the Earth's climate through Via this well-known the so-called "greenhouse effect". mechanism, any increase in the emissivity of the Earth's atmosphere will produce an incremental temperature rise near the planet's surface. Using the heat balance model of Haltiner and Martin¹⁶ for mean Earth conditions, it may be calculated that the long-wave aerosol effects detected in this study could conceivably warm the Earth by 3 or 4° C. In view of the uncertainty associated with even the qualitative effects of aerosol interaction with solar radiation, these results suggest that the likely effect of increasing the dust content of the atmosphere would be to produce a warming trend at the Earth's surface.

S. B. IDSO

US Water Conservation Laboratory, Agricultural Research Service, US Department of Agriculture, 4331 E. Broadway, Phoenix, Arizona 85040

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Tritium Contamination of Deuterium Compounds

Two reports^{1,2} have appeared which indicate that various commercial deuterated reagents and solvents contain appreciable quantities of tritium. Because this matter is of concern especially in view of the wide use of deuterated compounds as solvents for n.m.r. spectroscopy I wish to report that these observations are in error. Leete¹ indicated that only the deuterium oxide (D₂O) supplied by one company was low in tritium. In fact D₂O supplied by that company before the middle of 1971 was, at times, also high in tritium, and since then D₂O supplied by most companies has been low in tritium. The US Atomic Energy Commission (AEC) is the prime source of D₂O to nearly all suppliers and the results shown in Table 1 illustrate the dramatic reduction in tritium content of recent samples of D_2O obtained from the AEC.

Date	µCi ml.−1 of D2O
September, 1969	6.0
November, 1969	6.0
April, 1970	6.0
April, 1970	0.06
May, 1970	0.12
July, 1970	0.09
September, 1970	0.06
September, 1970	0.09
November, 1970	0.1
December, 1970	0.27
January, 1971	0.02
March, 1971	0.0012
July, 1971	0.00047
October, 1971	0.0004
January, 1972	0.0003
March, 1972	0.00031
March, 1972	0.00008
May, 1972	0.0004
August, 1972	0.00008

Thus, Leete's results (private communication) are no longer valid, having been obtained from old samples of D₂O; the heavy water currently available contains very little tritium. Because D_2O is the prime source of deuterium for other deuterated materials the reduction in the tritium content of D_2Q will result in a marked decrease in the tritium content of other deuterated chemicals.

J. R. CAMPBELL

Aldrich Chemical Co., Inc., 940 West St Paul Avenue, Milwaukee, Wisconsin

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Micro-fission Explosions and Controlled Release of Thermonuclear Energy

THE possibility of igniting a thermonuclear micro-explosion by a laser pulse has recently attracted great interest as a result of the proposal to lower the energy requirements by imploding a T-D thermonuclear pellet with a laser pulse of proper shape,