

LETTER TO THE EDITOR

Study of the variations of ^7Be , ^{32}P , ^{90}Sr , ^{210}Pb and ^{210}Po in the troposphere

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Marenco and Fontan (1974) have reported on the extensive measurements carried out by them at Toulouse, France, on the radionuclides mentioned above. Using these data as well as their theoretical calculations on the variations in activity levels and activity ratios by vertical exchange, precipitation scavenging, etc., they draw conclusions regarding the sources of the different isotopes and the causes for their seasonal variations. The seasonal increase in Be^7 in the surface atmosphere, noted by several investigators, is attributed to variations in precipitation scavenging and vertical exchanges within the troposphere and not due to increased transfer from the stratosphere as thought hitherto.

The data collected and analysis carried-out are impressive but the measurements at least are from one station only. It is doubtful how far one can extrapolate data from a single station to phenomenon on a hemispheric scale. Thus, it is not clear how a correlation can be established between activity levels in air and the index of precipitation at Toulouse. The air masses are in constant motion subject to washout and other processes throughout their path and not only at the point of measurement. In assessing the effect of washout by precipitation in producing seasonal variations, one should consider precipitation over a wide region (Hvinden, 1965; Volchok, 1965). This is very necessary as it is often noted that stations

with entirely different rainfall patterns show similar seasonal variations.

The authors also remark that the amplitude of the variations of ^{32}P at Toulouse is more than that of ^7Be and that this proves the absence of stratospheric intrusions, as such intrusions should result in more ^7Be than ^{32}P . Gedeonov et al. (1969) give ^{32}P and ^7Be levels and $^7\text{Be}/^{32}\text{P}$ ratios in surface air at Leningrad for the period 1963-1966. The seasonal increases in ^7Be and ^{32}P are in phase with a similar increase in the $^7\text{Be}/^{32}\text{P}$ activity ratios. Gedeonov et al. (1969) connect these increases with stratospheric inputs. Reiter et al. (1970) also connect the increases in ^7Be and ^{32}P at their station in Bavarian Alps with the descent of stratospheric air parcels as shown by isentropic trajectory analysis. As the simulation calculations of Marenco and Fontan (1974) allows 15% ^7Be from the stratosphere (this component should vary seasonally) and possibly this figure is not better than a factor of two, a significant ^7Be contribution from the stratosphere, as postulated by several investigators including the authors, may not be wrong.

Lastly, local and large scale components of ^{210}Pb can be more accurately evaluated by comparison with concurrent radon and Th-B levels as several phenomena, such as variations in air mass stability, changes in air masses, etc., influence ^{210}Pb through radon rather than directly (Rangarajan et al., 1975).

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