

suspicion that contrails *may* be influencing the weather and that it is important to find out if they *are*.

In conclusion, it should be stated that if contrails are affecting the weather it is not necessarily for the worse, although if there is any considerable change it is sure to make someone unhappy. The Russians might well be pleased with an ice-free Arctic Ocean; but if it leads to a major glaciation in central Canada, it is unlikely that the Canadians and Americans would regard it as favorable.

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CORRESPONDENCE

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Effect of Range on Apparent Height and Frequency of High-Altitude Radar Precipitation Echoes

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As coauthors of the captioned *Monthly Weather Review* article (Vol. 97, No. 6, June 1969, pp. 429-431), we welcome this opportunity to restate some of our findings so that possible misinterpretation by interested readers may be avoided.

Our conclusion concerning echo altitude and frequency of occurrence due to range effects should state that the net or resulting errors due to range are insignificant rather than the errors are insignificant. The individual

errors can be substantial, as mentioned in our paper, and as pointed out in a private communication from Dr. D. Atlas, Director of the Laboratory for Atmospheric Probing at the University of Chicago. We agree, for example, that there is a balancing effect between the increasing width of the beam with range that tends to increase the altitude of reported tops and the beam-width averaging or filling effect that decreases the average reflectivity of the top region with range. Also, height errors obviously depend on reflectivity and its height profile, so that, as Dr. Atlas emphasizes, serious overestimates of precipitation echo tops may occur when the edges or side lobes of the beam detect sufficient reflectivity from below. That such false echoes may occasionally enter the records despite operational procedures and professional manpower as used in the WSR-57 network underscores the fact that reflectivity is a vital factor in radar climatology of storm tops.