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To: EDGES Group
From: Alan E.E. Rogers
Subject: Meteor scatter rates

Since all the World's designated radio quiet zones are less than 2000 km from strong radio transmitters they are subject to RFI from meteor scatter. The key parameters of meteor scatter are poorly determined. For example, theory suggests that the radar cross-section (RCS) should decrease by 20 dB per decade from head echoes but measurements typically have an even faster decline with frequency.

The frequency range for significant scatter and the range of concern to radio astronomy is about 50 to 300 MHz. Some papers claim that 10^{12} meteors enter the Earth's atmosphere each day while others suggest a number more like 10^9 . In practice we observed a rate of about 1 per minute when located in a canyon (see memo #52) with sky coverage limited to elevations greater than about 25 degrees. Based on the geometry of Figure 1 this corresponds to a worldwide rate of about 10^7 /day.

Figure 2 shows the estimated burst rate as a function of elevation cut-off angle. This very sharp curve shows the advantage of limiting the low elevation response of the antenna or using the terrain to limit the elevation angle.

Potential locations for EDGES are on route 205 in the canyon just before 205 enters the Catlow Valley, Oregon or about 1km West of route 205 on Skull creek road.

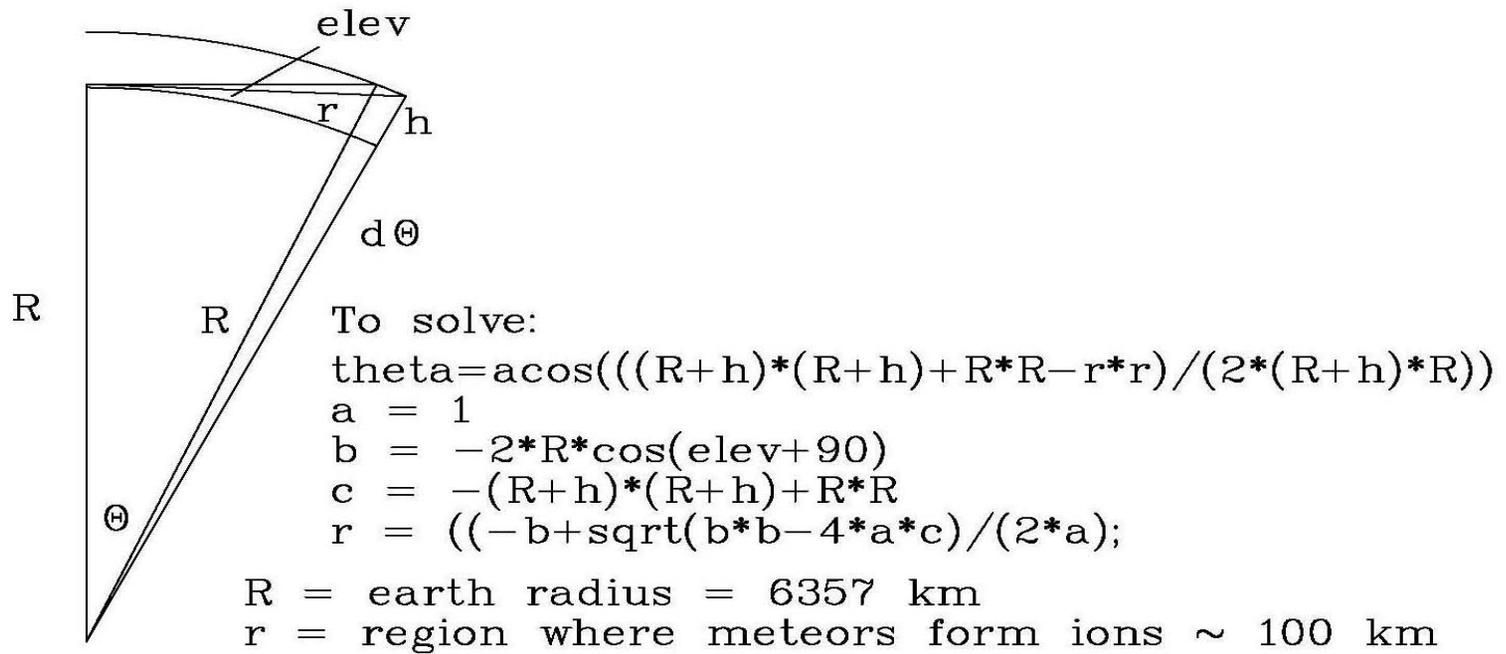


Figure 1. Geometry of meteor scatter

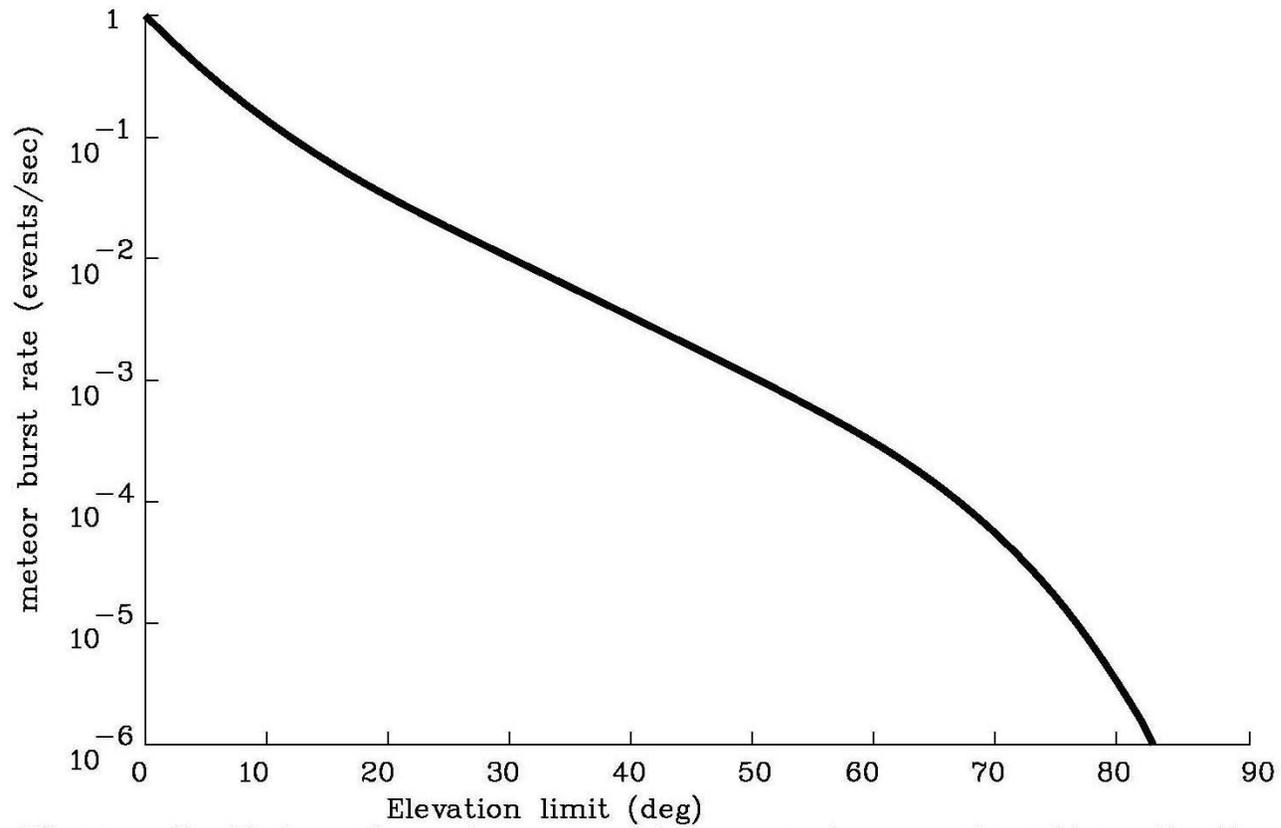


Figure 2. Rate of meteor scatter events vs elevation limit