Where the Rubber Meets the Soil: Tire Wear Particles as a Source of Zinc to the Environment. (S11-landa100534-Poster)

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Abstract:

Tire tread material has a Zn content of about 1 percent by weight. The quantity of tread material lost to road surfaces by abrasion, however, has not been well characterized. Two approaches, product of wear rate in g per km and km driven, and tread geometry using abrasion to wear bars, were used to assess the magnitude of this non-point source of Zn in the U.S. for the period 1936 to 1999. These analyses showed the quantity of Zn released by tire wear in the mid 1980s to be of the same magnitude as that from fossil fuel combustion. For 1999, the quantity of Zn released by tire wear in the U.S. is estimated to be 10,000 to 11,000 metric tons. A specific case study focused on an urban-suburban watershed, Lake Anne, in the Washington D.C. metropolitan area. The atmospheric flux of zinc wet deposition to the watershed was 8 microgram per sq-cm per year. The flux of Zn estimated from tire wear was 31 microgram per sq-cm per year. The measured accumulation rate of Zn in age-dated sediment cores from Lake Anne is 41 microgram per sq-cm per year. These data suggest that tire-wear Zn inputs to urban-suburban watersheds can be significantly greater than atmospheric inputs.

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