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WIND TUNNEL MODELING OF ATMOSPHERIC DIFFUSION

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Diffusion from a point source located within the turbulent boundary layer created by the floor of a 6 x 6 x 20 ft. wind tunnel test section is being systematically studied. Quantitative data pertaining to the effects of surface roughness, vertical temperature gradients and source location upon the resulting diffusion phenomena are being collected.

Using ammonia as the contaminant gas, the downstream mean concentration field is mapped by withdrawing the ammonia-air mixture through a needle sampling probe. Upon bubbling a definite volume of the mixture through an acid solution, the concentration of ammonia is determined colorimetrically after addition of Nessler's reagent. Hot-wire anemometry is used to determine the turbulence characteristics -- intensity and scale -- of the diffusion field.

An attempt to relate the geometrical properties of the wind-tunnel concentration fields to those associated with the concentration fields measured in Project Prairie Grass is being made. Data are being studied to determine if the length scaling of the concentration field is determined by the Eulerian time scales of the atmospheric surface layer and the wind-tunnel boundary layer.