Agricultural wind erosion and air quality impacts: A comprehensive research program

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Abstract. With the passage of the 1990 Clean Air Act came the responsibility to monitor and control particulates in the size range 10 um and smaller (PM_{10}). Many urban areas, particularly in the western U.S., have experienced concentrations of fugitive dust particulates from upwind sources that exceed the federal health standards. Often a significant amount of this material is generated upwind on agricultural fields, and then is entrained and transported in the regional air mass, thus degrading the air quality in downwind urban regions. Current technology cannot adequately quantify the fugitive dust emitted and transported from agricultural sources, nor specify adequate control methods. A comprehensive research plan recently was developed and initiated for the Columbia Plateau of eastern Washington State that involves multiple disciplines and several state and federal agencies. This research has several components: characterizing the soil, vegetation and climate in a region of 136,000 km^2; developing wind erosion and fugitive dust emission relationships for individual farm fields; developing and applying transport-dispersion-deposition models of the region; selecting and testing farm-level control strategies; and providing public information to both the urban and farm communities for understanding the problem and developing management plans. Simultaneous receptor analyses and public health research combine to make this a comprehensive regional research effort on fugitive dust emissions and impacts.

Key words: wind erosion, air quality, conservation, dryland farming, cereal, dispersion models, dust, particulate, PM_{10}.