J4.6 THE POTENTIAL FOR SMOKE TO VENTILATE FROM WILDLAND FIRES IN THE UNITED STATES

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1.0 SUMMARY

To help assess values of air quality and visibility at risk from wildland fire, we generated a spatial time series of ventilation potential for the United States. The ventilation potential was determined as a product of model-generated surface winds and spatially interpreted mixing height observations.

The surface winds (approximately 10 m agl) were generated from Danard's primitive-equation model (1977), using heights and temperatures at 850 hPa, 700 hPa, and 500 hPa from the NCEP Reanalysis as the upper boundary.

The mixing heights were calculated from radiosonde observations using Holzworth's parcel method (1972). In addition, we approximated the location of potential valley inversions with a GIS algorithm that considered terrain slope, curvature, and flow accumulation. Nights on which local inversions occurred were approximated by matching the hourly surface weather observations with Pasquill's stability criteria (1962) for representative neighborhoods.

The data represent a 40-year time series, twice daily, at 2.5' latitude/longitude (about 5 km) spatial resolution. A map-based, data acquisition system is available on the World Wide Web for use by land managers to help assess local, regional, and national ventilation potential. Periods of calm winds, low mixing heights, and resulting poor ventilation are seen in all areas of the country. The frequency and magnitude of ventilation potential, however, varies from place to place and time to time.

For a complete description of the project, technical background, assessment summary, and ArcIMS access to maps and plots of the data visit:

www.fs.fed.us/pnw/seattle/vent4

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2.0 REFERENCES

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