Where does the dust come from?

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Central Arizona College
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Desert pavement

Photographer: Wendy Van Norden
http://epod.usra.edu/blog/2015/02/desert.pavement.html
Interstate & international transport?

• Yes, occasionally, but rarely
• Of 45 dust storms studied by ADEQ for “exceptional events”: 2011 – 2014, one was interstate
• Other 44 events the dust was locally produced and transported within the region
## Sonoran Desert dust storm frequencies: 1948 - 1982

<table>
<thead>
<tr>
<th>site</th>
<th>frequency per year</th>
<th>ratio: 1km/11.3 km</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.3 km</td>
<td>1 km</td>
</tr>
<tr>
<td>Thermal</td>
<td>35.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Yuma</td>
<td>23.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Imperial</td>
<td>22.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Phoenix</td>
<td>18.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Blythe</td>
<td>12.7</td>
<td>3</td>
</tr>
<tr>
<td>Gila Bend</td>
<td>10.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Tucson</td>
<td>3.8</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Western Pinal County PM10 Emissions 2008

Unpaved roads: 1000s of tons per year
- Windblown: Commercial construction
- Point sources
- Windblown: Site development
- Paved roads
- Windblown: Residential construction
- Windblown: Developed rural lands
- Farming: Tilling
- Feedlots
- Windblown: Other
- Windblown: Unpaved roads
- Construction
- Windblown: Croplands
- Windblown: Desert shrublands
- Unpaved roads

Windblown dairies, 0.45, Windblown cleared areas, 0.39, Farming, harvesting 0.31, Windblown feedlots, 0.27, Unpaved parking, 0.25, Windblown developed urban lands, 0.20, Dairy, 0.19, Nonroad, 0.12, Railroads, 0.09, Fuel combustion, 0.03,

“Appendix B: Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days”, Sierra Research, Inc. August, 2014; revised by Arizona Department of Environmental Quality, Air Quality Division
Fallow agricultural lands

- Western Pinal County: 168,000 acres (2009 – 2014 average)
- Maricopa County: 91,000 acres (2011)
- Unregulated (Agricultural Best Management Practices do not apply)
- Likely to increase with hotter, drier climate and with reduced deliveries of Central AZ Project water and restrictions on groundwater pumping
Fallow/idle cropland in 2011: Maricopa, Pinal and Pima Counties
Fallow/idle cropland 2011
Maricopa County

166,145 acres
Fallow/idle cropland 2011
Pinal County

140,477 acres
Fallow/idle cropland 2011
Pima County

15,865 acres
Thank you
Conclusions

• High PM10 concentrations measured at Phoenix monitors likely due to the widespread fallow/idle croplands within Maricopa and Pinal Counties.
• Local dust sources likely responsible for PM10 exceedances during 2011 dust storms
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