Wildland Fire Emission Factors: Research and Implementation

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Wildland Fire Emission Factor Research and Implementation

- **Field Measurements (since 2005)**
  - NASA (ARCTAS, SEAC4RS)
  - Missoula Fire Lab (FLAME I, II, III)
  - JFSP (RxCADRE, others)
  - SERDP (several)
  - DOE (BBOP)

- Data publication
Newer studies show some significant differences with older, commonly used emissions factors.
Wildland Fire Emission Factor Research and Implementation

- **Synthesis Project: SERDP Wildland Fire Emission Factor Database (WFEFD)**
  - Synthesis of over 230 wildland fire emission papers (through 2012)

- **Synthesis Papers**
  - Andreae & Merlet (2001)
  - Battye & Battye (2002)
  - Akagi et al. (2011)
  - Yokelson et al. (2013)
  - Urbanski (2009, 2014)
Urbanski 2014 = purple, FEPS = green, CONSUME = blue, Strand et al. = peach
BlueSky 2014
Daily Emission Ratios: new/old
Wildland Fire Emission Factor Research and Implementation

- Field Measurements
- Data analysis and publication
- Synthesis Papers/Projects
- Scientific review and recommendation
  - Working group under the NWCG Smoke Committee
- Adoption of accepted values/data
Wildland Fire Emission Factor Research and Implementation

Where we are today

- Scientific review and recommendation
  - NWCG Smoke Committee Working Group
  - Audiences/needs
    - Emission Inventories
    - Land Managers (e.g. Emission Reduction Techniques)
    - Models (e.g. Fuels/Consumption Models, Air Quality Models, Smoke Forecasting Models)
    - Policy (e.g. Implications of a source that contributes 36% to total PM2.5 in the NEI, goes to 50%)

- Future: Adoption of accepted values/data
Thank you

More information:

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2014 NEI for Wildland Fires Processing

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Goals: 2014

1. Continue effort to gather as much state/local data as possible
2. Fix several known issues in methodology
3. Create transparent report and easier state review
2011 Effort

• Concerted effort to gather state / local data

• State-provided data covered 23 states

• Thank You!

• Final emissions reconciled state & national datasets
National Data

- Incident Command Reports – many WFs
- GeoMac Perimeters – large WFs
- US Fish & Wildlife – Rx burns on FWS land
- US Forest Service – Rx burns and some WFs on USFS land
- National Association of State Foresters – database of WFs and some Rx burns on state jurisdiction
- NOAA Hazard Mapping System – Detection from seven satellites plus human analysts
• Spatio-temporal overlaps associate data across datasets
• We ranked each data source for reliability of each element
• A final composite fire was created using the highest ranking data
2011 Results

- Large WF area in southwest, especially Texas
- Rx burns dominate area burned in southeast and central plains
- High PM$_{2.5}$ from peat fires (NC, MN)
Issues to Improve for 2014

- State-provided complete data sets
- Agricultural burn classification
- Emission factors
- Pile burning
- More transparent output and better review process
Do you have complete data?

- With information on fire types and land ownerships covered, we can use state-provided fire activity data exclusively, without the need to reconcile with satellites.
- Providing this metadata will allow us to improve the inventory.
Pile Burns

• At present, pile burns are treated as other prescribed burns

• To model pile burns properly, we need more data
  – At a minimum, number of piles and their approximate size

Source: USFS
# Transparency & Easy Review

<table>
<thead>
<tr>
<th>Event ID</th>
<th>Start Date</th>
<th>End Date</th>
<th>Event Name</th>
<th>Acres</th>
<th>Type</th>
<th>Latitude</th>
<th>Longitude</th>
<th>State</th>
<th>County</th>
<th>Sources</th>
<th>Total Acres</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Discovery Date</th>
<th>Fire ID</th>
<th>Fire Name</th>
</tr>
</thead>
</table>

## Report an Issue

**Hardaway 2011 Fire (2011 (USA) - Version_1)**

Please tell us about any specific issue with this fire.

### Area Burned
- **Current:** 2,275 acres
- **Change to Keep Current:** acres

### Start Date
- **Current:** Feb. 11, 2011
- **Change to Keep Current:**

### End Date
- **Current:** March 25, 2011
- **Change to Keep Current:**

### Type
- **Current:** Wildfire
- **Change to Keep Current:**

### Total PM2.5
- **Current:** 313 tons
- **Change to Keep Current:** tons

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View Fire Report an issue