Comparison of GFED3, QFED2 and FEER1
Biomass Burning Emissions Datasets in a Global Model
Xiaohua Pan 1,2, Charles Ichoku 5, Huisheng Bian 2,3, Mian Chin 2, Luke Ellison 1,2, Artindo da Silva 2, Anton Darmenov 2
1xiaohua.pan@nasa.gov; 2UMD ESSIC; 3NASA Goddard Space Flight Center; 4UMBC/Jet; 5SSAI

1. BACKGROUND AND MOTIVATION

Biomass burning contributes about 40% of the global loading of carbonaceous aerosols, significantly affecting air quality and the climate system by modulating solar radiation and cloud properties. However, fire emissions are poorly constrained in models on global and regional levels. In this study, we investigate 3 global biomass burning emission datasets in NASA GESSD, namely: (1) GFEDv3.1 (Global Fire Emissions Database version 3.1); (2) QFEDv2.4 (Quick Fire Emissions Dataset version 2.4); (3) FEERv1 (Fire Energetics and Emissions Research version 1.0).

2. EXPERIMENTS CONFIGURATION

<table>
<thead>
<tr>
<th>Exp.</th>
<th>Biomass Emission (BB)</th>
<th>BB grid (lon*lat)</th>
<th>BB Frequency</th>
<th>Time-frame</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>QFED2</td>
<td>QFEDv2.4</td>
<td>0.3125x</td>
<td>Daily</td>
<td>2000-present</td>
<td>Darmenov and da Silva (2005)</td>
</tr>
<tr>
<td>FEER1</td>
<td>FEERv1.0</td>
<td>0.5x0.5</td>
<td>Daily</td>
<td>2003-present</td>
<td>Ichoku and Ellison (2014)</td>
</tr>
<tr>
<td>GFED3</td>
<td>GFEDv3.1</td>
<td>0.5x0.5</td>
<td>Daily</td>
<td>1997-2011</td>
<td>Randerson et al. (2013)</td>
</tr>
</tbody>
</table>

3. RESULTS: COMPARISONS OF AOD OVER REGIONS

3.1 Northern Hemisphere

- CAN
- USA
- RUS

3.2 Tropics

- SEA
- SAM
- SAF

3.3 Southern Hemisphere

4. RECOMMENDATION

- Global simulation - use FEER1. It is not too high in NH, not too low in SH and Tropics
- Northern Hemisphere only simulation - use FEER1
- Tropics only simulation - use QFED2
- Southern Hemisphere only simulation – use QFED2

REFERENCES