

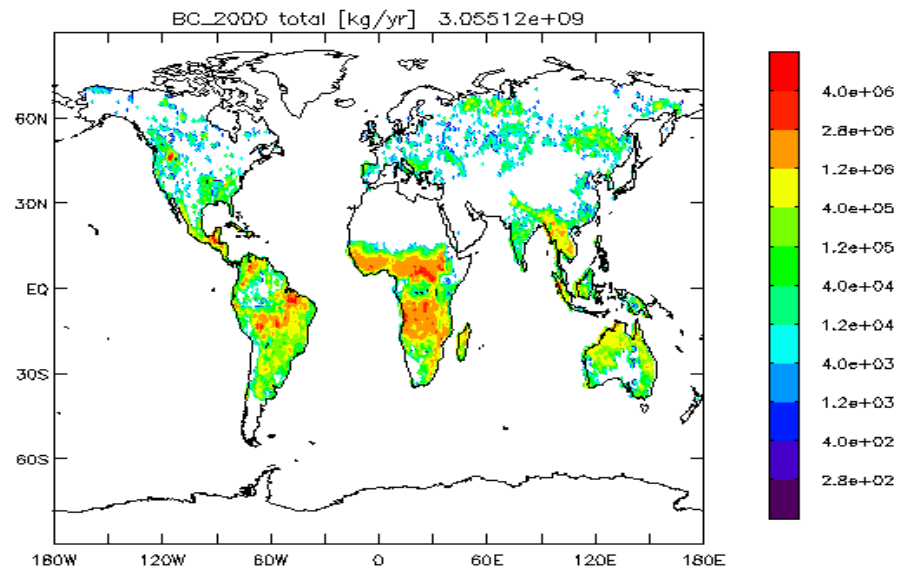
**Emissions of primary aerosol
and precursor gases
for the years 2000 and 1750
prescribed data-sets for AeroCom**

F. Dentener, S. Kinne, T. Bond, O. Boucher, J. Cofala, S. Generoso, P. Ginoux, S. Gong, J.J. Hoelzemann, A. Ito, L. Marelli, J. Penner, J.-P. Putaud, C. Textor, M. Schulz, G.R. van der Werf and J. Wilson

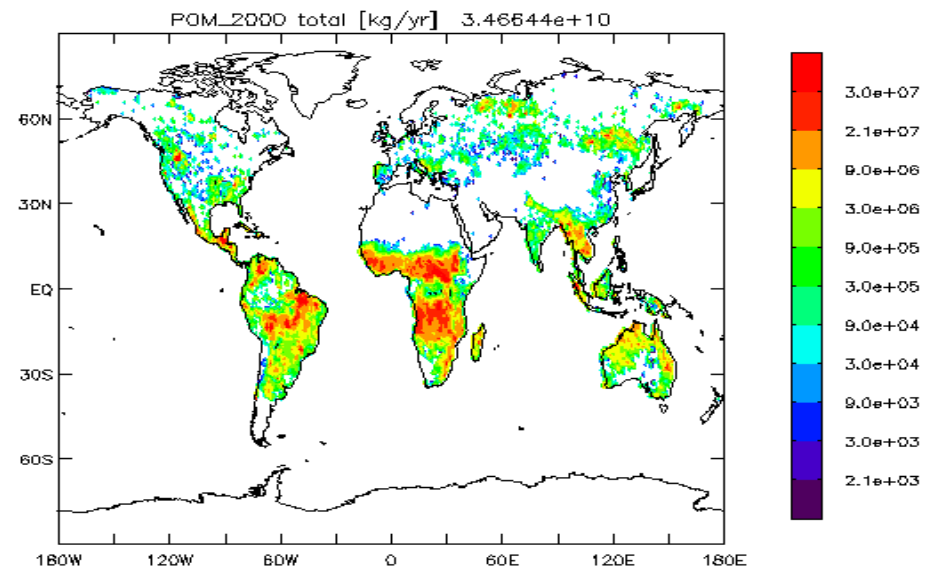
paper submitted to ACPD

GFED 2000 (Van der Werf et al., 2003)

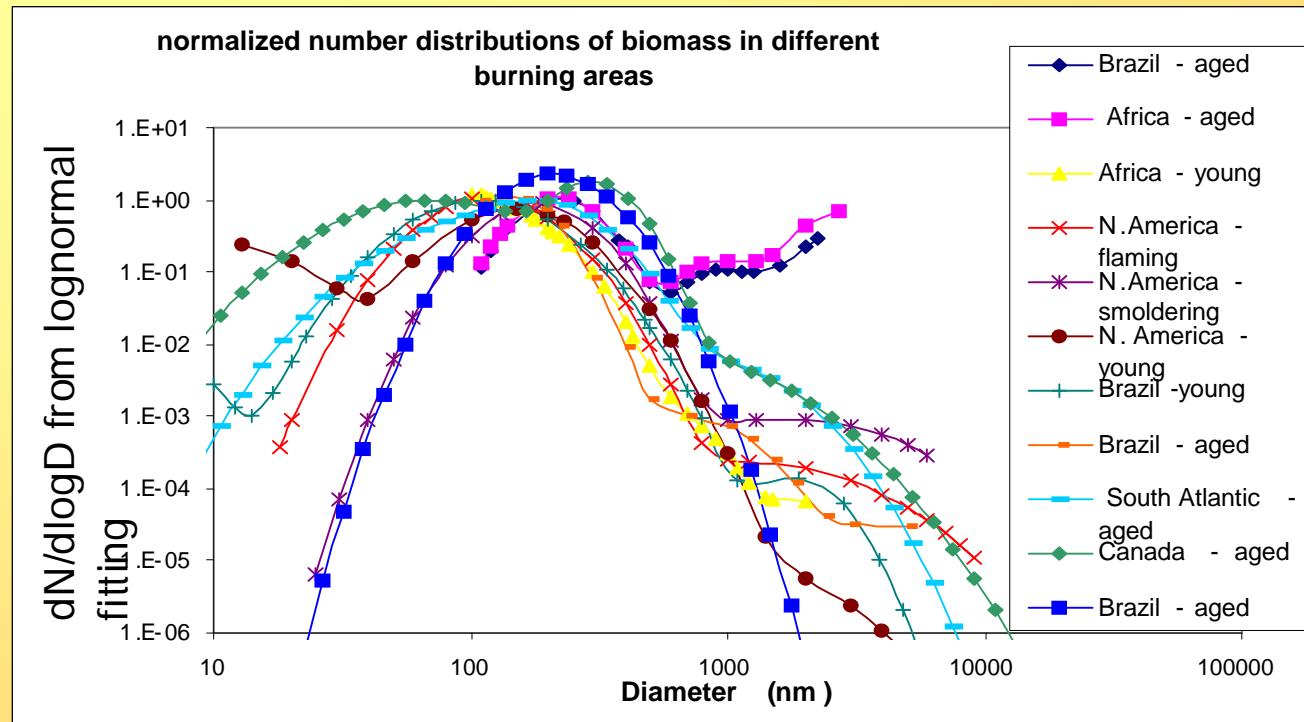
monthly data, 1*1 resolution



Tg/y	* POM	BC	SO ₂
	34.7	3.04	4.11



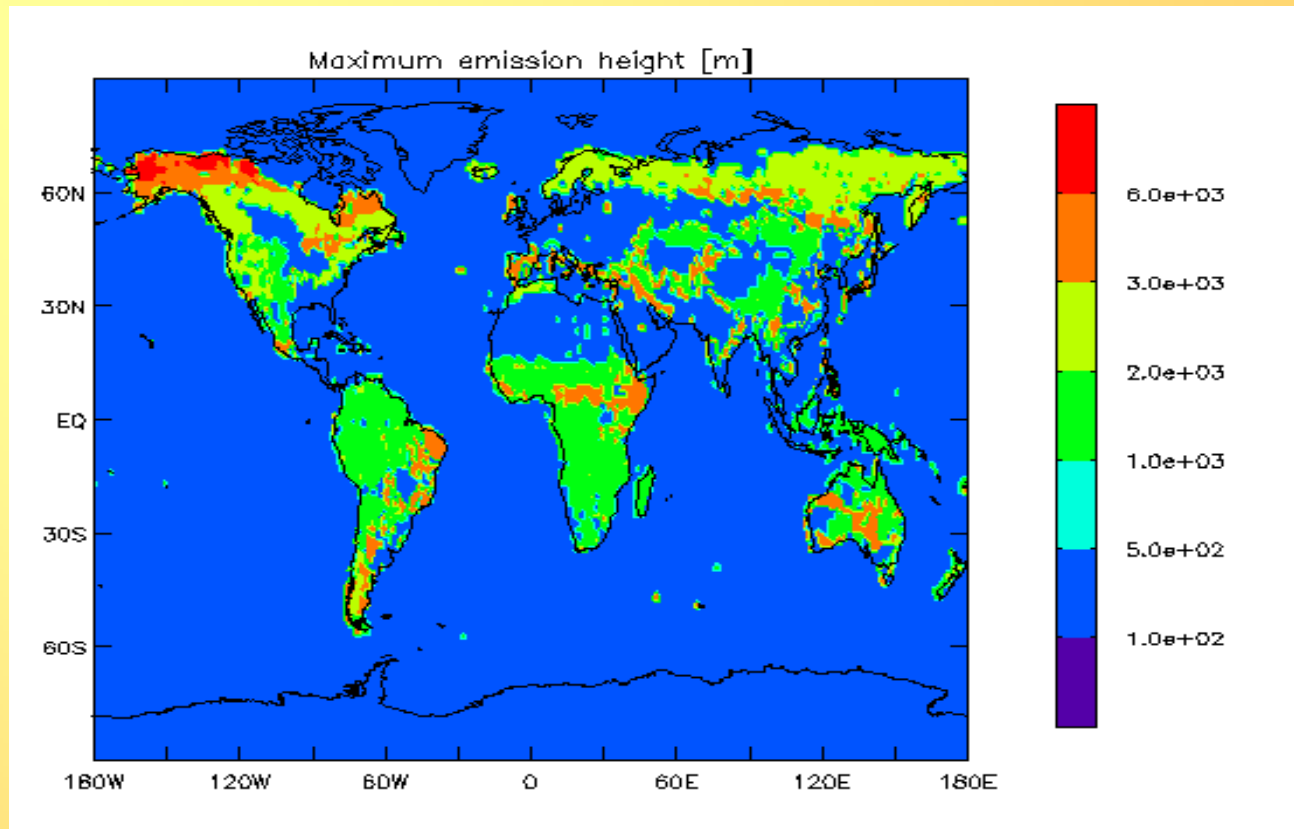
Size distribution



log-normal distribution fitted to young biomass burning aerosol (Marelli, 2003)

- $r, mode$ = 40nm
- $std. dev.$ = 1.8
- r, eff = 77nm

Injection heights



- 6 ecosystem-dependent altitude regimes (D. Lavoué)
- 0-.1km / .1-.5km / .5-1km / 1-2km / 2-3km / 3-6km
- vegetation types taken from Olson data, regrouped to 6 classes (F. Dentener)

Large scale biomass burning

OC (POM) / BC (EC) / SO₂

Global emissions (incl. large agricultural fires)

GFED 2000 (Van der Werf et al., 2004)

Tg/year	* POM	BC	SO ₂
	34.7	3.04	4.11

* POM=1.4 * OC
34.7Tg POM = 24.8Tg OC

compare to:

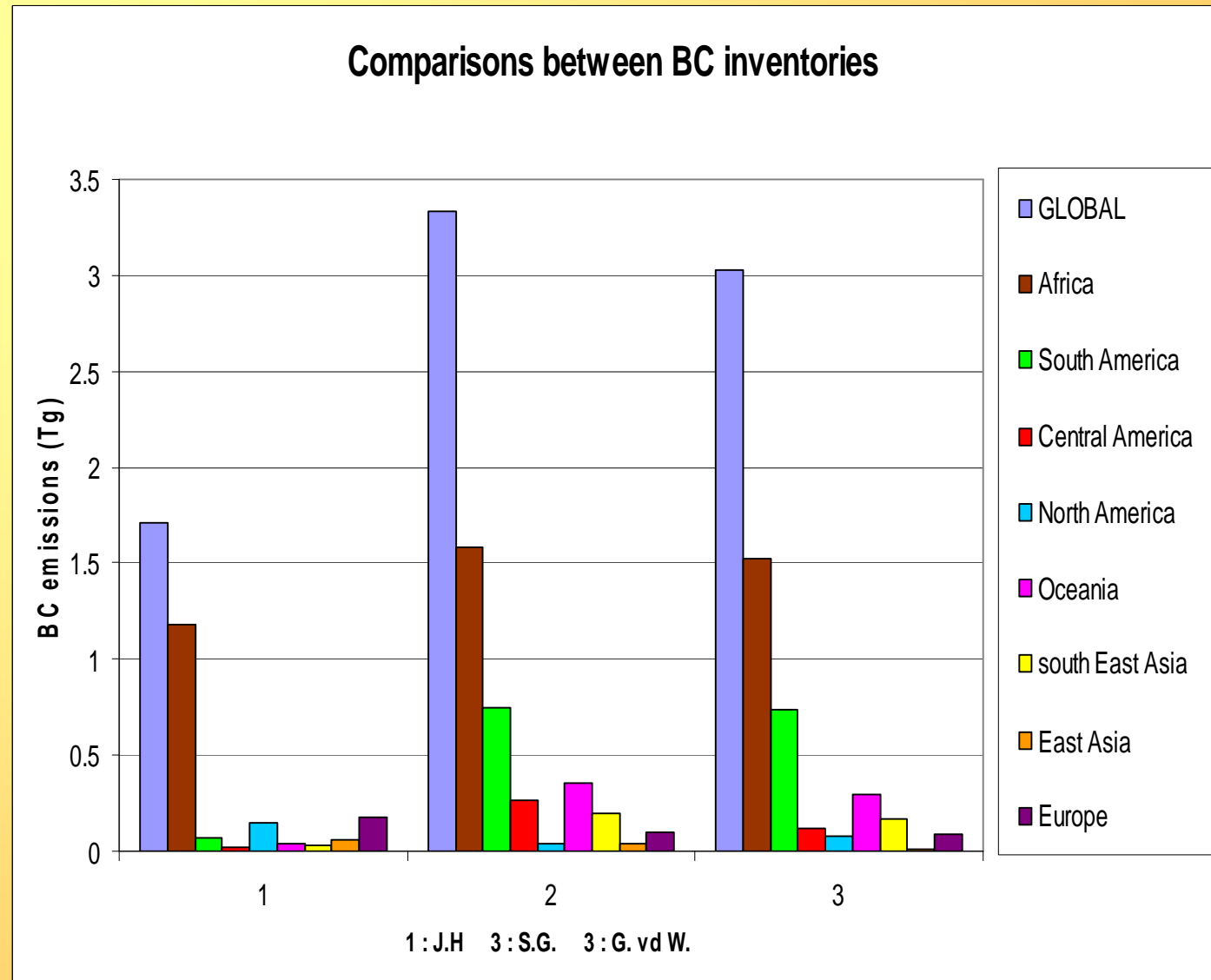
T. Bond POM 34.6 Tg, BC 3.32 Tg 'open burning'

S. Generoso POM 29.3 Tg, BC 3.33 Tg (ACP, 2003)

EDGAR3.2 (deforestation+savannah+mid-lat.burning) SO₂ 2.7 Tg

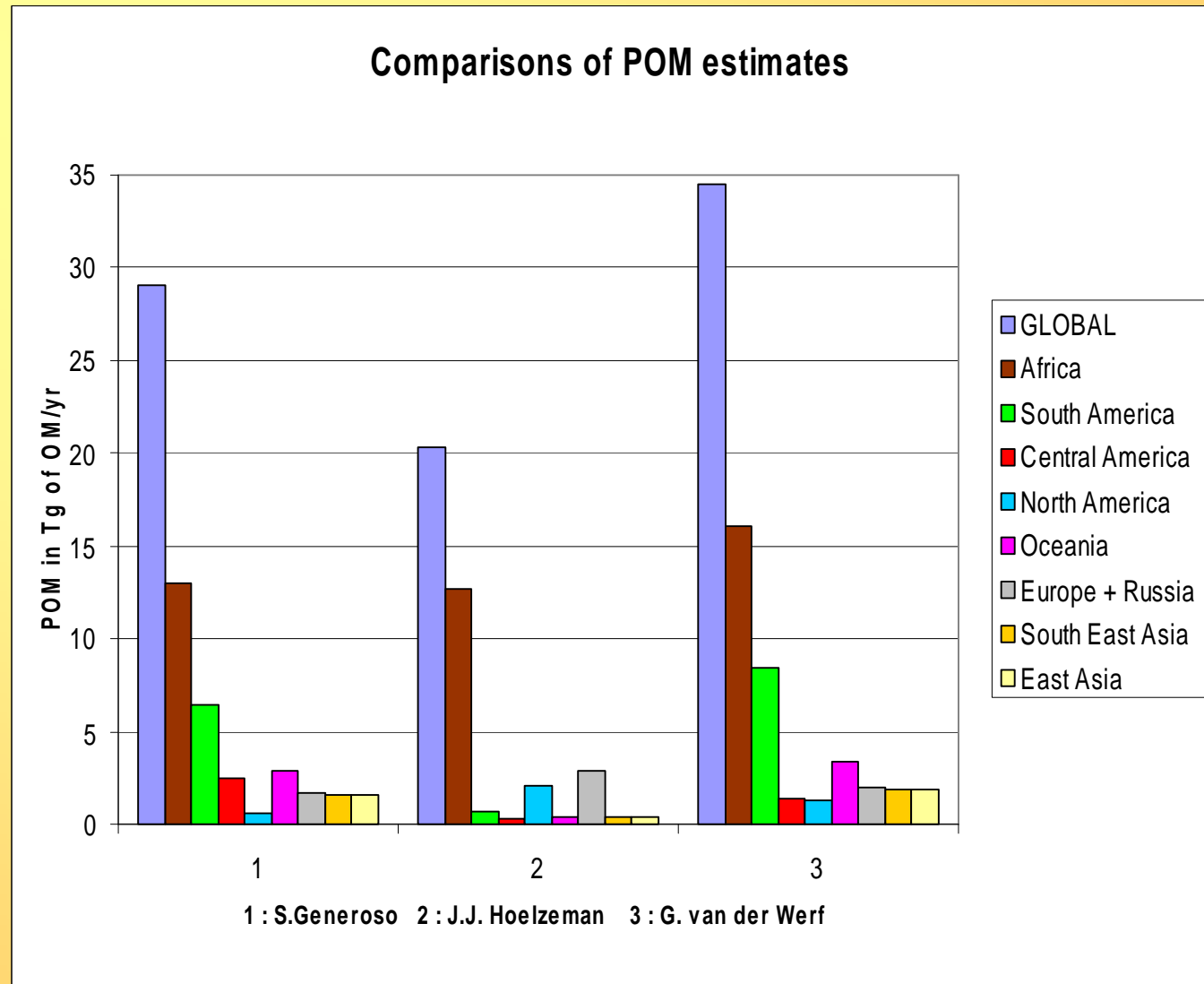
BC inventory comparisons

- **# 1**
GWEM
Hoelzemann
- **# 2**
Generoso
- **# 3**
GFED 2000
van der Werf



POM inventory comparisons

- **# 1**
Generoso
- **# 2**
GWEM
Hoelzemann
- **# 3**
GFED 2000
van der Werf



Fossil (bio-)fuel related emissions

POM/ OC / BC

- based on **SPEW**
also see: Tami Bond -
a technology based
global inventory of
black and organic
carbon emissions
from combustion,
revised to JGR, 2003.
- based on **GEFD** for
large scale burning
(open fires)

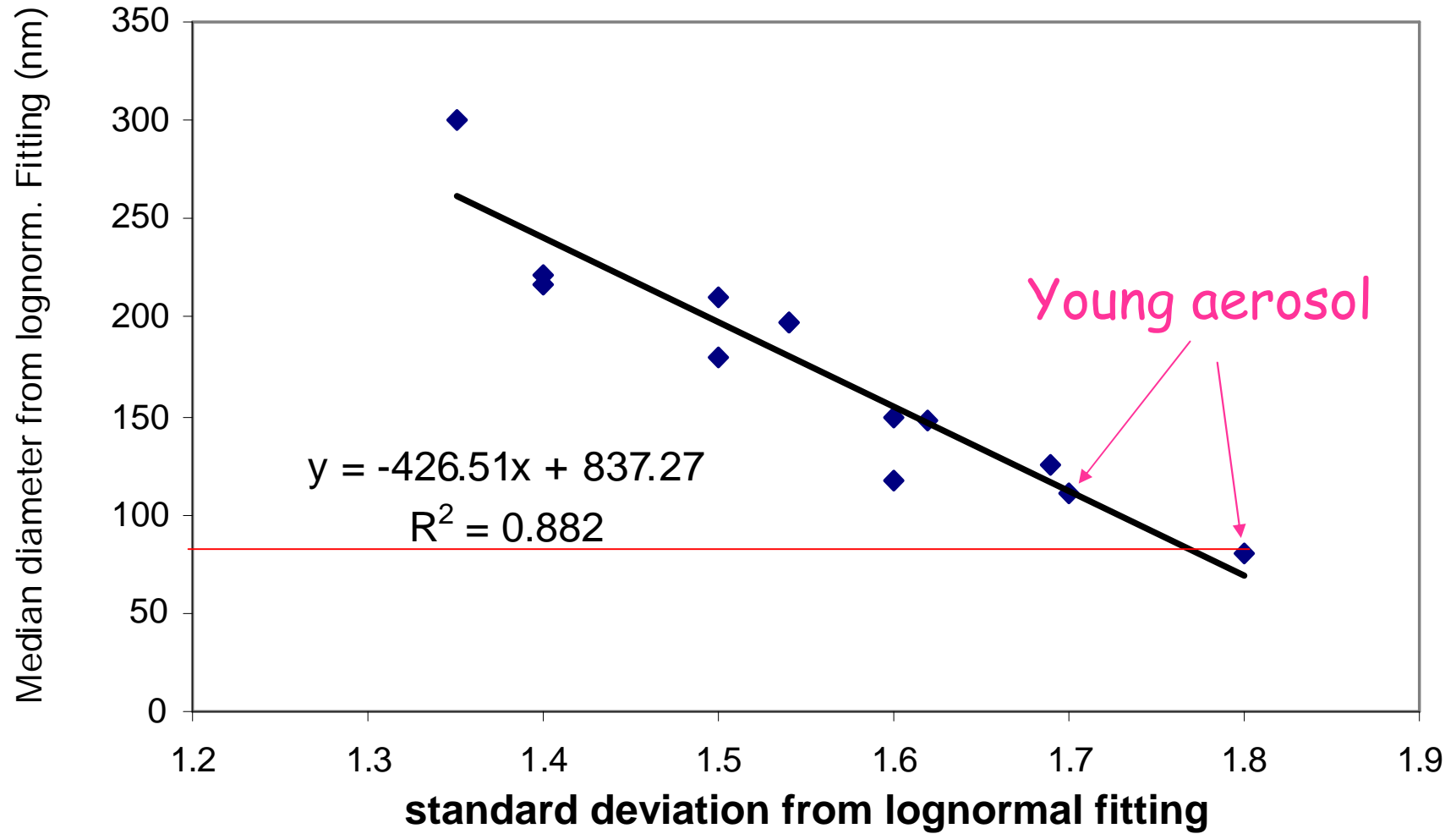
<i>Tg/year</i>	BC	OC	POM
fossil	<i>3.04</i>	<i>2.41</i>	<i>3.20</i>
biofuel	<i>1.63</i>	<i>6.50</i>	<i>9.1</i>
open fire	<i>3.32</i>	<i>25.08</i>	<i>34.6</i>
total	8.0	34.0	46.9

*note, these emissions are 35 % lower than those of a
previous inventory, which was based on 1984 statistics*

Goal

- to provide recommended data-sets for anthropogenic aerosol and precursor gases for **year 2000** simulations
 - including recommendations for *size-distribution* of primary emissions
 - including recommendations for emission altitude

Accumulation mode diameter vs standard deviation



BC Regional Comparison

<i>Tg /year</i>	SPEW	SPEW	SPEW	GFED
recommendations are shown in BLUE	bio-fuel	fossil fuel	open fire comparison	open fire
Open Ocean	1.42 e+6	7.80 e+5	2.93 e+7	0.0
Canada	8.08 e+6	5.28 e+7	3.57 e+7	8.75 e+6
USA	6.33 e+7	6.28 e+7	2.92 e+8	6.78 e+7
Latin America	1.08 e+8	9.10 e+8	3.04 e+8	8.63 e+8
Africa	3.48 e+8	1.47 e+9	1.25 e+8	1.54 e+9
OECD-Europe	2.96 e+7	5.26 e+7	2.78 e+8	6.42 e+6
Eastern Europe	3.36 e+7	6.40 e+6	9.88 e+7	6.21 e+6
CIS(old USSR)	1.77 e+7	1.01 e+8	1.67 e+8	9.31 e+7
Middle East	1.73 e+7	2.03 e+7	1.32 e+8	3.75 e+5
Indian Region	4.27 e+8	1.64 e+8	1.86 e+8	8.83 e+7
China Region	4.54 e+8	1.87 e+8	1.01 e+9	6.39 e+7
East Asia	1.23 e+8	1.28 e+8	1.99 e+8	1.14 e+8
Oceania	4.26 e+6	1.64 e+8	2.74 e+7	2.13 e+8
Japan	3.60 e+4	2.51 e+6	1.56 e+8	7.97 e+5
WORLD	1.63 e+9	3.32 e+9	3.04 e+9	3.06 e+9