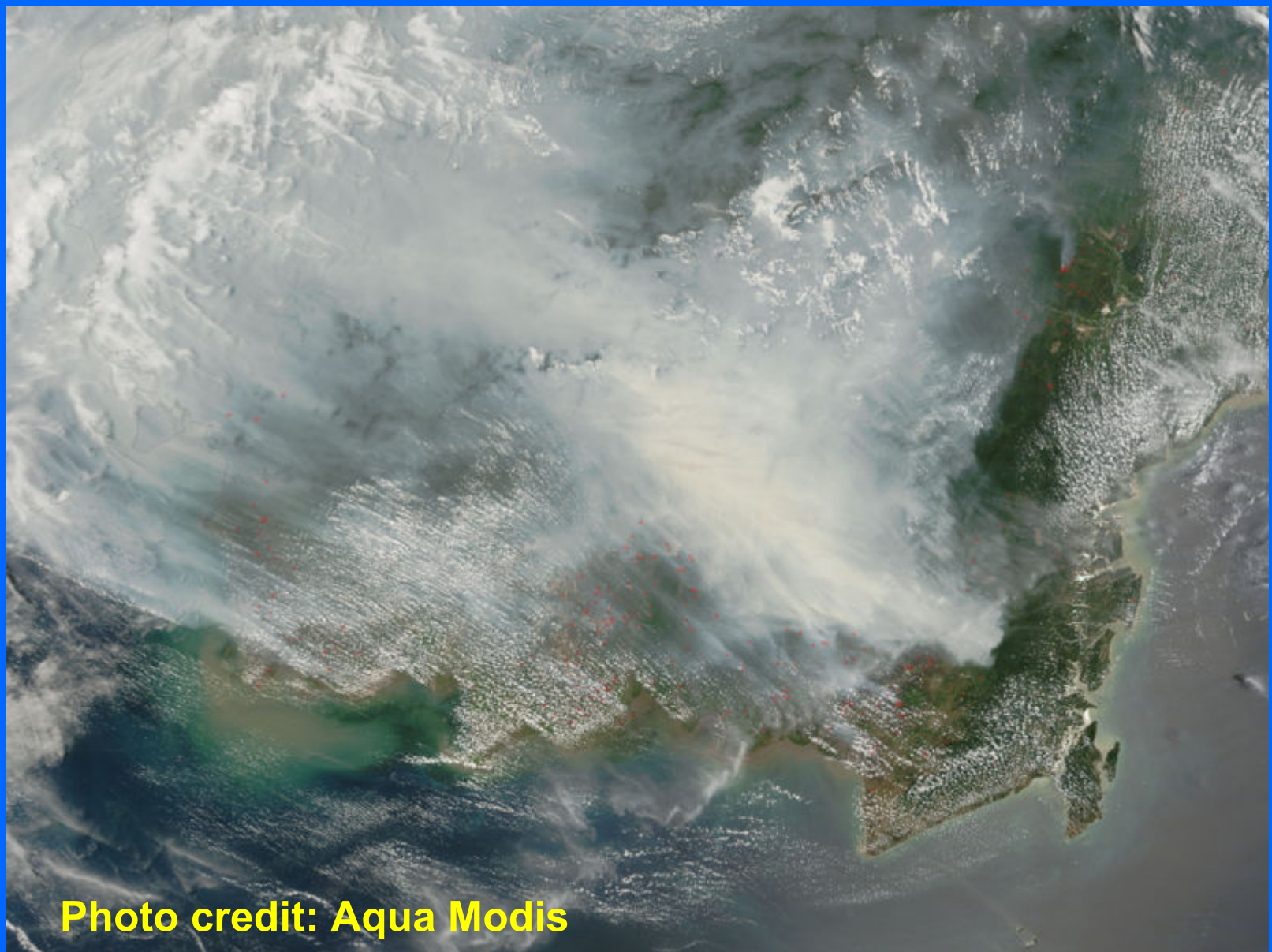
FOREST FIRES, HAZE and HUMAN HEALTH

Photo credit: Friends of the Earth

Borneo 05.10.2006



Sumatra , 04.10.2006

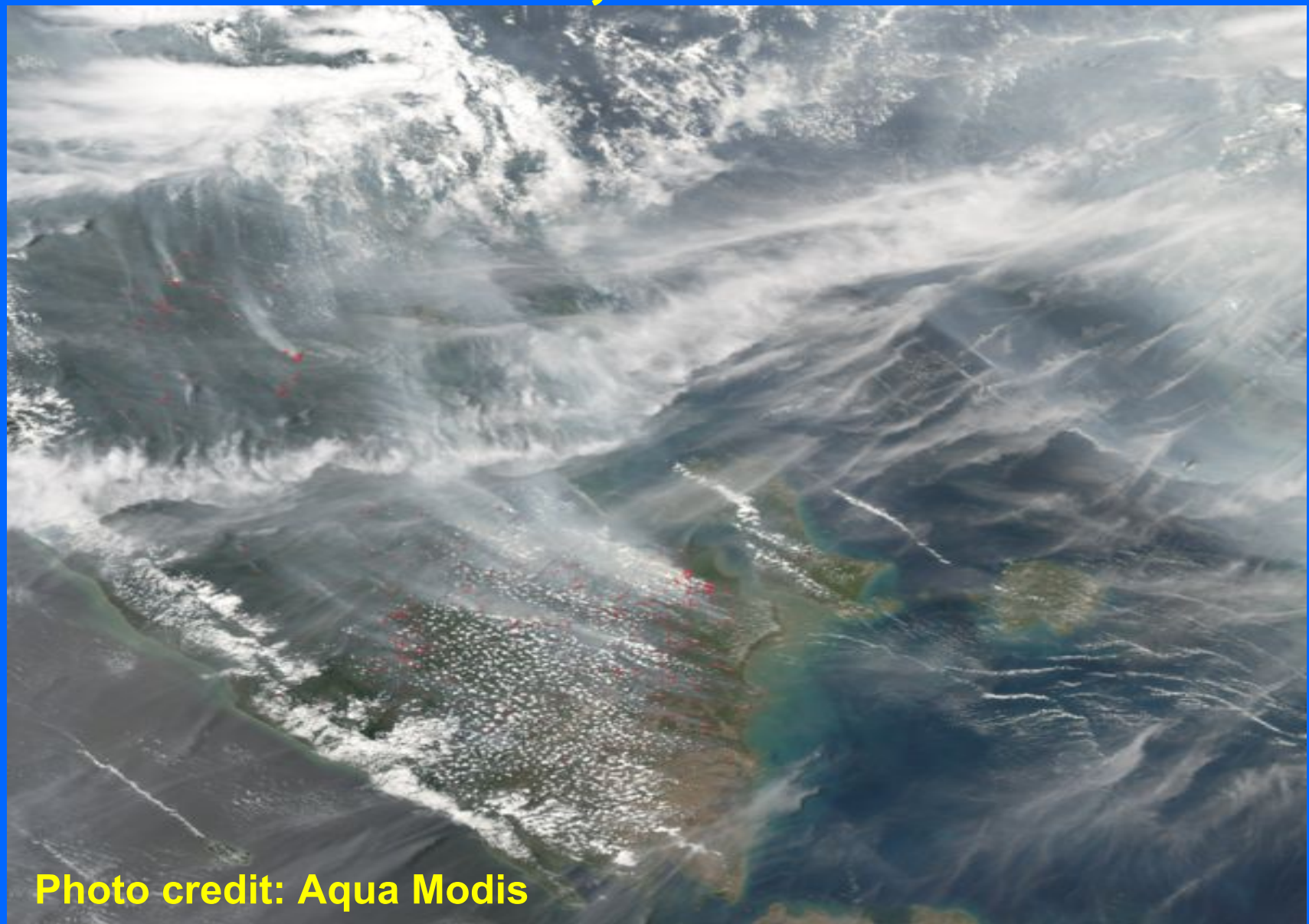
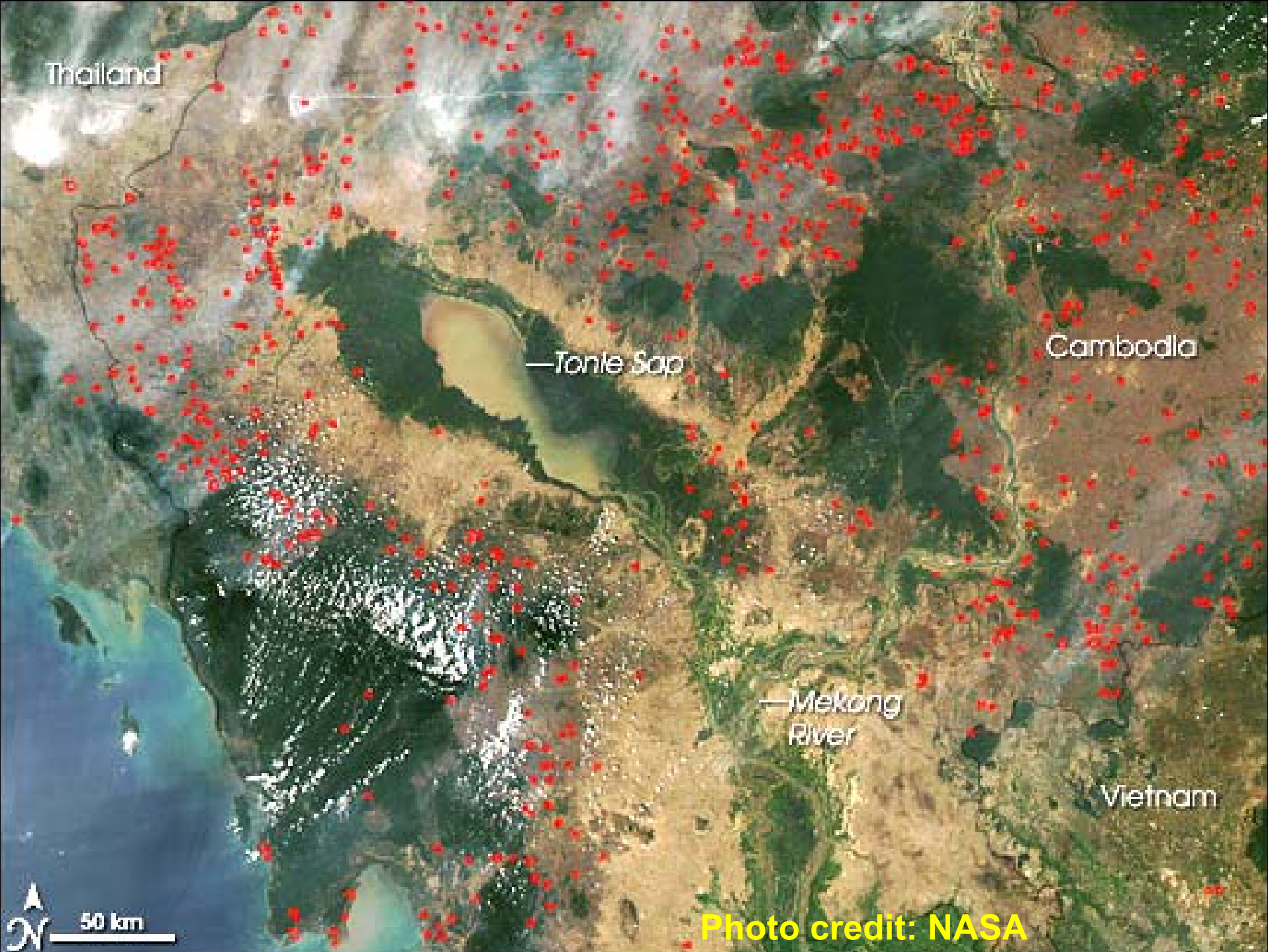


Photo credit: Aqua Modis

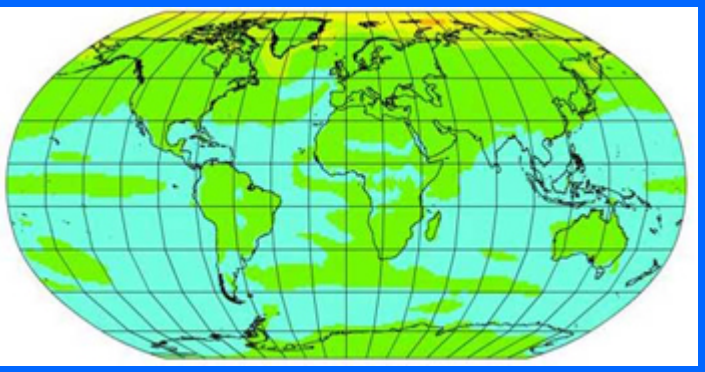

Thailand
—Tonle Sap
Cambodia
—Mekong River
Vietnam
50 km
Photo credit: NASA

Forest fires

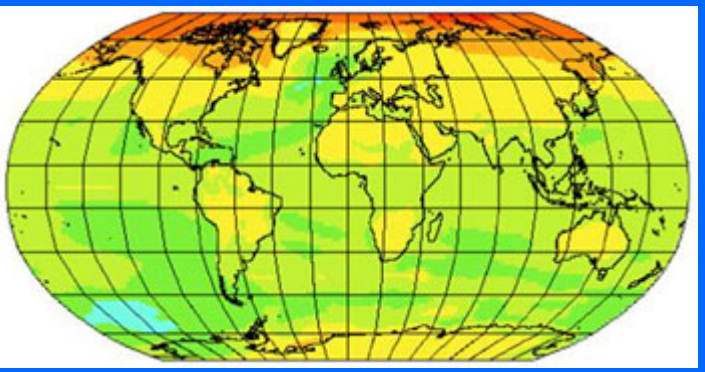
- Derived from land conversion
- Inadequate fire use policies
- Peat swamp vegetation catching fire
- Dry weather conditions
- Delayed rains
- Lack of surveillance
- Poor air quality monitoring and reporting systems in place
- Weak preparedness and response plans
- Little public awareness

1. Involve local communities to achieve Zero burning policy
2. Increase fire fighting efficiency
3. Public education campaigns

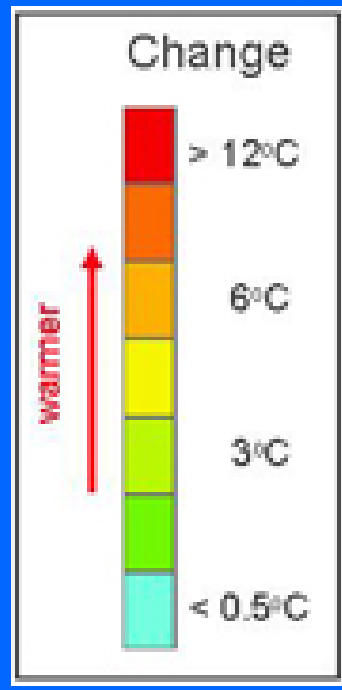
Temperatures in 2090

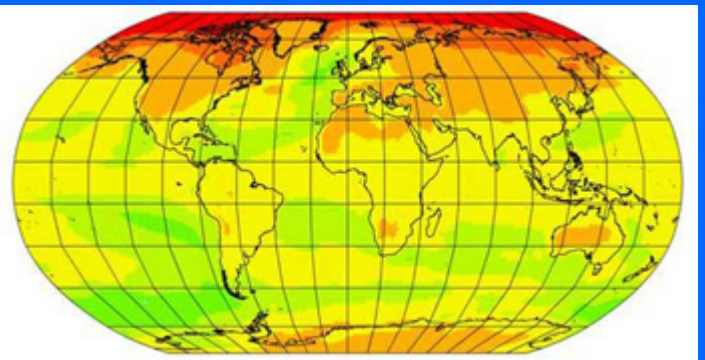


Atmospheric CO2: 400 ppm



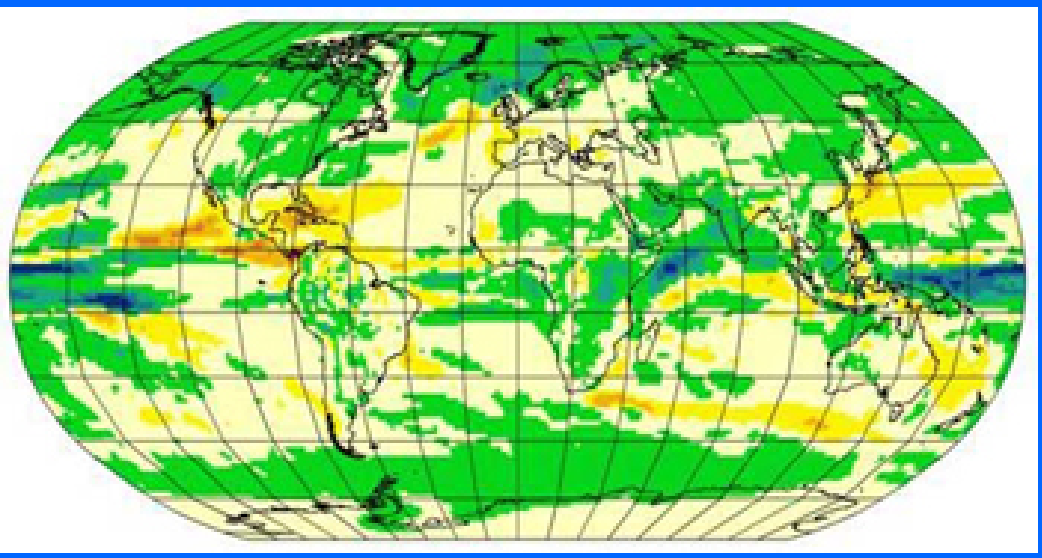
Atmospheric CO2: 850 ppm



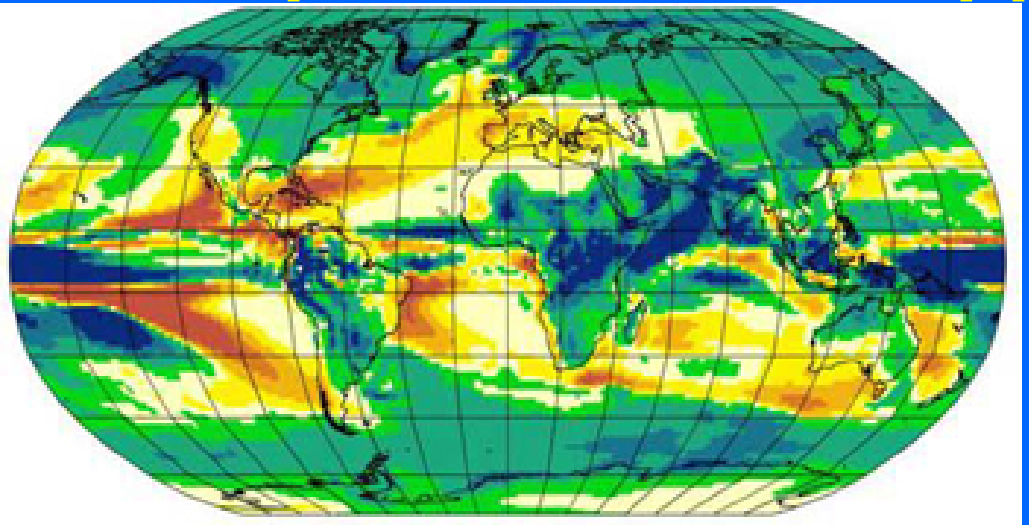


Atmospheric CO2: 850 ppm

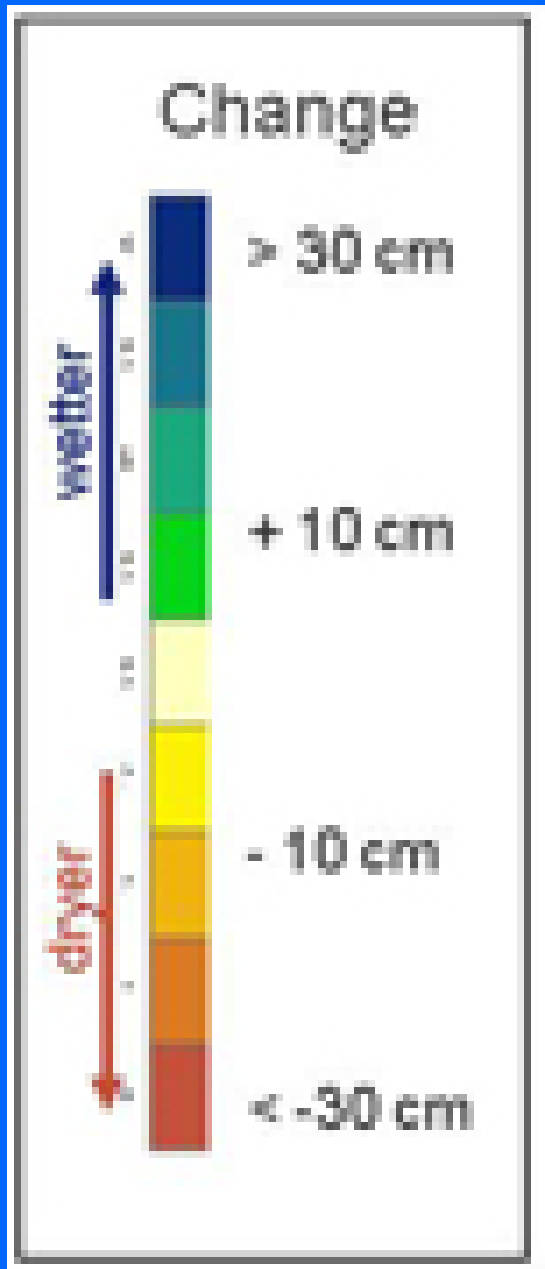
Precipitations in 2090



Atmospheric CO2: 400 ppm



Atmospheric CO2: 850 ppm



There is strong evidence from the available literature that PM from biomass combustion is associated with a respiratory health outcomes such as bronchitis, asthma and upper respiratory tract infections, eye and skin irritation.

Preventive action:
Revision of air quality standards
Monitor air quality for early warning
Remain indoors, reduce physical exertion
Wear respiratory masks outdoors
Closure of schools and public offices

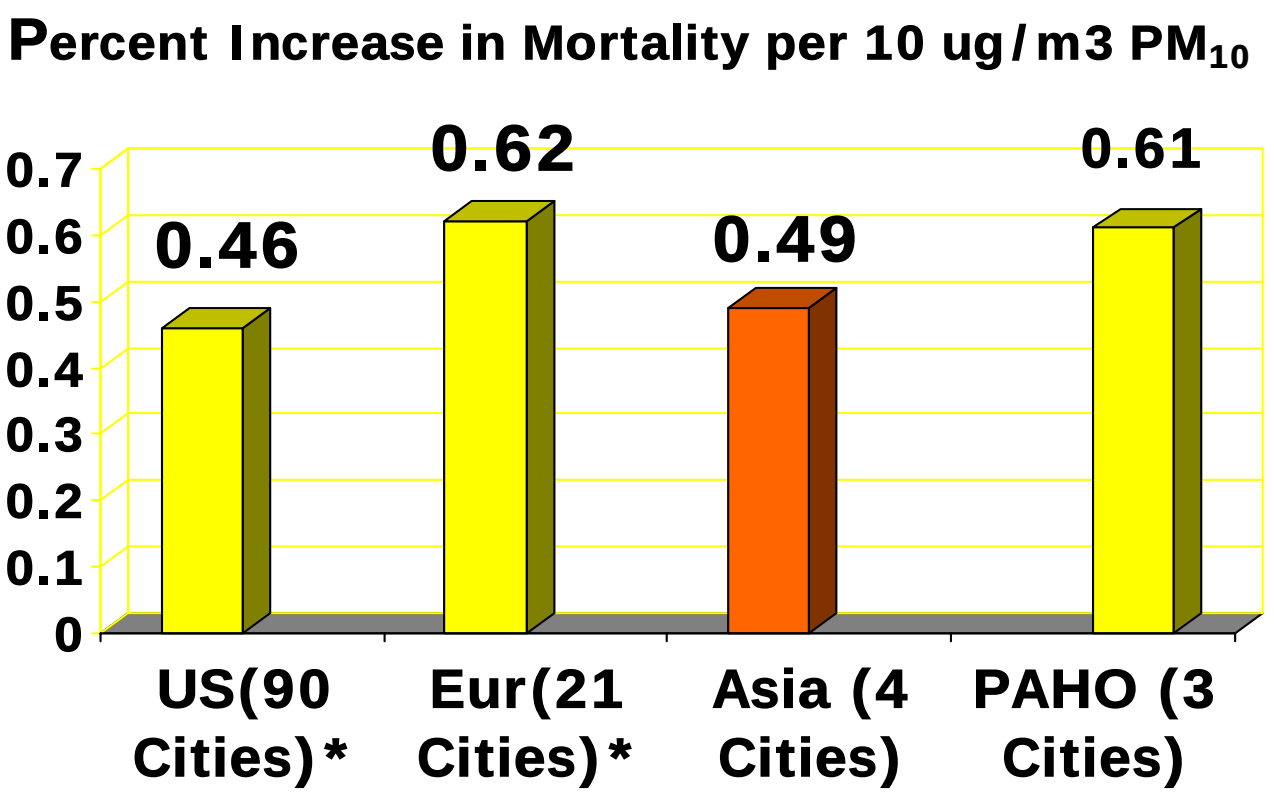
WHO new Air Quality guidelines (AQGs): revised limits for particulate matter

- **PM2.5** : 10 µg/m3 annual mean
  25 µg/m3 24-hour mean
- **PM10** 20 µg/m3 annual mean
  50 µg/m3 24-hour mean

➢ first time a guideline value defined for PM,

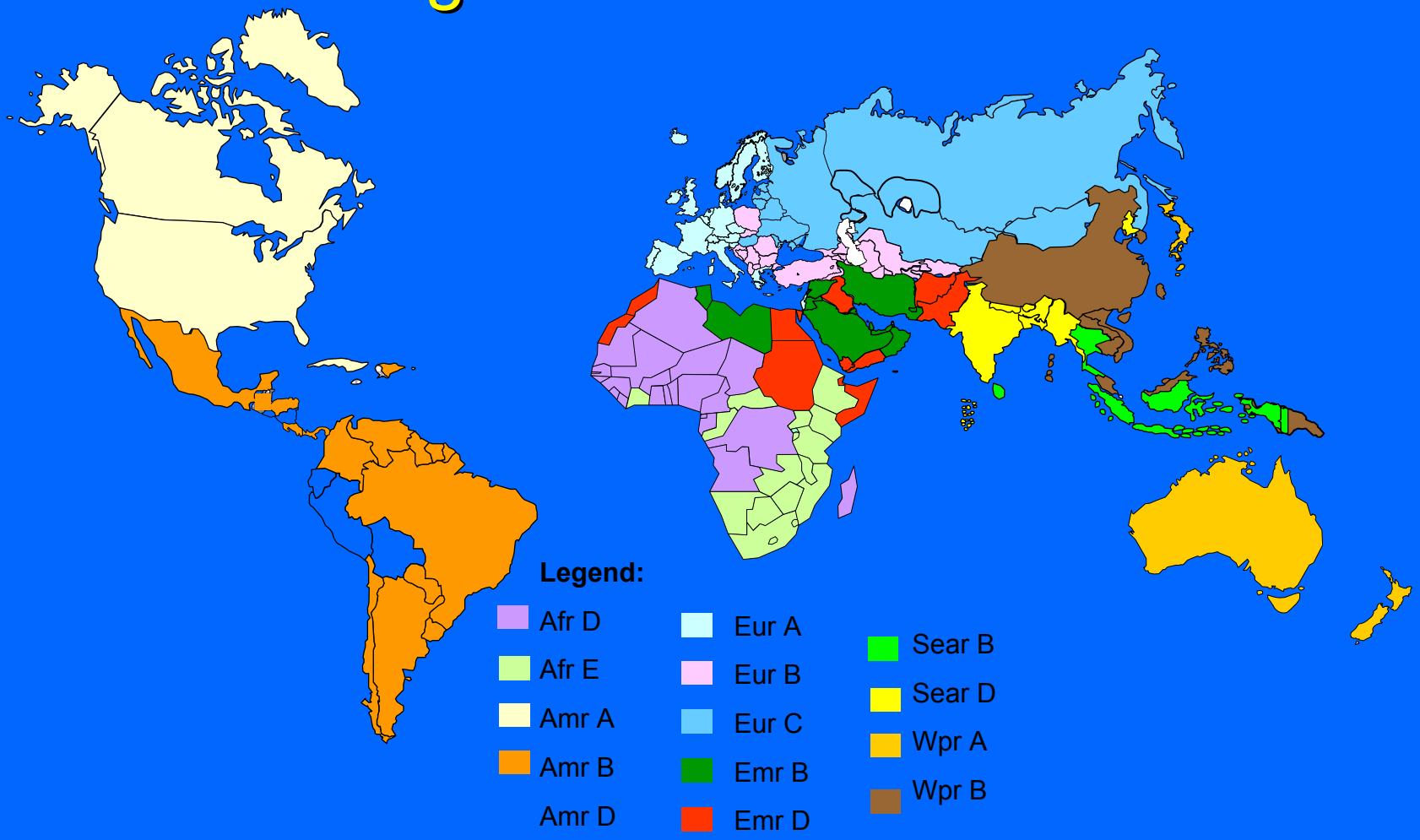
➢ Aim: lowest concentrations possible, no threshold below which no damage to health observed,

Short term exposures and health

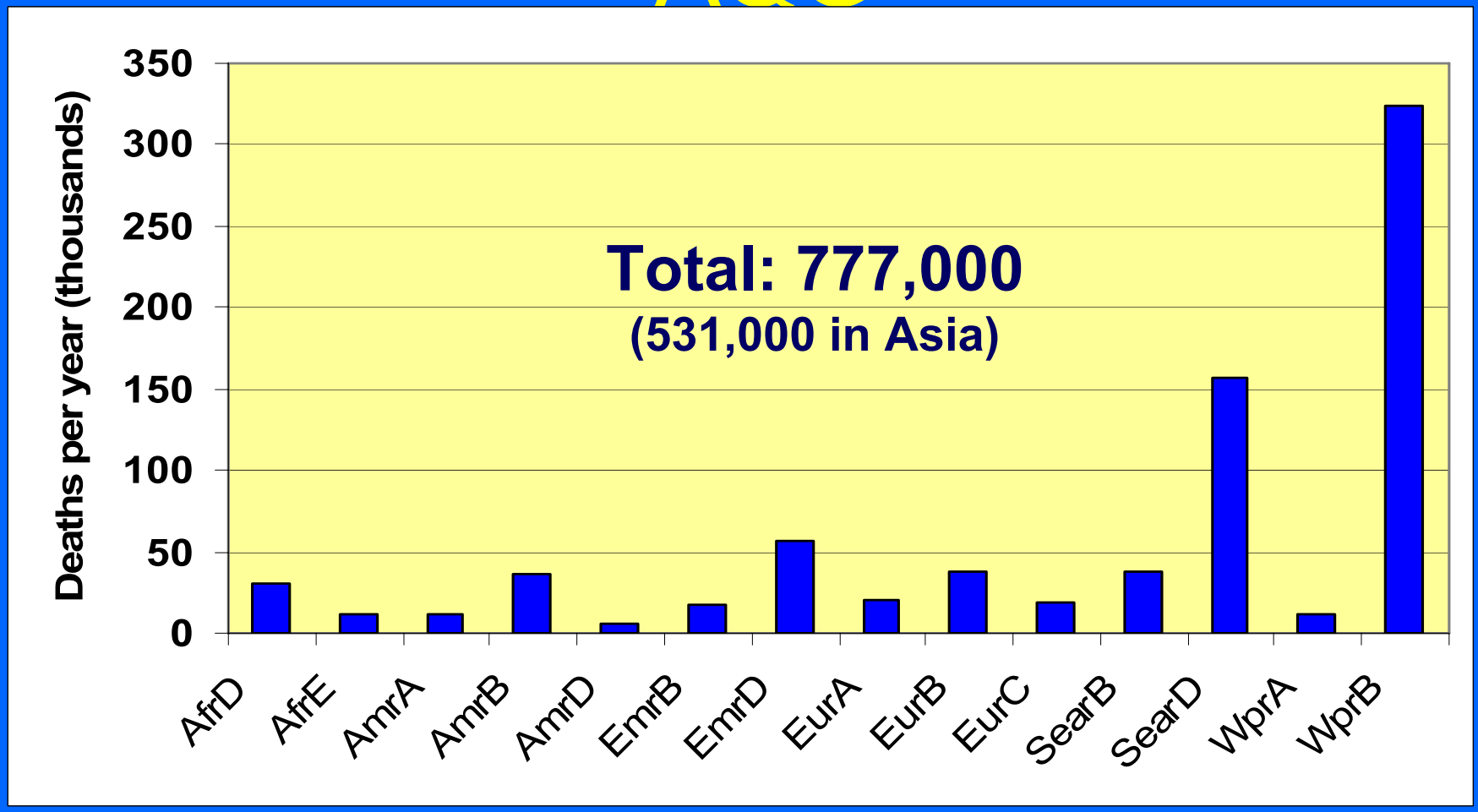


Curtesy: A. Cohen /HEI

WHO Comparative Risk Assessment: regions in calculations



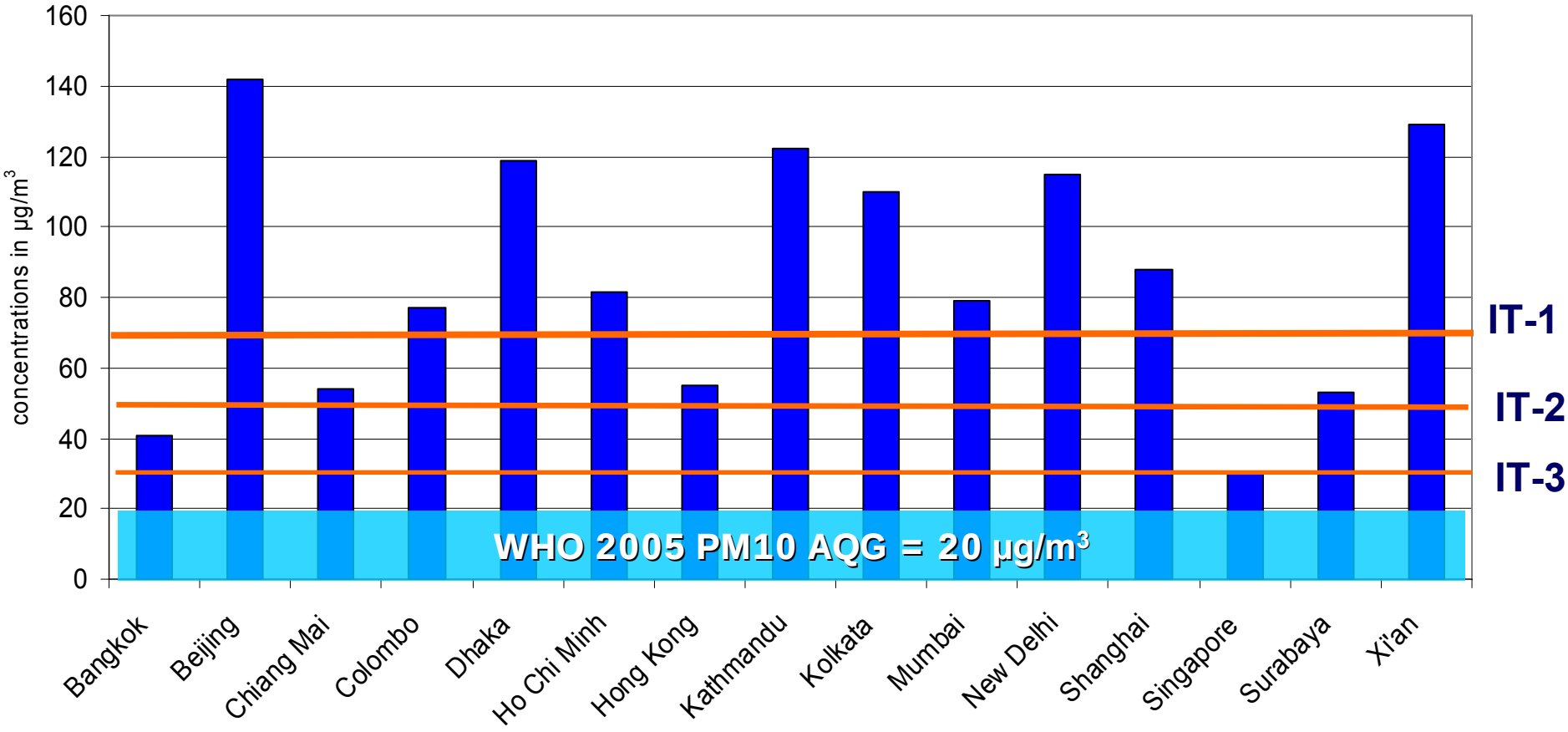
Deaths attributable to urban PM > AQG



WHO AQG for particulate matter

Annual mean level	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Basis for the selected level
Interim target-1 (IT-1)	70	35	Levels associated with about 15% higher long-term mortality than at AQG
Interim target-2 (IT-2)	50	25	Risk of premature mortality decreased by approximately 6% compared to IT1
Interim target-3 (IT-3)	30	15	Mortality risk reduced by approximately 6% compared to IT2 levels.
Air quality guideline (AQG)	20	10	Lowest levels at which total, CP and LCA mortality have been shown to increase (Pope et al., 2002). The use of $PM_{2.5}$ guideline is preferred.

PM10 AQG: for all cities in Asia



Source: CAI-Asia

More information

WHO guidance on the health impacts of air pollutants

- http://www.who.int/phe/health_topics/outdoorair/en/index1.html
- ASEAN Haze online: http://www.haze-online.or.id
- WWF: http://www.panda.org/about_wwf/what_we_do/forests/problems/forest_fires/index.cfm

WHO new Air Quality guidelines (AQGs): revised limits for ozone, nitrogen dioxide and sulfur dioxide

- O3: 100 µg/m3 8-hour mean
  - reduced from 120µg/m3

- NO2: 40 µg/m3 annual mean
  200 µg/m3 1-hour mean
  - Unchanged

- SO2: 20 µg/m3 24-hour mean
  500 µg/m3 10-minute mean
  - Reduced from 125 µg/m3 24-hour mean