

Open Burning and the Arctic: Causes, Impacts, and Mitigation Approaches
Sankt Peterburg, Russia, 8-9 November 2010

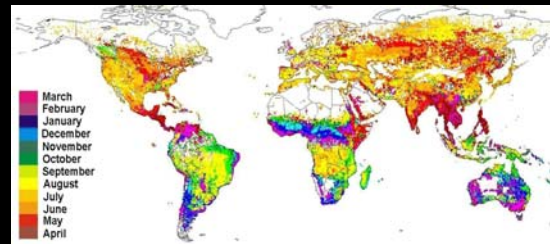
Set Fires & Their Impacts: Health, Environment, Property

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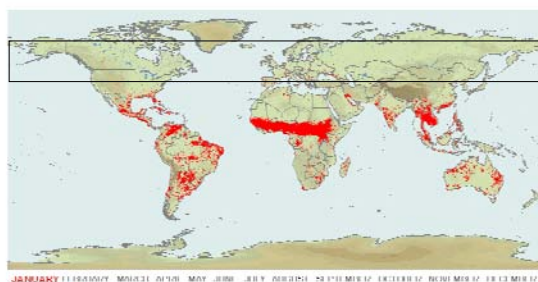
Global Fire Calendar



300-400 million hectares (3-4 million km²) of forest & other lands annually affected by land-use fires and wildfires

Seasonal Variability of Global Vegetation Fires (2005)

MODIS Rapid Response Fire Detections for 2005



Historic and Contemporary Issues on Transboundary Fires and Fire Impacts

Contemporary

- Wildfires crossing borders of national jurisdiction / responsibility and international borders
- Transboundary smoke pollution threatening human health and security
- Radiatively active trace gases and aerosol, including Black Carbon, affecting the global climate

History of Fire Use

From stone age to late medieval land use and cultivation



Unifying global issues (I): Change of land-use, climate and fire regimes – Eurasia (West Europe and Russia) and globally

- In the tropics / developing world: Human pressure on ecosystems resulting in increasing use of land clearing fires and occurrence of wildfires
- In the temperate-boreal zone / industrialized world: Rural exodus (people urbanizing) resulting in increasing wildfire hazard because of abandonment of land cultivation and weakened professional and local community work force to use fire properly or to suppress wildfires



Unifying global issues (II)

- Urban exodus resulting in establishment of new or restructuring traditional rural communities that are becoming more vulnerable to wildfire (Russia: weekend / summer houses replacing traditional village structures)
- The heritage of historic and contemporary fire exclusion resulting in increase of severe and often non-controllable wildfires. Example: The exclusion of low-intensity fires set by lightning in Siberian pine and larch forests is changing the forest structure – resulting in increased wildfire hazard



Western Russia 2010: The Moscow Times 27 October 2010

Deaths Up 18% in Heat Wave

- Deaths soared nearly 18 percent nationwide last summer amid a heat wave that fanned wildfires and blanketed Moscow with acrid smoke, a new government report said.
- Economic Development Ministry: "In connection with the unusual heat, forest fires and smoke, 14,500 more people died in July this year and 41,300 more people died in August than during the same period last year"



Smoke Impacts of peat and forest fires

Composition of vegetation fire smoke

Acute toxicity:

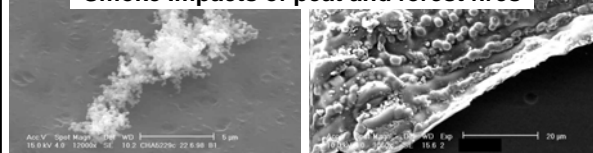
- Particulates below 2.5µm
- Formaldehyde
- Acrolein
- Polycyclic Aromatic Hydrocarbons
- Free radical precursors
- Carbon monoxide

Particulate effects on the respiratory / cardiovascular systems

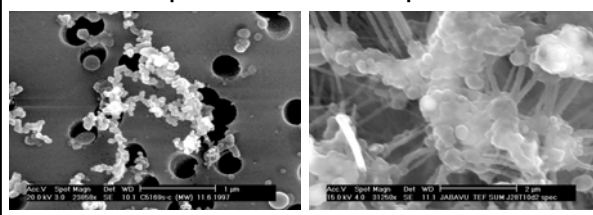
- Respiratory infections in adults and children
- Acute and chronic changes in pulmonary function
- Asthma attacks
- Cardiovascular diseases (CVD)
- Hospital admissions
- Increase of daily mortality



Smoke Impacts of peat and forest fires



Examples of fire-emitted soot particles



Moscow Region 2010

Upper left photo: China News



Communities affected in Western Russia

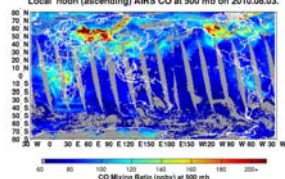
Besides more than 50 people killed directly by wildfires:

- 800,000 ha burned
- 2000 houses burned
- > 30 villages destroyed
- drought and fire destroying agricultural crops
- 60,000 flights delayed or cancelled



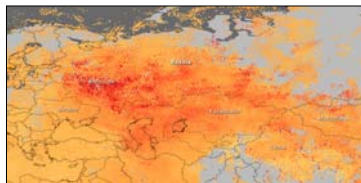
Long-range transport of pyrogenic carbon monoxide

Local noon (ascending) AIRS CO at 500 mb on 2010.08.03.



Atmospheric Infrared Sounder (AIRS) carbon monoxide on 3 Aug 2010

MOPITT carbon monoxide 1-8 Aug 2010



Long-range transport of pyrogenic emissions

This image of 1 August 2010 shows the smoke plume from the greater Moscow region drifting to Ukraine – on a day when high fire-smoke alert had been declared in its capital Kiev.



© Image and interpretation: MODIS Aqua scene (acquired on 1 August 2010, 250m resolution) and GFMC

Additional themes of transboundary problems:

Radioactive fire emissions: Consequences of the Chernobyl NPP failure

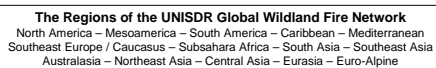
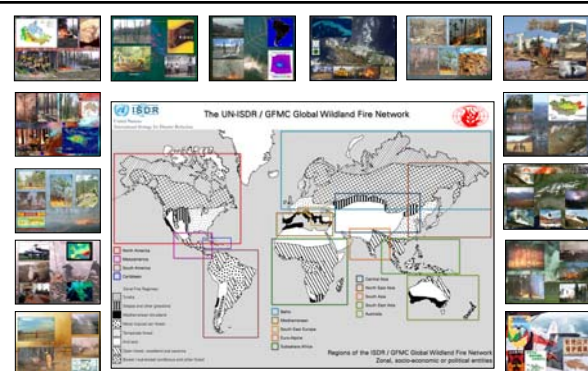
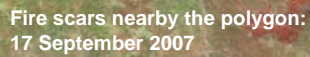
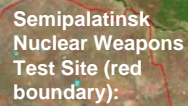
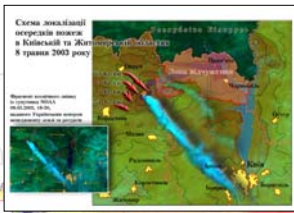
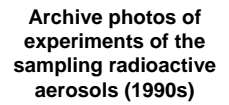


Abandoned forests – increasing fuel loads and wildfire hazard

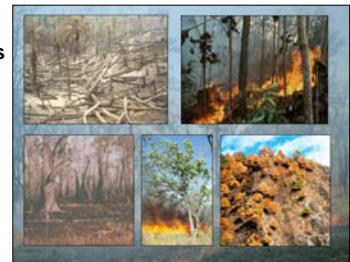
Consequences of the Chernobyl failure



The Chernobyl firefighters scrap yard

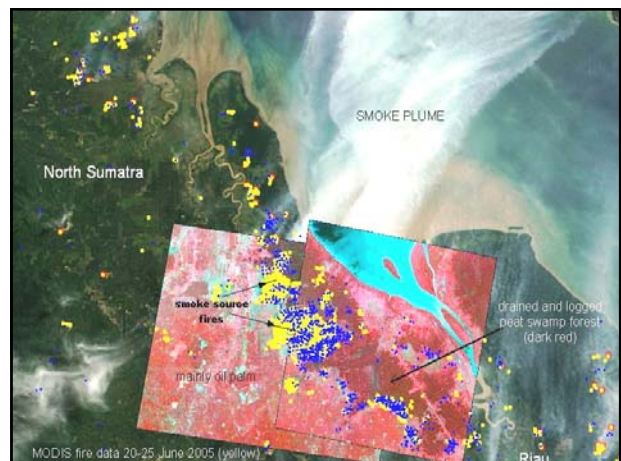


- Rain forests
- Monsoon forests
- Peat-swamp forests
- Mountain coniferous and deciduous forests
- Savannas



Southeast Asia: Hotspot Indonesia

- Land clearing for booming biofuel markets



Impacts on Human Health and Security

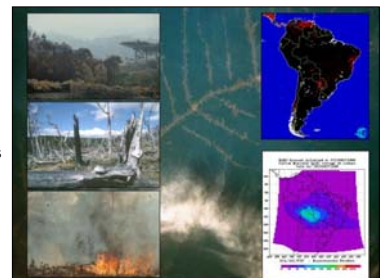
- Smoke effects in South East Asia 1997-98
- 50 to 100 million (??) people in SE Asia affected by smoke in various degrees (increased morbidity and mortality; long-term health effects)
- >250 human death toll by aircraft and maritime accidents



Regional South America Wildland Fire Network

Broad range of ecosystems affected by fire

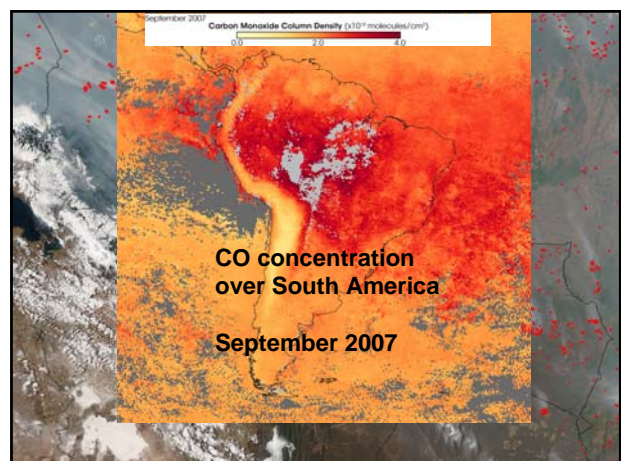
- Equatorial rain forest
- Cerrado / Cerradao
- Araucaria and Nothofagus forests
- Degraded grasslands and savannas
- Agricultural / pasture lands




Almost unnoticed at international level:

On 19 August 2010 Bolivia declared the national emergency:

- 25,000 wildfires burning
- Area affected: 1.5 M ha






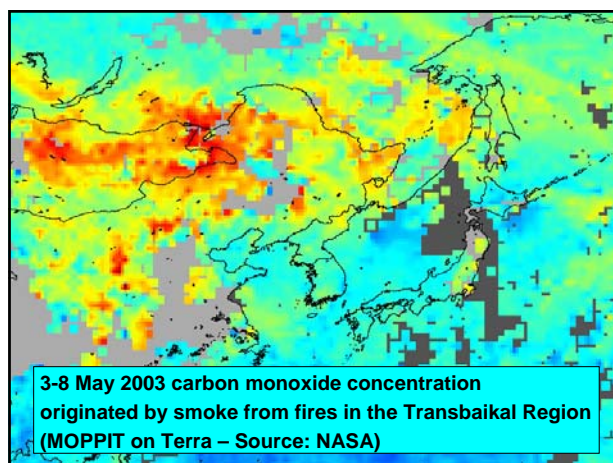
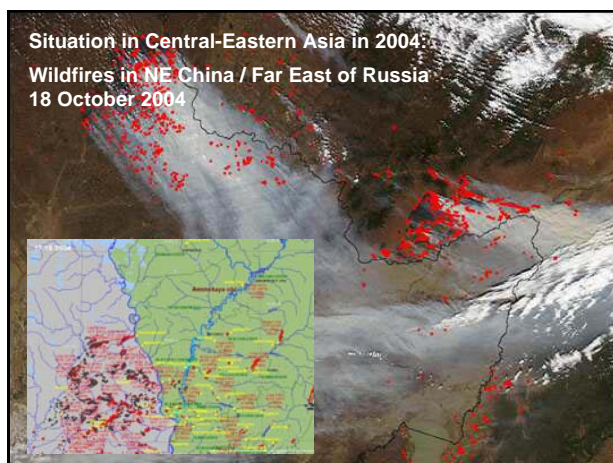
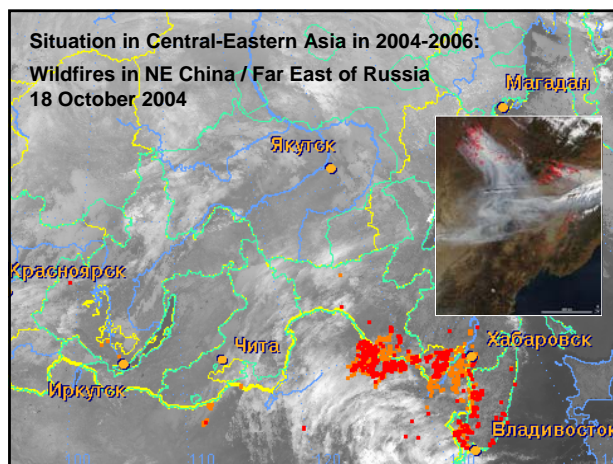
Regional Northeast Asia Wildland Fire Network

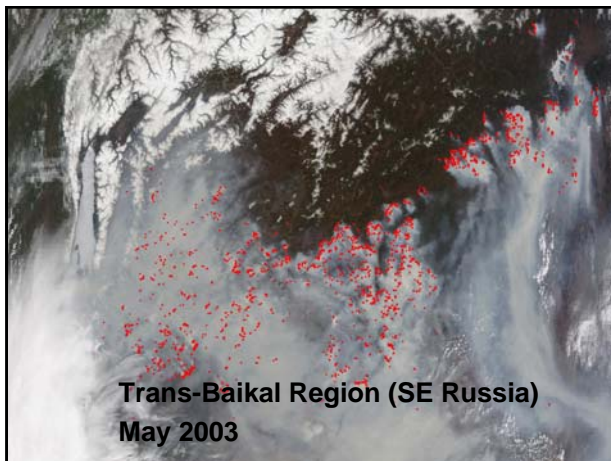
A culturally and ecologically facet-rich region

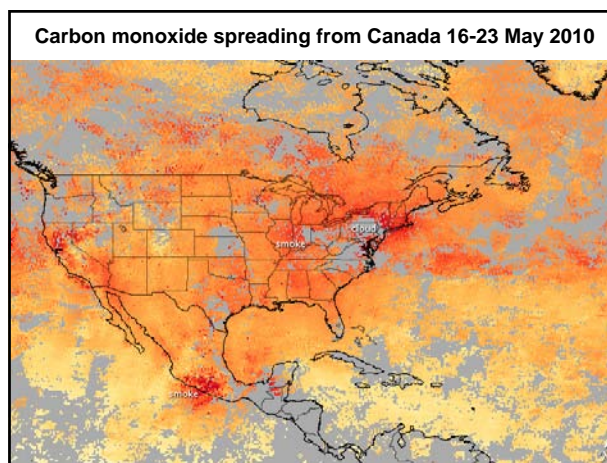
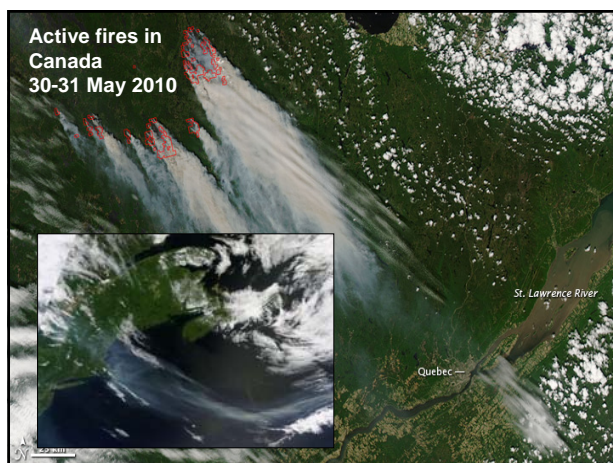
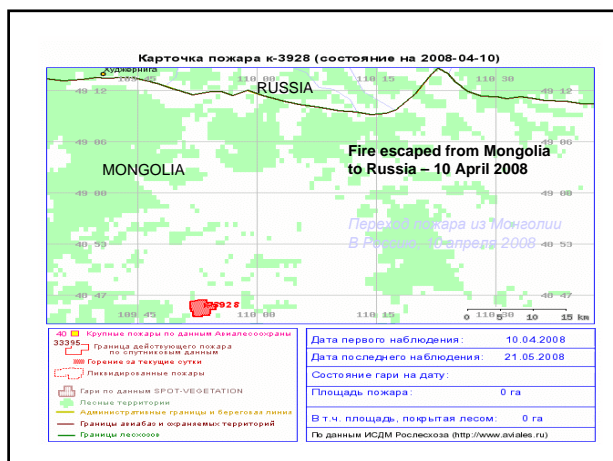
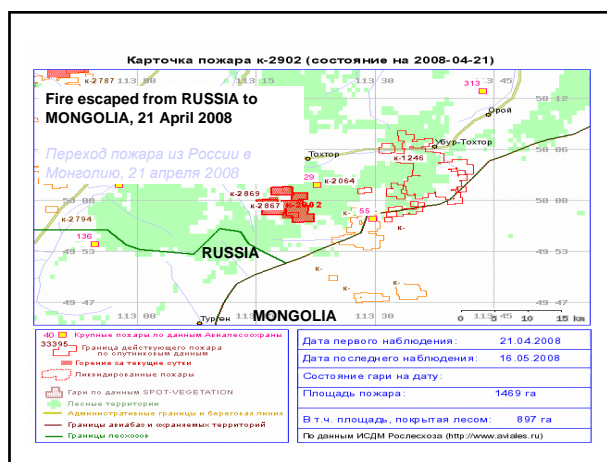
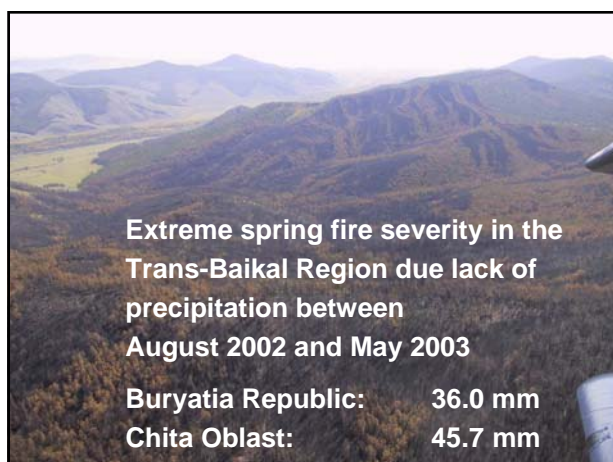
Network foundation:
March 2004
Host: Korea Forest Research Institute

Members (all APEC):
South Korea
Japan
PR China
Russia (Far East)







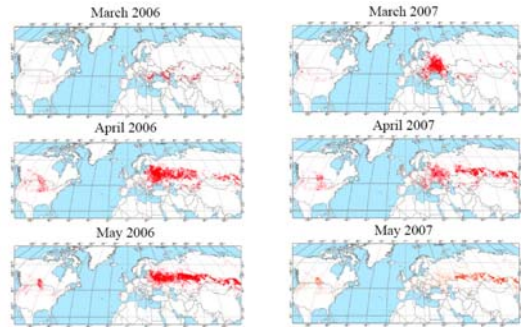


Agricultural Fires in Illinois, U.S.A. (21 October 2010)

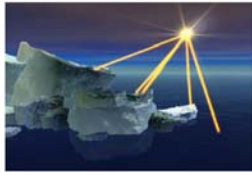


Spring Fires in the Northern Hemisphere 2006 – 2007

Source: MODIS by Arthur Lembo (CATF Report)



Лед и снег отражают солнечные лучи.

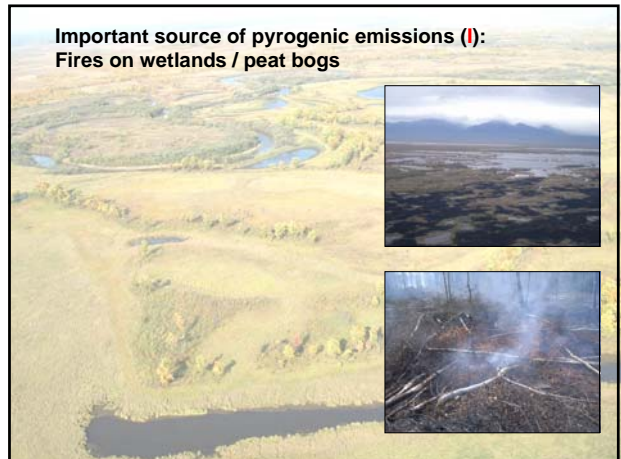


Отложения черного углерода затемняют поверхности и сокращают их отражательную способность.

Impacts of “black carbon”. Deposits darken snow / ice surface in the Arctic region and reduce reflectivity.

Source: A.Pettus / CATF
Agricultural Fires And Arctic
Climate Change: A Special
CATF Report

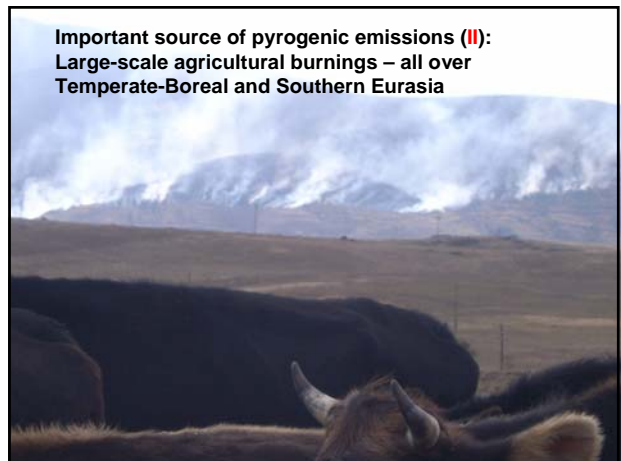
**Important source of pyrogenic emissions (I):
Fires on wetlands / peat bogs**

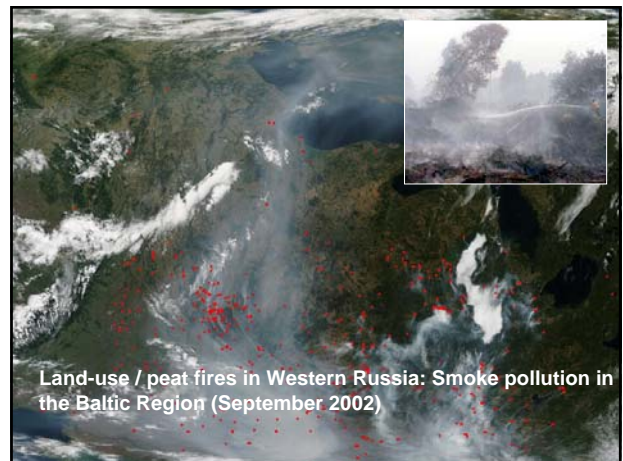
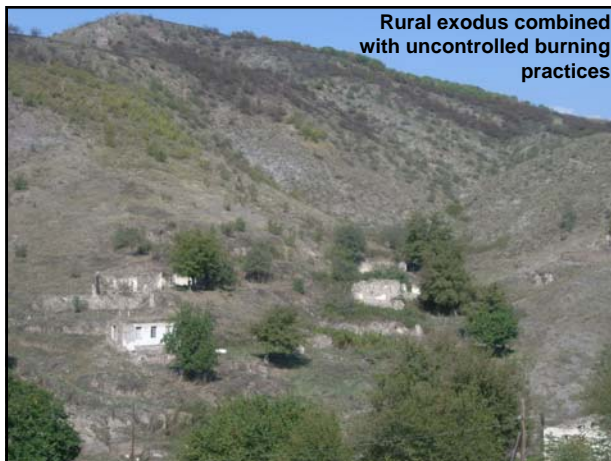


**Important source of pyrogenic emissions (I):
Fires on wetlands / peat bogs**



**Important source of pyrogenic emissions (II):
Large-scale agricultural burnings – all over
Temperate-Boreal and Southern Eurasia**



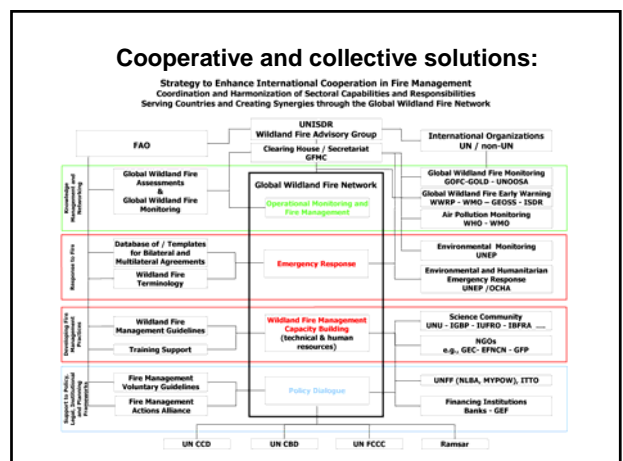


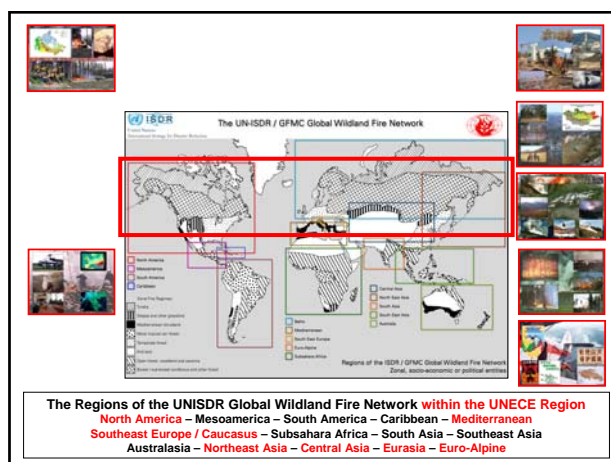
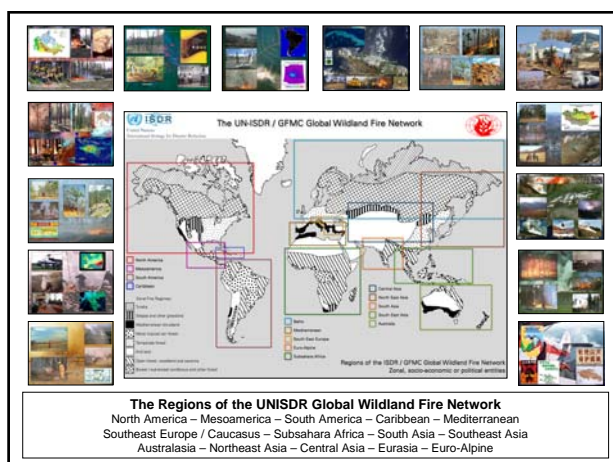
Consequence of transboundary wildland fire smoke pollution

11 May 2006 – Media Release by the UK Department for Environment, Food and Rural Affairs (DEFRA)

The Meteorological Office said that the easterly air-flows which have brought the particles to the UK are likely to remain over the next few days and that this will not change until Saturday. Until then, the levels of PM10 may depend on how quickly the fires are brought under control.

The UK government is pushing for a revision of the United Nations Convention on Long Range Transboundary Air Pollution to prevent similar occurrences in the future, a DEFRA spokesman said.





UNEP / FAO Team of Specialists on Forest Fire: Mandate (extract)

To provide, in close cooperation and coordination with the UNISDR Wildland Fire Advisory Group / Global Wildland Fire Network, FAO, UNISDR, Council of Europe and other partners, **guidance to ECE member states on forest fire management and forest fire policies, including bilateral / international cooperation** of ECE member states.

Emphasis:

- Guidance to countries in transition
- Corporate approaches allowing creation of synergies
- Implementation of transboundary cooperation

Outputs 2008-2010 (I)

International meeting on Cross-boundary Fire Management (Irkutsk, Russia, 16-18 June 2010)

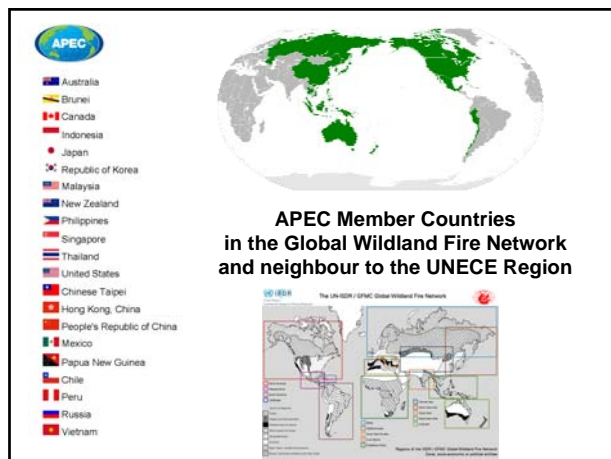


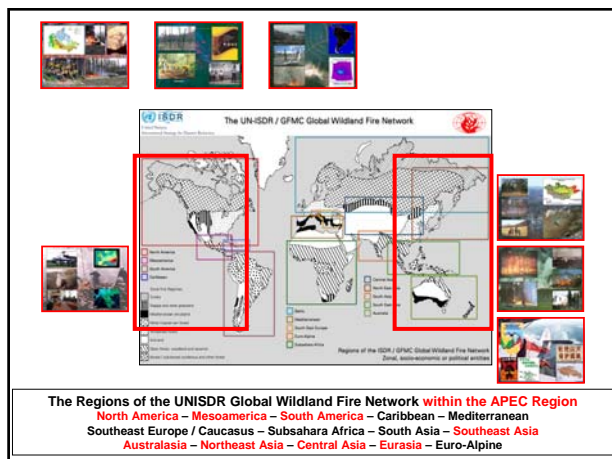
Emphasis:

- Enhancing efficiency and effectiveness of regional cooperation in fire management



New edition of the International Multi-Lingual Fire Management Glossary





Outputs 2008-2010 (II)

International APEC Conference on Forest Fire: Management and International Cooperation in Fire Emergencies of the Asia Pacific (Khabarovsk, Russia, 3-7 October 2010)

Emphasis:

- Harmonization of approaches with multilateral agreements neighbouring the UNECE region



Activity 2011

Support the preparation of an “ECE Regional Conference on Cross-boundary Fire Management” (to be hosted by Italy in 2011), to build on the results of the Irkutsk, Khabarovsk and South Africa conferences.

Emphasis:

- Development of an UNECE agreement on “Cross-boundary Fire Management”

ECE Regional Conference on Cross-boundary Fire Management (I)

Initiative:

- UNECE/FAO Team of Specialists on Forest Fire

Host

- Italy

Partner

- Council of Europe

Symbolic contribution to

- UN International Year of Forests



**INTERNATIONAL YEAR
OF FORESTS • 2011**



ECE Regional Conference on Cross-boundary Fire Management (I)

Rationale: Need to better understand and manage

- Consequences of rural abandonment and urbanization on agriculture, pastoralism, forestry and **wildfire hazard**
- Rural exodus affecting **presence** of the rural work force, including **availability of volunteer firefighters**
- Re-privatization of formerly nationalized forests resulting in vacuums of forest management in **smallholder forest estates**; abandonment of forest management in smallholder forest estates as consequence of urbanized forest owners

ECE Regional Conference on Cross-boundary Fire Management (II)

Rationale: Need to better understand and manage

- Weakened governance over forestry and decreased fire management capabilities in many Eastern European and Central Asian countries as a consequence of the transition of national economies, resulting in uncontrolled or illegal forest use and increase of related wildfires (**relation to Forest Law Enforcement and Governance - FLEG**) and **excessive / unnecessary burning of actively managed and abandoned agricultural lands**
- Increasing problems of wildfires affecting the **perimeters of metropolitan** areas, settlements and developments dispersedly located in wildlands

ECE Regional Conference on Cross-boundary Fire Management (III)

Rationale: Need to better understand and manage

- New standards for controlling gaseous and particle emissions from fossil fuel and biomass burning that are affecting human health: resulting in **conflicts in fire management** (e.g., difficulties for the acceptance of prescribed burning)
- Secondary problems associated with wildfires, notably on **territories contaminated by radioactivity and remnants from armed conflicts** (e.g., unexploded ordnance, land mines, uranium-depleted ammunition).

Conference objectives (I)

- The conference will elaborate recommendations to UNECE and CoE member states to take advantage of recent insights and solutions of contemporary and expected future wildfire problems

➤ Outcomes of "Open Burning and the Arctic"

- Main focus of the conference: To address the situation in countries in which progress of enhancing fire management capabilities is limited, e.g. as a consequence of political and administrative transition as well as difficult economic conditions, or countries with significant or extraordinary fire situations, which would benefit from the experience of their neighbor countries.

Conference objectives (II)

- The overall aim of the Forum will be a first step towards the development of an **agreement on international cooperation to enhance fire management capability in the region**
- Right from the beginning of the political and technical planning and consultation process in preparation of the Forum will be connected to the outcomes of the 5th International Wildland Fire Conference (May 2011) and a follow-up process.



Translate these challenges into a regional fire management policy framework – a draft concept for a regional UNECE agreement on Cross-boundary Fire Management

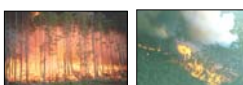
➤ Relationship to the Convention on Long-range Transboundary Air Pollution (CLRTAP) of 1979?

➤ CLRTAP Gothenburg Protocol ?

However

In forestry we know that a reduction of uncontrolled and destructive wildfires through measures of Integrated Fire Management will include the integration of "beneficial effects" of natural fires, and the use of prescribed management fires

Instead of wildfires



>

Fires set by Management



Development of Fire Management Capabilities

Development of methods to actively control the fire in order to establish forest stands that are less susceptible to wildfire



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Central Asian Fire Experiment Mongolia (June 2008)

Goal:

To introduce the concept of
Prescribed burning for stabilizing
Forests against wildfire destruction
and to preserve the terrestrial carbon pool



Handover of equipment and demonstration



Conducting prescribed burning with Mongolian, Russian and German fire experts



Example: Atlantic heathlands in Germany

Generated by hundreds of years of land
cultivation





Total agricultural fire ban in German States – but fire permission possible by exemption



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Sankt Peterburg, Russia, 8-9 November 2010

Thanks for Your Attention

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