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CLIMATE CHANGE AND WILDLAND FIRE REGIMES: SOUTH ASIA REGIONAL PERSPECTIVES

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Wildfires and Climate Change

Wildfires major driver

- destruction of pristine biodiversity and habitats of any rare species
- degradation of forests
- changes of ecosystem properties
- deterioration of social and economic conditions
- damage to cultural heritage sites and land-use systems that provide the basis for livelihoods to a population of around 150 million people living in the mountain region

Secondary consequences of wildfires include the destruction of soil protecting vegetation cover, affecting water regimes for a population of 1.4 billion residing downstream of the HKH region.

... Wildfires and Climate Change

The warming of the global climate systems is clear and very likely due to increased greenhouse gas concentrations in the atmosphere resulting from human activities.

(IPCC 2007).

Carbonaceous aerosols cause strong atmospheric heating and large surface cooling that is as important to South Asian climate forcing as greenhouse gases, BUT, the aerosol sources are poorly understood.

(Gustafsson et al., 2009, Science 23 January 2009: 495-498)

The phenomena is most persistent in South Asia, Southeast Asia, but has also been identified in large metropolitan areas in Egypt, China, South Korea and other tropical locations.

(Gustafsson et al., 2009).

ABCs (upto 5km thick blanket) significantly effect regional climate.

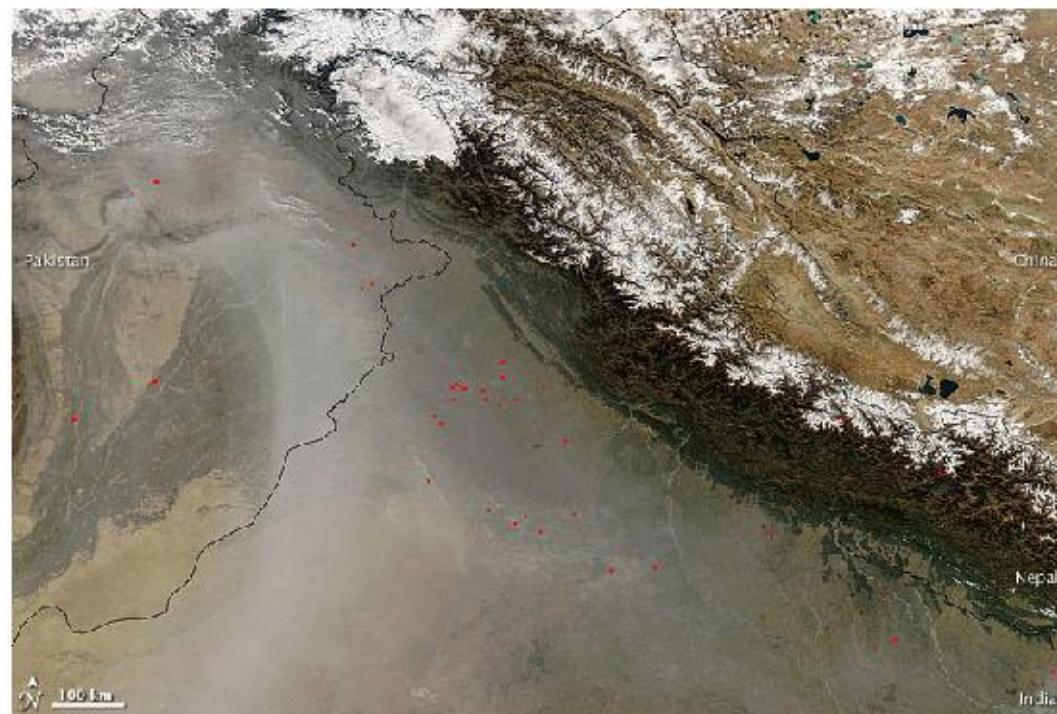
(UNEP 2007, Gustafsson et al., 2009).

ABCs in South of HKH Region

- the soot in the brown haze linked to hundreds of thousands of deaths each year mainly from lung and heart disease
- Contributed by wood and dung fires, fossil fuel burning, wildfires, agricultural fires, and dusts
- forming a thick blanket during the beginning of winter season blown from the West

ABCs in South of HKH Region

MODIS on NASA's Aqua satellite image, acquired 16 November 2008. Thick smoke hides most of the areas of northern **India** (Amritsar, New Delhi, Jaipur), east **Pakistan** (Islamabad, Rawalpindi, Lahore, Okara) and south-west **Nepal** (Mahendranagar).



(source: <http://earthobservatory.nasa.gov>)

Consequences of ABCs

- Asian cities
 - getting darker (dimming by 6%)
 - Plant growth
- Glaciers on the Himalayas
 - melting faster
 - GLOF
- Weather system
 - getting more extreme
 - Too much water- Too little water
 - WIDs and food production
 - extended dry spells
 - concentrated ppt
 - increasing wildfire incidents

the clouds primarily affected air quality in Asia, probably worsening the effects of climate change in the region

Ramanathan 2008, UNEP 2007, Thompson 2006

Consequences of ABCs

Developing and least developed countries – critically vulnerable from CC

- coping capacity low– due to poverty and low technology
- decline of biodiversity and deterioration or loss of ecosystem services
- environmental problem challenge to sustainable development and the livelihoods of poor in HKH region.

(UNEP 2007)

Knowledge gaps on regional vulnerability

While Asian countries have been found to be most vulnerable region in the world in the context of climate change (IPCC 2007), the vulnerability of Himalayas is unclear because of the lack of data and knowledge at the regional level.

- National Assessment on Wildland fires,
- Research
- Regional adaptive capacity
- Human resources
- ...

Conclusions

- ❑ Burning biomass is the main cause of the dense 'brown clouds' that plague South Asia each winter, and both biomass and fossil fuel burning should be targeted to combat climate change and improve air quality.
- ❑ While the brown cloud acts as a 'global dimmer' by absorbing heat trapped by greenhouse gases, it also affects the regional climate by melting glaciers, affecting crop growth and impacting the Asian monsoon.
- ❑ Biomass-burning produces two-thirds of the carbon soot and a half to two-thirds of a type of soot called black carbon, whose role in climate change is under debate.

Conclusions

- ❑ Atmospheric Brown Clouds (ABCs) could be the major driver to the regional climate change and pollution though not well understood
- ❑ ABCs → negatively affecting to the agricultural production, changing glacier dynamics and wildfire regimes.
- ❑ Occurrence of wildfires is increasing as a consequence of regional warming and extended dry spells.

Recommendations

- ☐ Policymakers should discourage biomass burning and support a development of cleaner sources (low-tech solar, improved stoves and biogas cookers).
- ☐ To enhance and strengthen bilateral/multilateral and international cooperation in wildland fire management for creating synergies.
- ☐ To share knowledge and technical and human resources among countries in the region.
- ☐ To strengthen local communities coping with wildfires and aiding them in addressing the consequences of climate change and wildfires and the effects on their livelihoods.

... Recommendations

- ☐ To emphasize the improvement of participatory/community-based fire management approaches and institutional and technological capabilities at all levels,
- ☐ To promote education and awareness-raising programmes on wildfire management.

Thank You

Comments? Questions?

UNISDR-Global Wildland Fire Network web page:

<http://www.fire.uni-freiburg.de/GlobalNetworks/globalNet.html>

UNISDR-Regional South Asia Wildland Fire Network web page:

http://www.fire.uni-freiburg.de/GlobalNetworks/South_Asia/Front_RSAWFN.html

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