Cultural Uses and Impacts of Landscape Fires: Past, Present and Future

Tentative Whitepaper Outline

For each of these, we want to know the state of knowledge, and gaps. We also want to know low hanging fruit for synthesis strategies.

Our goals are:

- Understand the interactions of fire with climate and biogeochemistry, in order to anticipate future change.
- To understand how human activities have modified the extent and impact of fire and the subsequent feedbacks on the climate system and global biogeochemical cycles.
- Generate alternate scenarios of human and environmental interactions for the future extent of fire in earth systems. This can include scenarios about the re-integration of indigenous burning practices across various areas – good examples will come from South America, North America and Australia.
- Develop a strategy for integrating our understanding of fire into Earth system models
- Achieve a local to global understanding of the role of indigenous burning practices in ecosystem function and Earth systems and the implications of this for future landscape management.

I. Fires in the current climate.

A. Fires as a natural process (Group 1)

1. Fire as a landscape process
    a) Plant evolution related to fire
    b) Implications of fire regimes for distribution of animal species
    c) Biogeochemistry of fires (land/soil perspective)
2. Emissions and geochemical cycling
    a) Gas emissions and impacts
        i. Green house gases
        ii. Atmospheric chemistry
        iii. Atmospheric biogeochemistry (e.g. nitrogen deposition impacts)
    b) Aerosol emissions and impacts
        i. Climate impacts
        ii. Biogeochemistry impacts
    c) Human health impacts

B. Human impacts on fire (Group 2)

1. How do we define human impacts on fire?
2. Cultural use of fires - Comparisons of indigenous/non-indigenous emissions
    a) Savannas

b) Boreal forests
c) Rainforests
d) Grasslands
e) Mediterranean/Chaparral

II. Fire distributions (Group 3)

A. Paleo data for fires
1.Where do we have it? Quality?
2.Soils
3.Ice cores?
4.Marine sediment records?

B. Satellite fire distribution data sets
1.Global distribution
2.Frequency
3.Seasonality

C. Other datasets on fire

It is important here to consider the time scales over which fire occurs and the spatial extent of fire events – ie. Boreal (1 in 100 yrs) vs. Savannas (Annual fire)

III. Paleo data/human interactions

A. Examples of interpreting past fire history, behavior, impacts (Group 4)
a) Savanna
b) Boreal forests
c) Rainforests
d) Grasslands
e) Mediterranean/Chaparral

B. Models of human/fire interactions at small to large scales? (conceptual to full complexity) (Group 5)
1. Local
2. Landscape
3. Regional
4. Meso
5. Global

IV. Fires in the Anthropocene (Group 6)

A. Drivers of changing fire regimes
1.Settlement
2.Landuse change
3.Biofuels and fire (sugar cane in Brazil as an example)
4.Fire Policy

B. Implications of change (Group 7)
1.Wildfire
a) Higher intensity and severity

b) Less biological complexity

2.Invasive species

3.Landscape fragmentation and land use change related to fire

4.Impact of changes in fires on climate

V. Future fire (Group 8)

A. Impacts of human onto fires (indirectly)

1.Changing vegetation communities: invasive species and land use

2.Landscape fragmentation

3.Changing fire regimes from climate change

B. Fire as a tool for conservation and management

1.Ecosystem services

2.Maintaining cultural traditions as process

a) West Arnhem Land fire abatement project case study

3.State and local communities: fire management traditions: future interactions

4.Beyond Kyoto/Bali: Use of fire for carbon sequestration and gas abatement

Perhaps here can be a discussion of the various "gold standards" such as those by CCBA. http://www.climate-standards.org/