

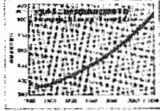
# リモートセンシングを用いた 気候変化に伴うカナダ北方林の植生変化の検出

Detection of Vegetation Change Possibly Induced by Global Warming with Special Reference to Forest-Tundra Ecotone of the Northern Yukon Territory, Canada

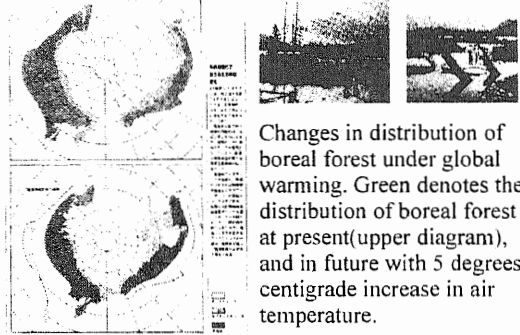
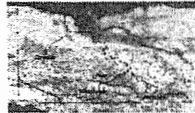
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## Biggest Coniferous Forest in Danger Global warming brings northern forest disturbance

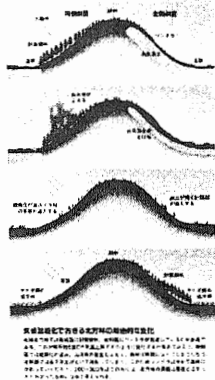


Boreal forest will catch most severe influence from global warming

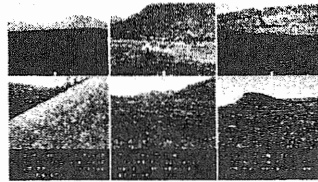


Changes in distribution of boreal forest under global warming. Green denotes the distribution of boreal forest at present(upper diagram), and in future with 5 degrees centigrade increase in air temperature.

Travel speed could not catch up the warming rate  
- Southern edge of boreal forest in midland region such as Yukon Territory will become dry, and grassland will appear.  
- South faced slope becomes more dry, and fire clear off the forest



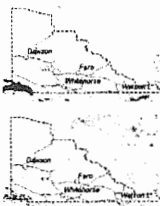
Forest change will not appear over the wide are, but appear *very point* first  
- In the south-faced slope, drying promote forest fire, and finally turned to grassland  
- Thawing of the permafrost in the north-faced slope change the tundra to forest



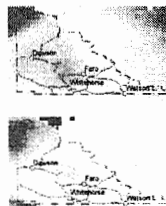
- Boreal forest changes to grassland  
- Subarctic alters to shrub  
- Arctic becomes polar desert

How we can detect the signals on vegetation changes?  
Answer: Satellite Remote Sensing and inspection of the images with field experiences

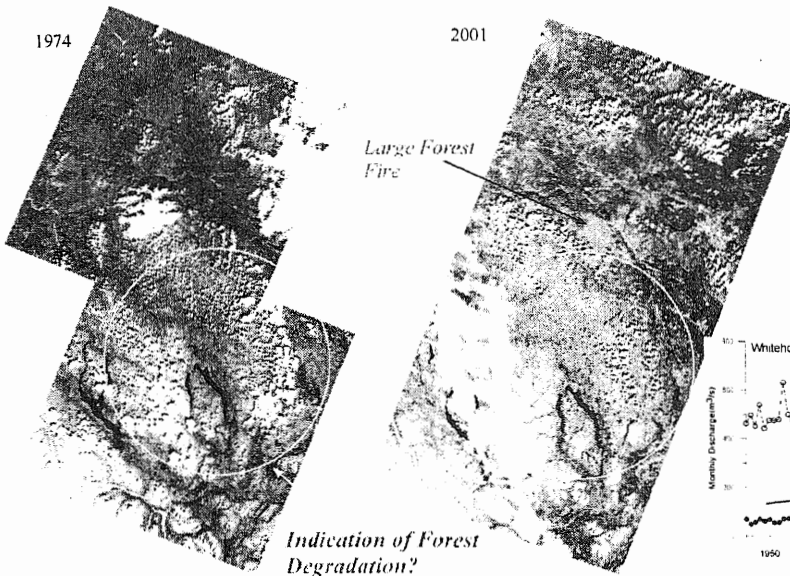
## Long term changes in climate and vegetation



Trend of annual integrated NDVI(UP) and maximum NDVI(DOWN) between 1982 and 2000  
- Plus anomaly around Whitehorse and Dawson in Integrated NDVI  
● Increased greenness in Boreal Forest  
- Plus anomaly in tundra zone at northern coast  
● Indication of change in biome



Trends of maximum monthly air temperature(UP) and precipitation of June, July, August between 1971 and 2000(CRU TS 2.0)  
- Increase in air temperature around Dawson, Faro, Whitehorse  
● Long term warming  
- Decreasing trend of summer precipitation to the north of St. Elias Mts  
● Drying by mountain shade



We are analyzing MSS in 1970's and TM, ETM+ in 1990's and 2000's.  
- Careful inspection considering topography, biome, and other knowledge will enable the detection of vegetation changes.

Some signal appeared in the discharge in the Yukon River

Low flow is increasing during past half century at Whitehorse and Frank Creek in the Yukon River

Possible reasons --- Thawing of permafrost ?

