Multi-year land cover distribution over Canada from earth observation data

Land cover 1990

Land cover 1995

Land cover 2000

Reducing Canada's vulnerability to climate change

This poster presents preliminary results of applied scientific research on the application of earth observation for land use and land cover change. *Land cover change is a major cause or key forcing factor of global change and is representative of the means by which human adaptation to these changes will occur*.

This research is part of the Earth Science for National Action on Climate Change, a project integrated into the NRCan/ESS Climate Change Program and appreciably sponsored by the Canadian Space Agency through the Government Related Initiatives Program.

The analysis of land-use & land cover changes is approached from three complementary perspectives: 1) monitoring, 2) providing earth observation based spatially explicit input for regional climate impact assessment models and 3) assessment of impact on ecological functions. The research is conducted using earth observation data at the regional scale and at the landscape scale providing land cover information at 1km and 30m resolutions.

The results presented here allow for qualitative assessment of changes in land cover over the Canadian landmass for the period 1990-2000. Three land cover maps were produced from enhanced AVHRR surface reflectance time series data. The base map derived from 1995 AVHRR seasonal data was updated backward to produce 1990 and forwarded to produce 2000 land cover maps using a change detection and local classification methodology. Changes for 1990-1995 and 1995-2000 were generated using temporal change detection that employs 10-day composites for the summer seasons. Areas of significant change were extracted using ecoprovince specific thresholds set by comparison with Landsat and provincial fire databases. To classify change areas, local spectral signatures were generated around the change area based on the 1995 landcover map and spectral data for the year to be updated. The pixels within the change area were then classified using these signatures *The approach taken for producing these land cover data ensures its consistency and continuity while the unique classification legend allows for comparison and monitoring.*
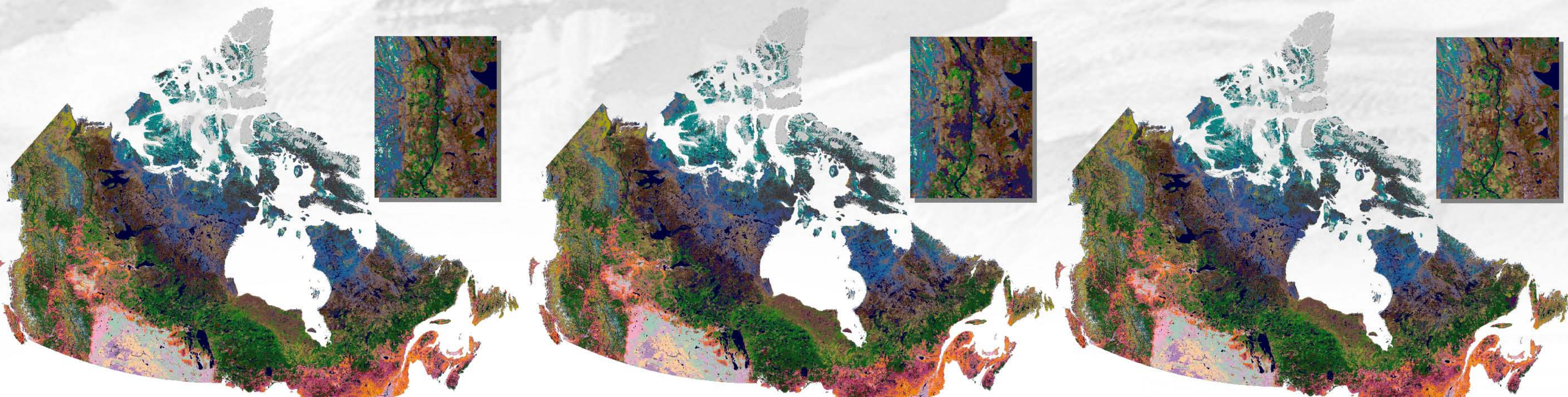
Land cover 1990

1	1.0 Forest Land
2	1.1 Evergreen Needleleaf Forest
3	**1.1.1 High Density (1)**
4	1.1.2 Medium Density
5	**1.1.2.1 Southern Forest (2)**
6	**1.1.2.2 Northern Forest (3)**
7	1.1.3 Low Density
8	**1.1.3.1 Southern Forest (4)**
9	**1.1.3.2 Northern Forest (5)**
10	**1.2 Deciduous Broadleaf Forest (6)**
11	1.3 Mixed Forest
12	**1.3.1 Mixed Needleleaf Forest (7)**
13	1.3.2 Mixed Intermediate Forest
14	**1.3.2.1 Mixed Intermediate Uniform Forest (8)**
15	**1.3.2.2 Mixed Intermediate Heterogenous Forest (9)**
16	**1.3.3 Mixed Broadleaf Forest (10)**
17	1.4 Burns
18	**1.4.1 Low Green Vegetation Cover (11)**
19	**1.4.2 Green Vegetation Cover (12)**
20	2.0 Open Land
21	**2.1 Transition Treed Shrubland (13)**
22	2.2 Wetland/Shrubland
23	**2.1.1 High Density (14)**
24	**2.1.2 Medium Density (15)**
25	**2.3 Grassland (16)**
26	2.4 Barren Land
27	2.4.1 Shrub and Lichen Dominated
28	**2.4.1.1 Lichen and others (17)**
29	**2.4.1.2 Shrub/Lichen Dominated (18)**
30	2.4.2 Treeless
31	**2.4.2.1 Heather and Herbs (19)**
	2.4.2.2 Low Vegetation Cover (20)
	2.4.2.3 Very Low Vegetation Cover (21)
	2.4.2.4 Bare soil and rock (22)
	3.0 Developed Land
	3.1 Cropland
	3.1.1 High Biomass (23)
	3.1.2 Medium Biomass (24)
	3.1.3 Low Biomass (25)
	3.2 Mosaic Land
	3.2.1 Cropland-Woodland (26)
	3.2.2 Woodland-Cropland (27)
	3.2.3 Cropland-Other (28)
	3.3 Urban and Built-up (29)
	4.0 Non-Vegetated Land
	4.1 Water (30)
	4.2 Snow/Ice (31)

Change – Decreasing vegetation cover

Change – Increasing vegetation cover

Land cover change 1990-1995

Land cover change 1995-2000

Preliminary % Change Estimates (1990-1995)

% area change of Canada's landmass

1995 land cover class
- Barren land
- Shrub land
- Mosaic land
- Low veg. cover
- Forest land

1990 land cover class: Forest land, Low veg. cover, Mosaic land, Shrub land, Barren land

Preliminary % Change Estimates (1995-2000)

% area change of Canada's landmass

2000 land cover class
- Barren land
- Shrub land
- Mosaic land
- Low veg. cover
- Forest land

1995 land cover class: Forest land, Low veg. cover, Mosaic land, Shrub land, Barren land

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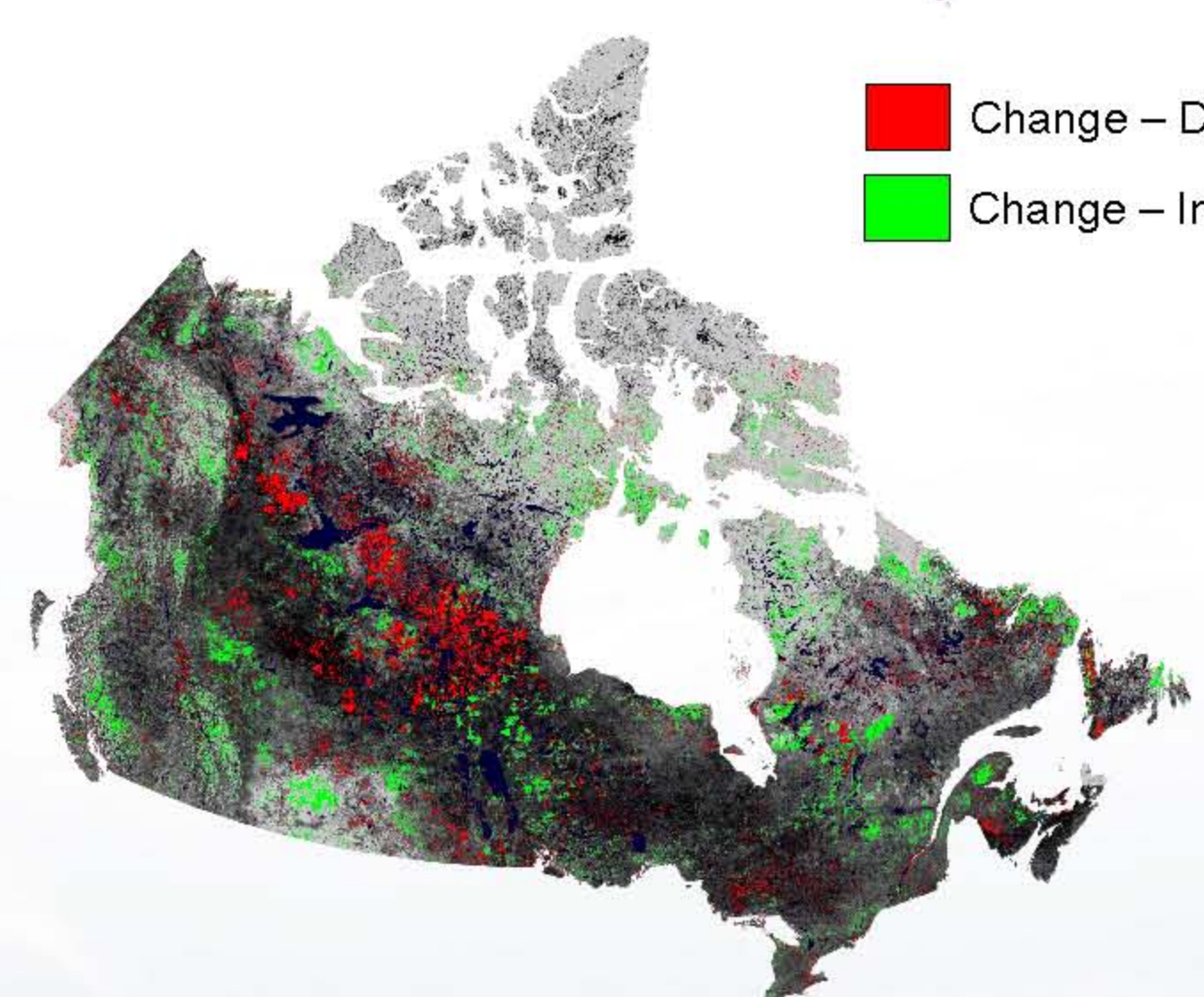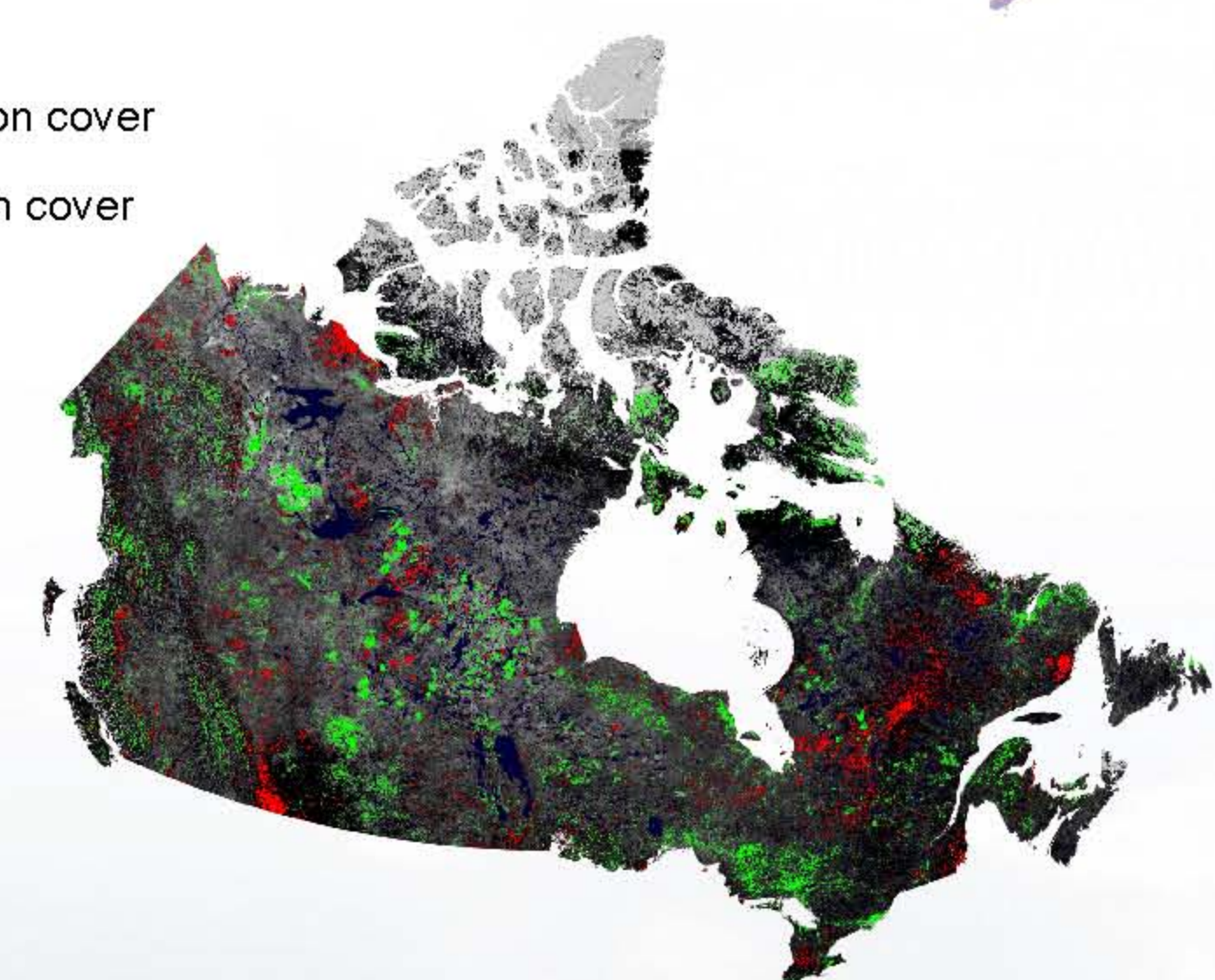
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