

# EFFECTS OF CLIMATE CHANGE ON FOREST FIRES OVER NORTH AMERICA AND IMPACT ON U.S. OZONE AIR QUALITY

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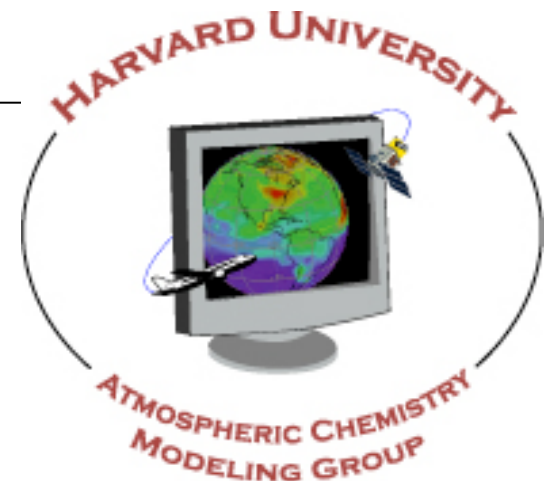
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<sup>4</sup> Now at Michigan

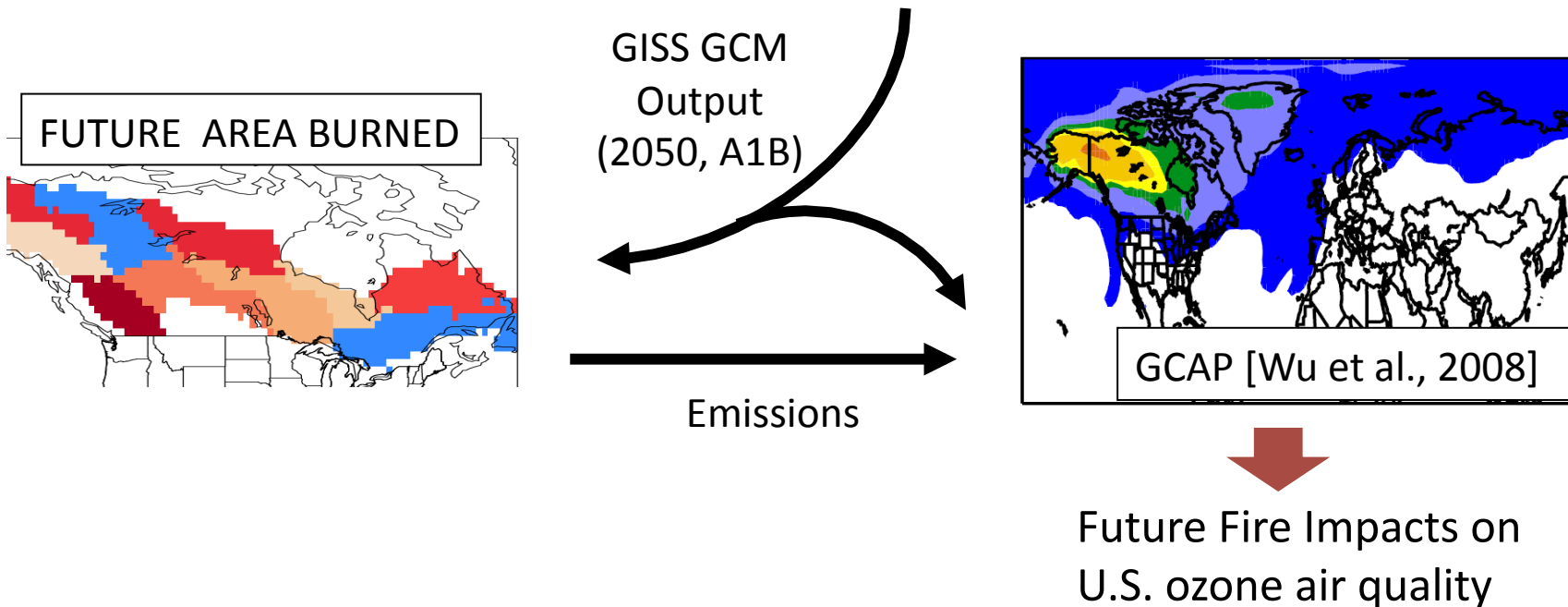
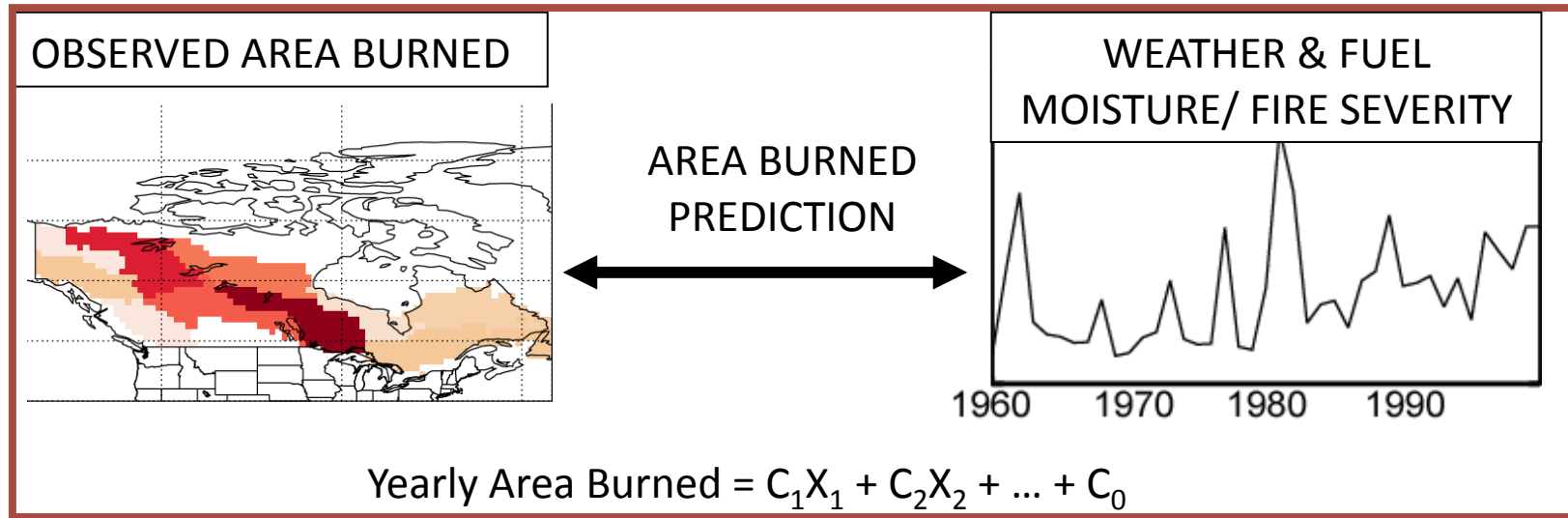
Tech  
Service

<sup>5</sup> Canadian Forest

<sup>6</sup> UC Merced

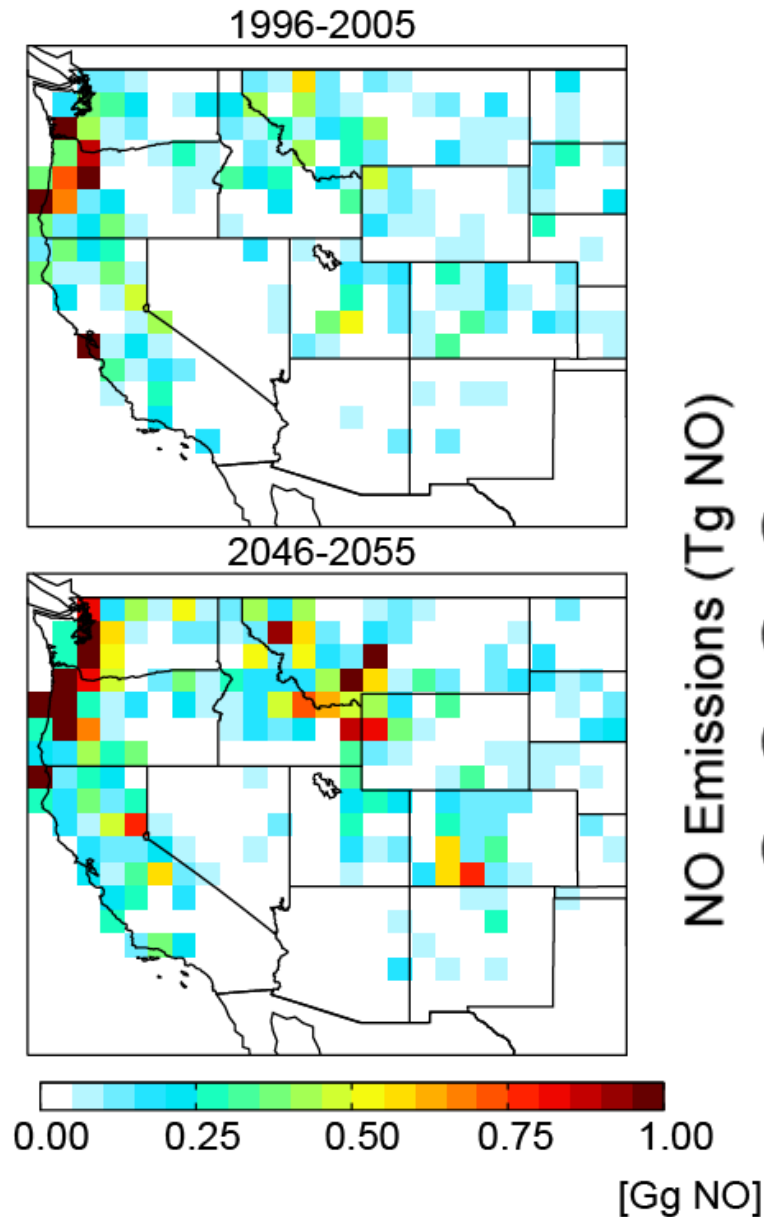


# PREDICTING FUTURE FIRE IMPACTS ON U.S. OZONE

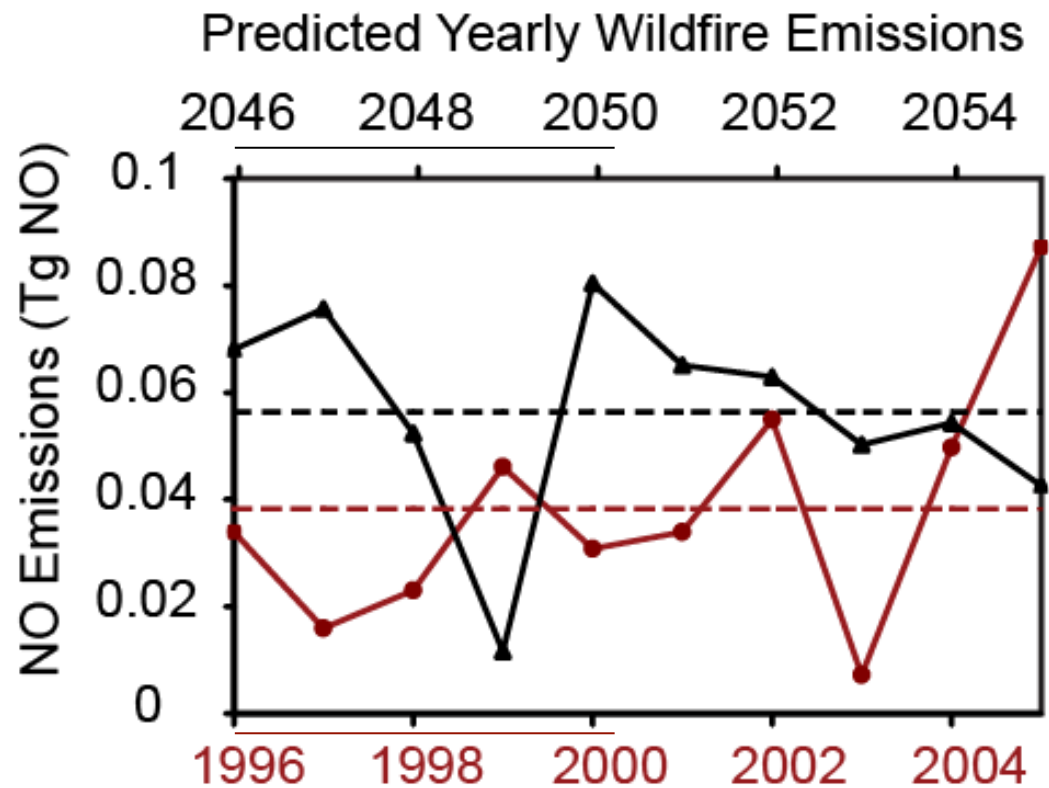


# PROJECTED WESTERN U.S. WILDFIRE NO<sub>x</sub> EMISSIONS

*increase primarily driven by 1.8K Temperature Increase*



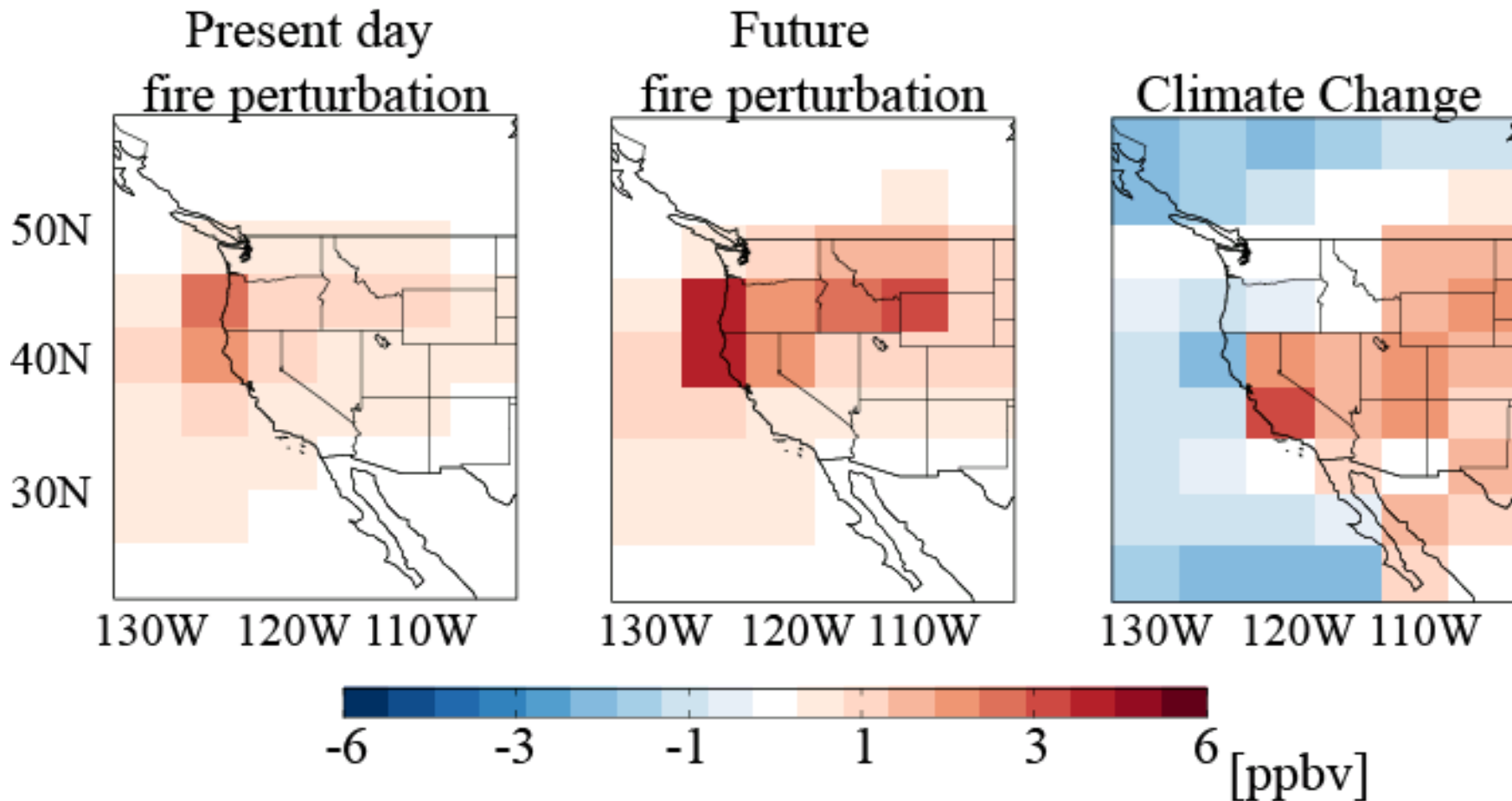
**2050 PROJECTED WILDFIRE NO<sub>x</sub> EMISSIONS ARE 50% LARGER THAN 2000**



\* We use fuel consumption projections for W. US from Spracklen et al., [2009]

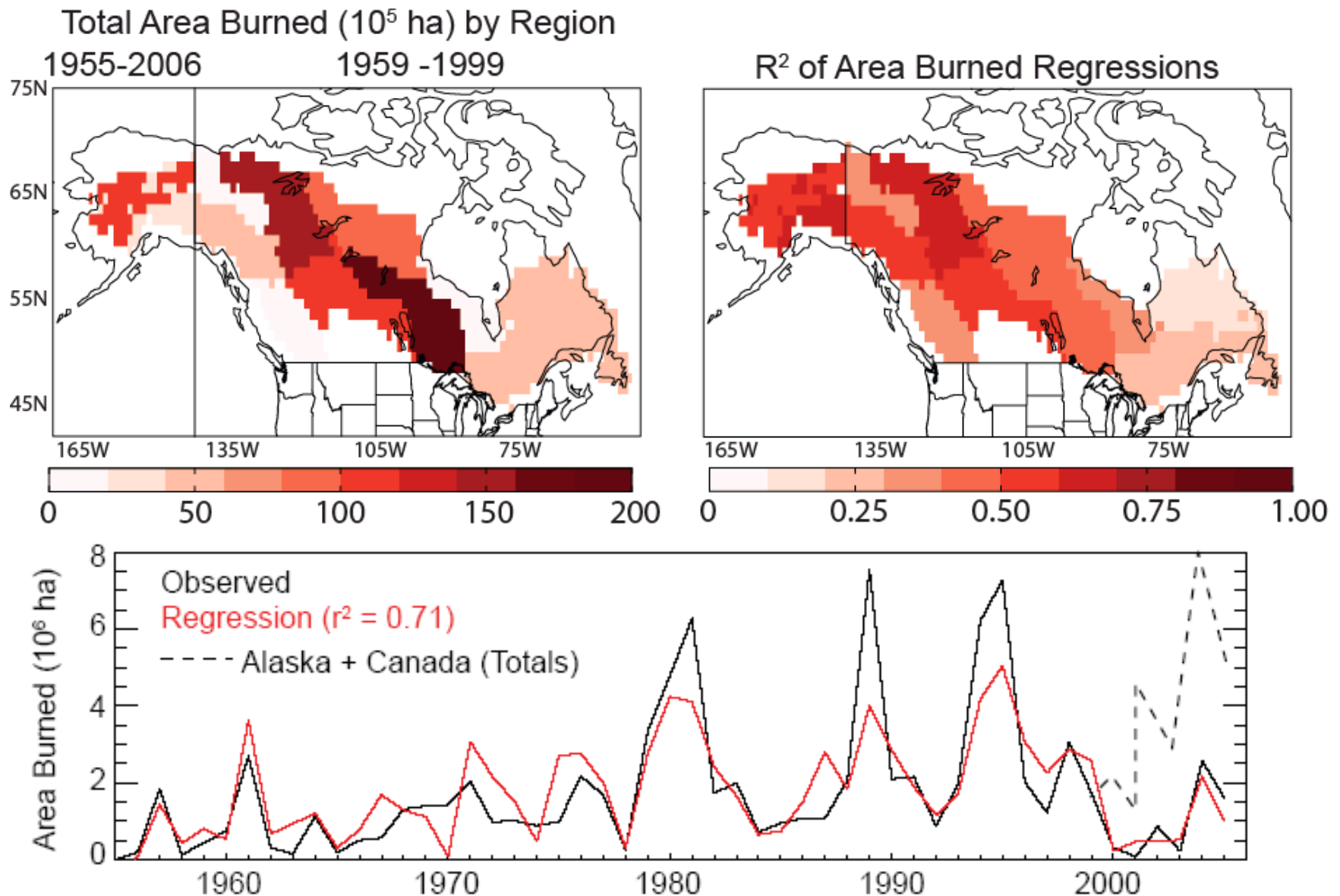
# PREDICTED JULY MEAN MAXIMUM 8-HR OZONE *perturbation from fires doubles*

5 Years Future (2046-2050) vs. 5 Years Present (1996-2000)



Consistent with these results, recent observational estimates of regional enhancements of 2 ppbv for each 1 million acres burned [*Jaffe et al., 2008*]

# REGRESSIONS CAPTURE VARIABILITY IN REGIONS WITH LARGEST AREA BURNED

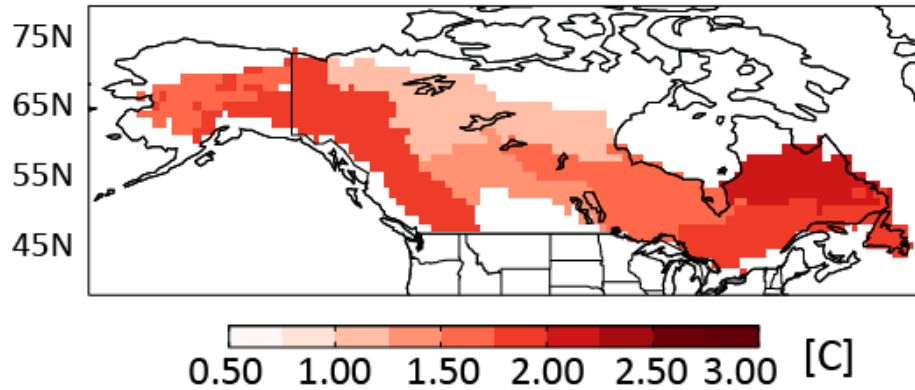


Major predictors in regressions: 500 mb GPH & Drought Severity Rating

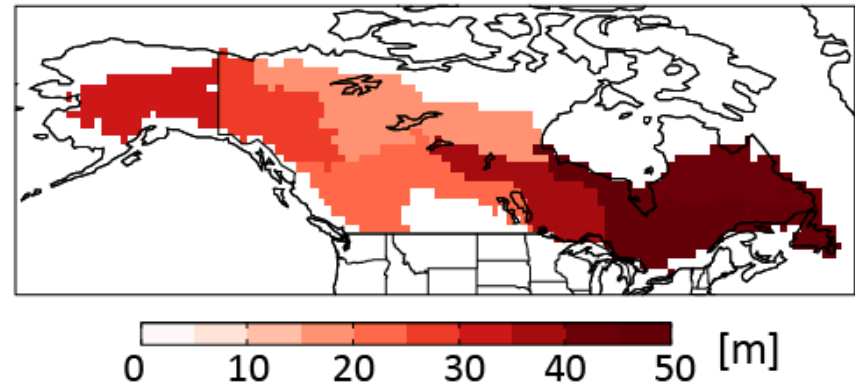
# DOES RAIN OFFSET TEMPERATURE INCREASE?

GISS simulated May – August 2046-2055 vs. 1996-2005

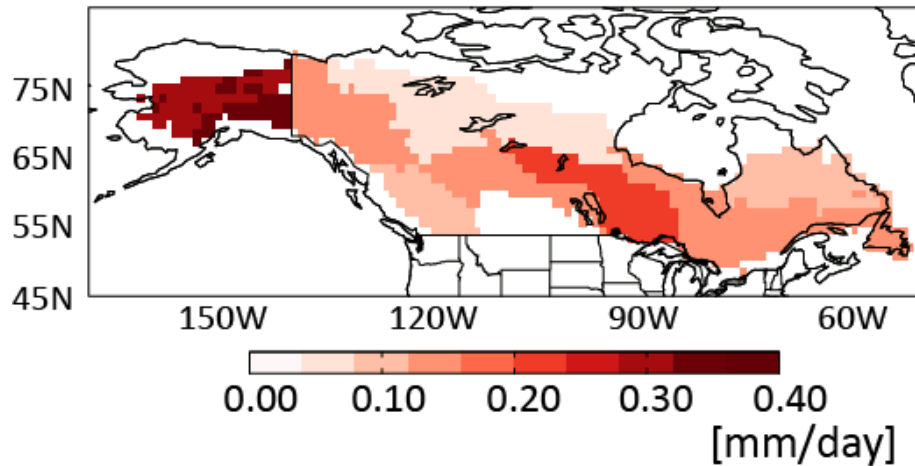
Temperature



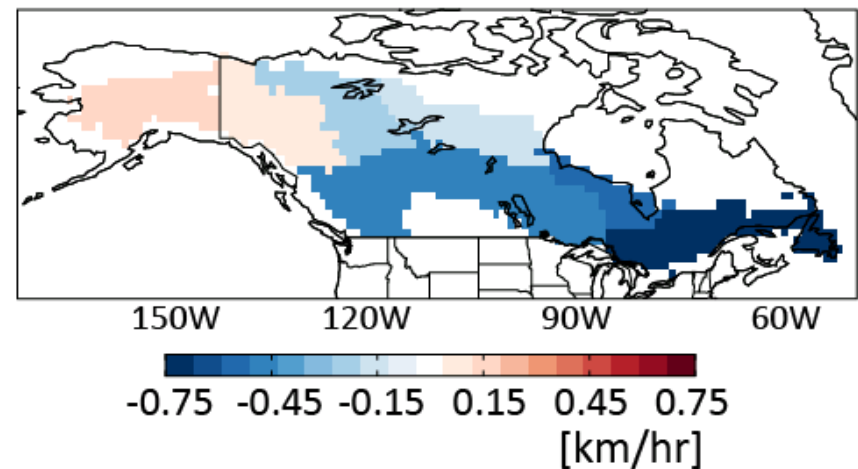
500 mb Geopotential Height



Rain

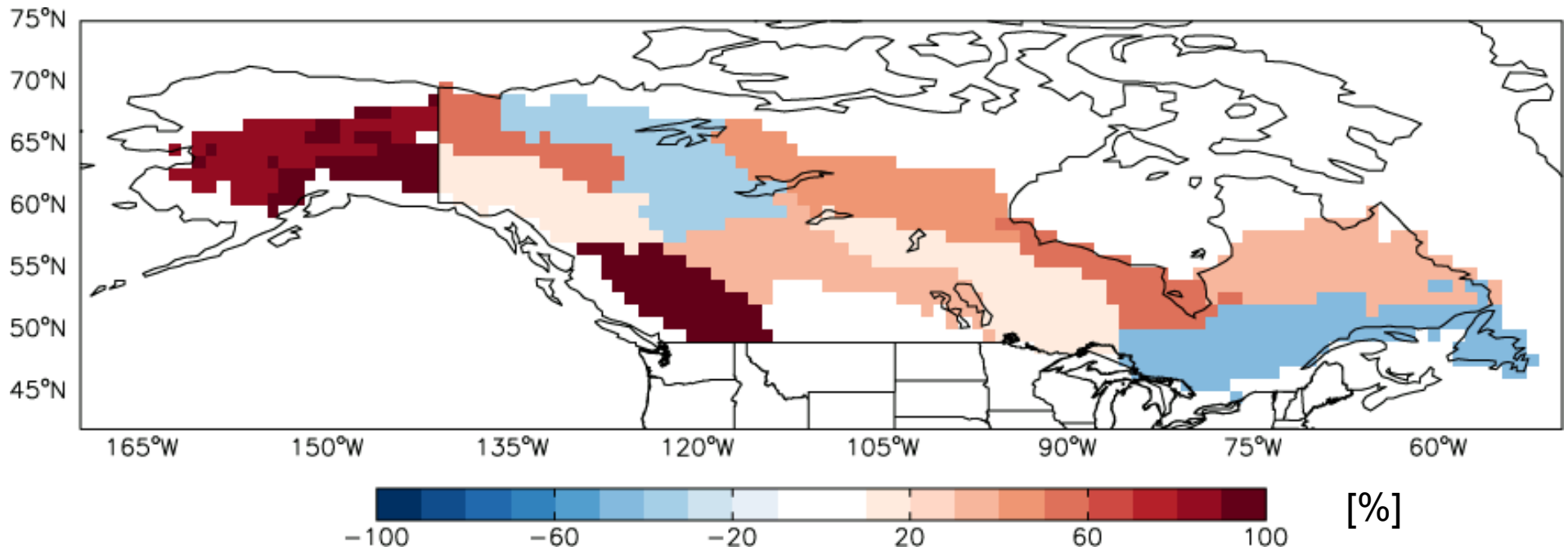


Wind



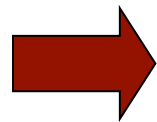
# AREA BURNED PROJECTIONS

25% increase over Canada and Alaska w/ large regional variability

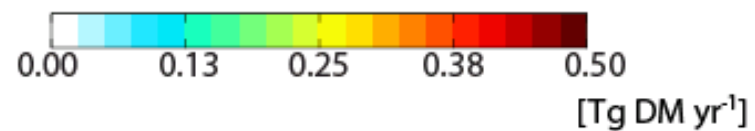
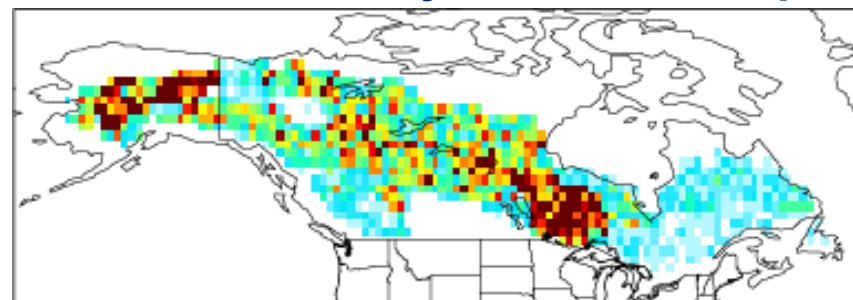


25% increase in dry mass consumption

+ FUEL  
CONSUMPTION  
ESTIMATES

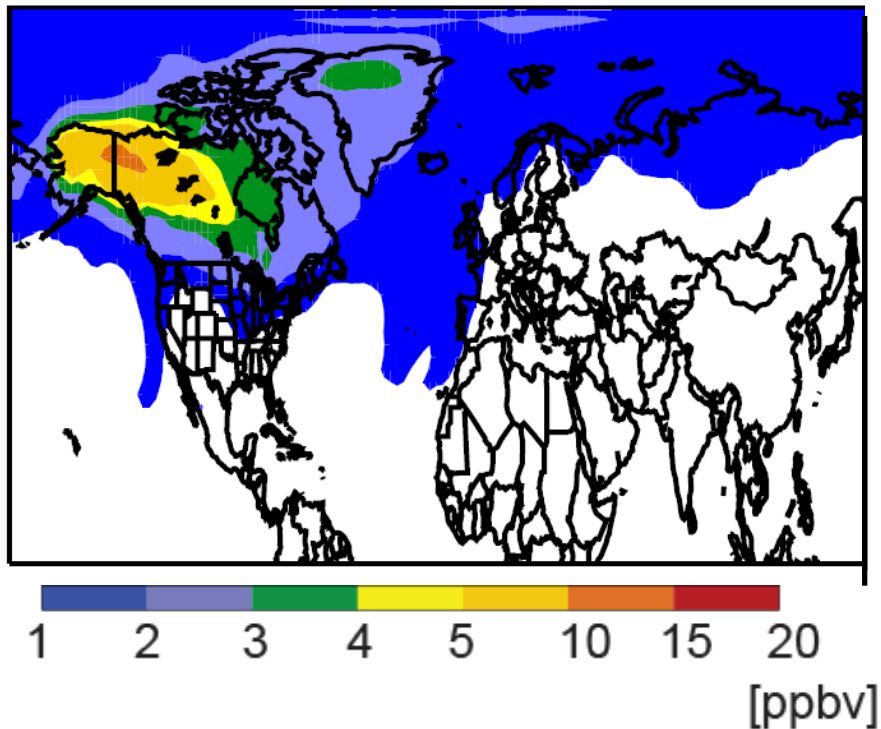


(Maria Val Martin)



# FUTURE WORK

Ozone enhancement from NA  
biomass burning 0-2 km  
Simulated July 2004 mean



[Hudman et al., 2009]

- Finalize stochastic placement of the fires
- Decide how to deal with areas that reburn and fire length
- Do the runs...