



Municipal Adaptation and Resiliency Service (MARS)

Training Series



1. Call to Action

Visit: www.glslcities.org/mars.cfm

Email form to: simon.belisle@glslcities.org

2. Community of Practice

Visit: www.ccadaptation.ca/MARS

3. Adaptation Training

4. Adaptation Award

5. Demonstration Projects

1 MARS Training Series Overview

MARS Training Series Overview



- 8 webinars
- All delivered using GOTO webinar
- Java required – IT may need to update
- Webinar 1 – 1.5hrs long
- All others – 1 hr long
- Delivered every 2 weeks starting Jan 22, 2014

Portal Tour- January 29th

- Orientation to the MARS Community of Practice (MARS CoP) Portal
- Presentation by Annette Morand from the Ontario Centre for Climate Impacts and Adaptation Resources (OCCAR)

Financial implications of climate change- February 6th

- Legal drivers – will include expert presentation from Zizzo Allen LLP
- Policy drivers
- Regulatory drivers
- Business drivers
- Other drivers
- Barriers to implementation
- Facilitating factors

SECTOR SPECIFIC WEBINARS (3-7) OVERVIEW



- Webinar 3 – Transportation infrastructure, February 20th
- Webinar 4 – Building code and land use planning, February 27th
- Webinar 5 – Vulnerable Populations, March 6th
- Webinar 6 – Green Infrastructure, March 20th
- Webinar 7 – Water / waste water / storm water, March 27th

SECTOR SPECIFIC WEBINARS (3-7) OVERVIEW



For each sector specific webinar we will examine:

- How this sector will be affected by climate change
- Demonstrate adaptation options using real examples that show
 - What the drivers were
 - What the issue was
 - What the process was
 - Who was involved
 - How was it funded
 - Challenges/opportunities
 - Lessons learned
 - Additional information sources

Communicating and Collaborating - April 10th

- Communicating internally
- Communicating externally
- Fostering internal collaboration
- Fostering external collaboration
- Knowing your audience
- Framing your message for your audience
- Communication tools
- Engagement tools
- Resources

WEBINAR SCHEDULE



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- | | |
|---|---------------------------|
| 1. Climate Adaptation in the Municipal Context | January 22 nd |
| 2. MARS Community of Practice Portal Tour | January 29 th |
| 3. Financial and Legal Implications of Climate Change | February 6 th |
| 4. Municipal Transportation Related Infrastructure | February 20 th |
| 5. Building Code and Land Use Planning | February 27 th |
| 6. Vulnerable Populations | March 6 th |
| 7. Urban Natural Systems | March 20 th |
| 8. Water, Wastewater and Storm Water Systems | March 27 th |
| 9. Communication and Collaborating | April 10 th |

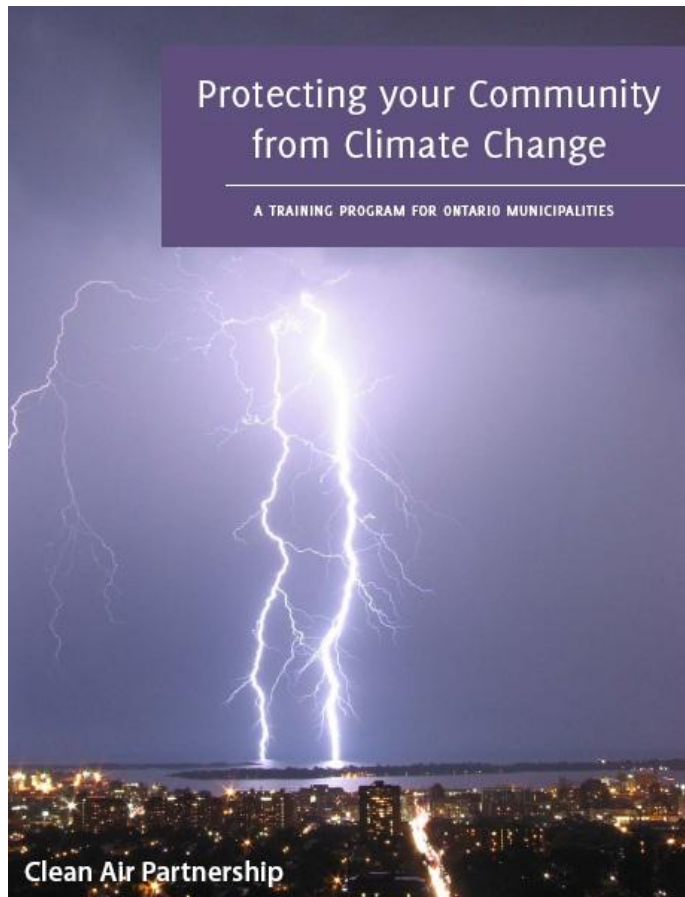
ADAPTATION TRAINING PROGRAM



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http://www.cleanairpartnership.org/municipal_adaptation_program_resources



- 12 Modules
- All PowerPoint presentations
- All worksheets & exercises
- Train the trainers program

WEBINAR 1 OVERVIEW



1. MARS Webinar Series Overview
2. Introduction to climate change adaptation
3. Overview of observed climate change globally, in Canada, and in Ontario
4. Recent events in Ontario
5. Sourcing climate trends and projections information
6. Overview of an adaptation program

2 INTRODUCTION TO CLIMATE CHANGE ADAPTATION

CLIMATE CHANGE LEADS TO



- Warmer air, soil and water temperatures
- Shorter winters; Earlier springs – but sometime “backwards” springs
- Longer summers, growing seasons; Later falls
- Changes in precipitation patterns, including more intense events
- Increased weather variability & extreme events
- Increased evaporation from surface waters; Potential for lower Great Lakes
- Coastal sea level rise and stronger storm surges;
- Shrinkage of polar ice cap and glaciers
- Reduced average snow packs – but, potential for more extreme snow storms

HEAT RISKS

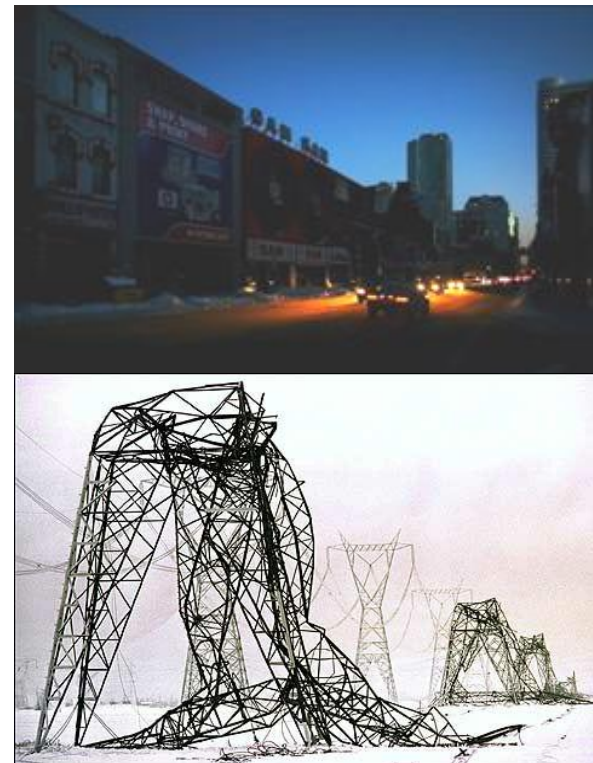
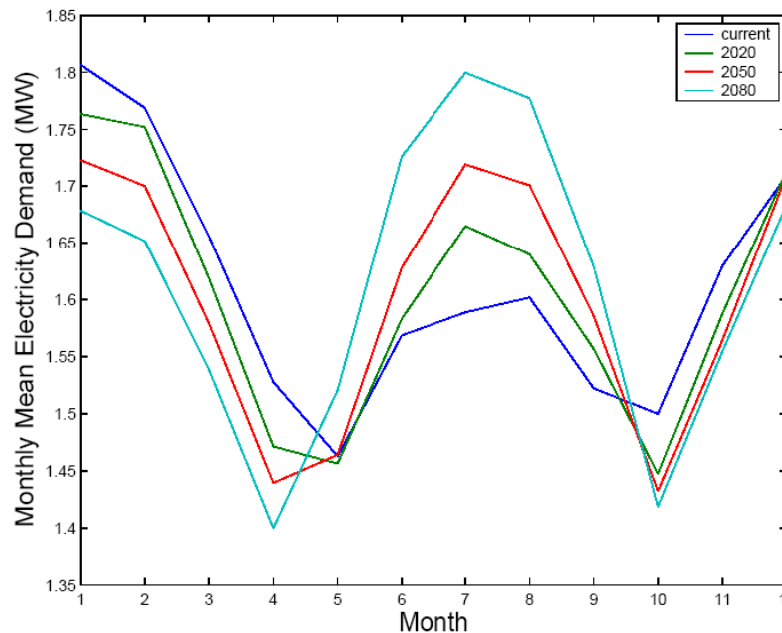
- Heat-related illness & deaths
- Increased smog and related illness and deaths (unless emissions reduced)
- More food-borne illness
- Increase in vector-borne diseases such as West Nile & Lyme disease, new diseases



PRECIPITATION RISKS

- Increased waterborne disease potential
- Injuries and deaths from flooding & winter storms (e.g. ice storms)
- More lake effect snowstorms
- Increases in basement mould from flooding incidents

- Rise in average & peak summer demand
- Stress on electricity generation, transmission & distribution
- Damage to transmission & distribution capacity from storms, wind
- Decreased hydro power from declining water levels



TRANSPORTATION IMPACTS



- Damage to roads, bridges, culverts
- Disruptions due to blackouts, storms, floods, freezing rain
- Reduced Great Lakes shipping
- More frequent disruption of air traffic



WATER IMPACTS

- More frequent flooding from intense rainfall events; changed seasonality to flooding risks
- Water quality impacts from stormwater runoff, warmer water in lakes and streams and lower lake levels, algal blooms
- More frequent heat waves and droughts (increasing water demand and potentially leading to water shortages)



BUILDING IMPACTS



- Basement flooding
- Damage from high winds, severe thunderstorms & tornados
- Roof damage from ice dams created by frequent freeze-thaw cycles, rain on snow
- Increased thermal discomfort in buildings without a/c
- New building codes and standards; retrofits & repairs to existing buildings
- Accelerated concrete deterioration (CO₂)

URBAN ECOSYSTEM IMPACTS



- Stress on vegetation from heat & drought
- Damage to parks & trees from floods & windstorms
- More pests & disease
- Loss of native biodiversity
- Loss of wetlands & shorebirds
- More invasive species established



VULNERABLE POPULATIONS



- Homeless
- Low-income people
 - Housing conditions
 - Limited mobility
 - Lack of insurance, savings
- People in poor health
- Isolated seniors
- Infants & small children

GOVERNMENT FINANCE IMPACTS



- Direct costs of repairing weather-related damage to municipal infrastructure, facilities & parks
- Costs for premature replacement of infrastructure, increased maintenance
- Expenditures during & after weather emergencies
- Subsidies for uninsured residents & businesses affected by climate-related events
- Increased insurance costs
- Loss of taxes, incomes due to business disruption
- Lawsuits

ADAPTATION Vs MITIGATION



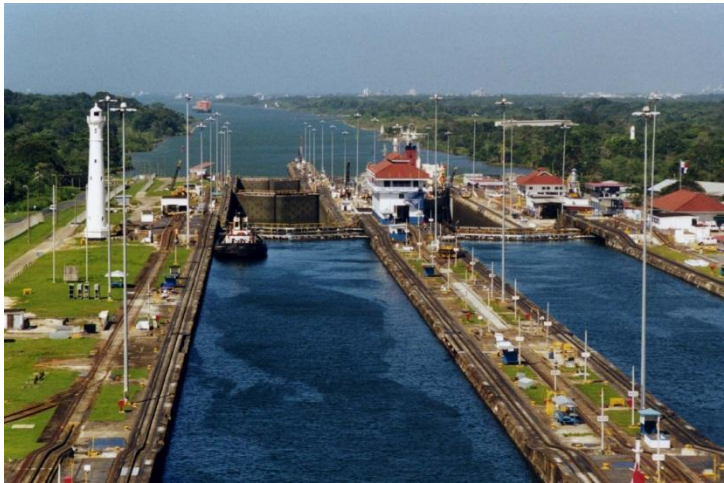
- Mitigate reduce greenhouse gas emissions

“Avoid the unmanageable”

- Adapt take action to reduce vulnerability

“Manage the unavoidable”

ADAPTING OUR ENVIRONMENT



THE FUDAI FLOODGATE



- 12 years to build ('72-'84)
 - ¥3.56 billion (\$33m)
 - 205m span
 - 15.5m high
 - 10m is standard height for a Japanese floodgate
 - Ugly as hell, costly
-
- Not based on past data or trends, but rather on the worst possible future scenario imaginable

ADAPTING TO CLIMATE CHANGE



- Actions that reduce negative impacts of climate change, increase opportunities
- Adjusting policies and actions in response to observed or expected changes in the climate
- Can be reactive or proactive in nature
- The past will not be the future, due diligence to consider likely future conditions
- Identify vulnerabilities, pick the priorities (impact and likelihood)
- Adaptation is not always cheap, nor is it always expensive
- Prevention of future possible impacts is not always popular but the risks and impacts should be considered; staged approaches are options
- Perfect data is not a prerequisite to adaptation – but uncertainties on the future climate must to be factored into decisions (to avoid maladaptation risks)

CLIMATE ADAPTATION IS NOT NEW



- Following Hurricane Hazel, Ontario developed regulations that restricted developments on flood plains
- Following the August 2005 storm, the City of Toronto developed new overflow protection for Black Creek
- Following heat waves in the 1980's and 1990's, many municipalities developed heat alert and response systems



WHAT IS NEW FOR ADAPTATION?



- Thinking ahead, rather than only looking back
- Using historical climate trends and climate projections to estimate the impacts of a changing climate
- Planning for the future to avoid potential impacts
- Especially important for:
 - Climate impacts that could inflict multiple deaths or major economic damage
 - Long-lived, costly infrastructure that is expected to serve while the conditions under which it operates are changing
 - Natural systems and their ecosystem services that benefit all municipalities and reduce municipal climate risks

ADAPTATION IS ALREADY HAPPENING



	Buildings	Transportation	Health	Water	Natural systems
Increasing Adaptive Capacity	<ul style="list-style-type: none"> •Review of building codes and standards •PIEVC infrastructure engineering studies •Energy efficiency studies 	<ul style="list-style-type: none"> •Transportation risk assessments •Review of engineering standards •Active transportation master plans 	<ul style="list-style-type: none"> •Heightened planning and exercises •WNV Task Force •Heat island mapping •Local food plans 	<ul style="list-style-type: none"> •Source water protection plans •wastewater master plans and strategies •Flood studies 	<ul style="list-style-type: none"> •Naturalization policies •Shade policies •iTree studies; •Humber Nursery tree plots for future
Delivery of Adaptation Projects	<ul style="list-style-type: none"> •Backflow valve installations •Regional building energy retrofits •Install hurricane ties & clips •Emerging Building codes and standards for future climate 	<ul style="list-style-type: none"> •Permeable pavements •Fan installations in traffic signal boxes •Installing concrete at bus stopping zones •Changed materials and practices 	<ul style="list-style-type: none"> •HARS •Cooling centres •Mosquito control •Cold weather response 	<ul style="list-style-type: none"> •Low water response systems •Flood warning system •Combined sewer separation •Designs with additional capacity 	<ul style="list-style-type: none"> •Systematic tree pruning •Increase tree canopy •Parkland naturalization

3 CLIMATE CHANGE IN ONTARIO

Dr. Neil Comer, Heather Auld
Risk Sciences International (RSI)



Provides private and public sector clients with the tools and expertise needed to understand and effectively manage risk

<http://www.risksciences.com/>

Dr. Neil Comer, Senior Climatologist

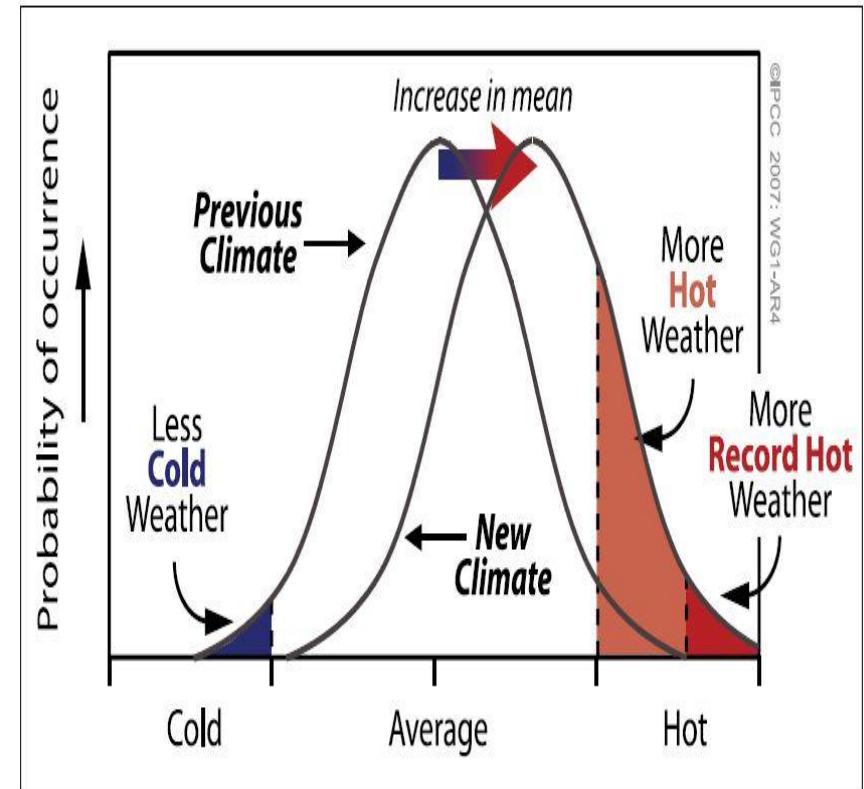
- Worked with the Meteorological Service of Canada and the Adaptation and Impacts Research Section of Environment Canada
- Developed Environment Canada's Atmospheric Hazards Network and the Canadian Climate Change Scenarios Network (CCSN)
- Current Advisor to the Ontario Regional Climate Change Consortium and reviewer for the International Panel on Climate Change (IPCC) 5th Assessment Report

Heather Auld, Principal Climate Scientist

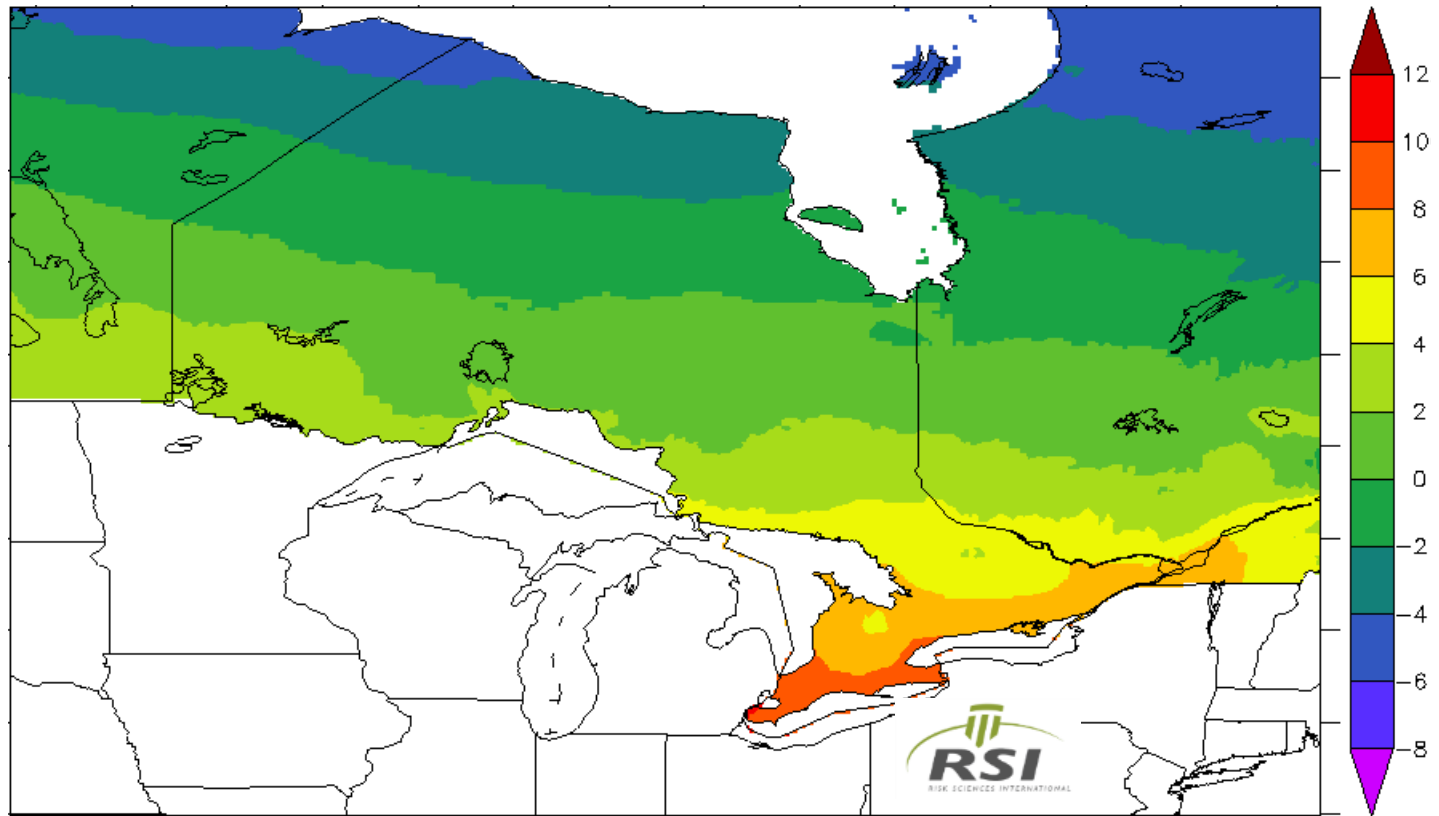
- Worked with Environment Canada and the Department of National Defence
- One of Canada's foremost engineering climatologists
- Served on both World Meteorological Organization (WMO) and IPCC expert groups
- Main climate science advisor to Canada's National Codes Commission

CONDITIONS ARE CHANGING

- Observed 'Normal' climate has already changed
- Climatologists use 30 years to define a climate period
- 30 years 'smooths out' normal year to year variation
- In Great Lakes regions, normals are becoming **warmer** and **wetter** in general

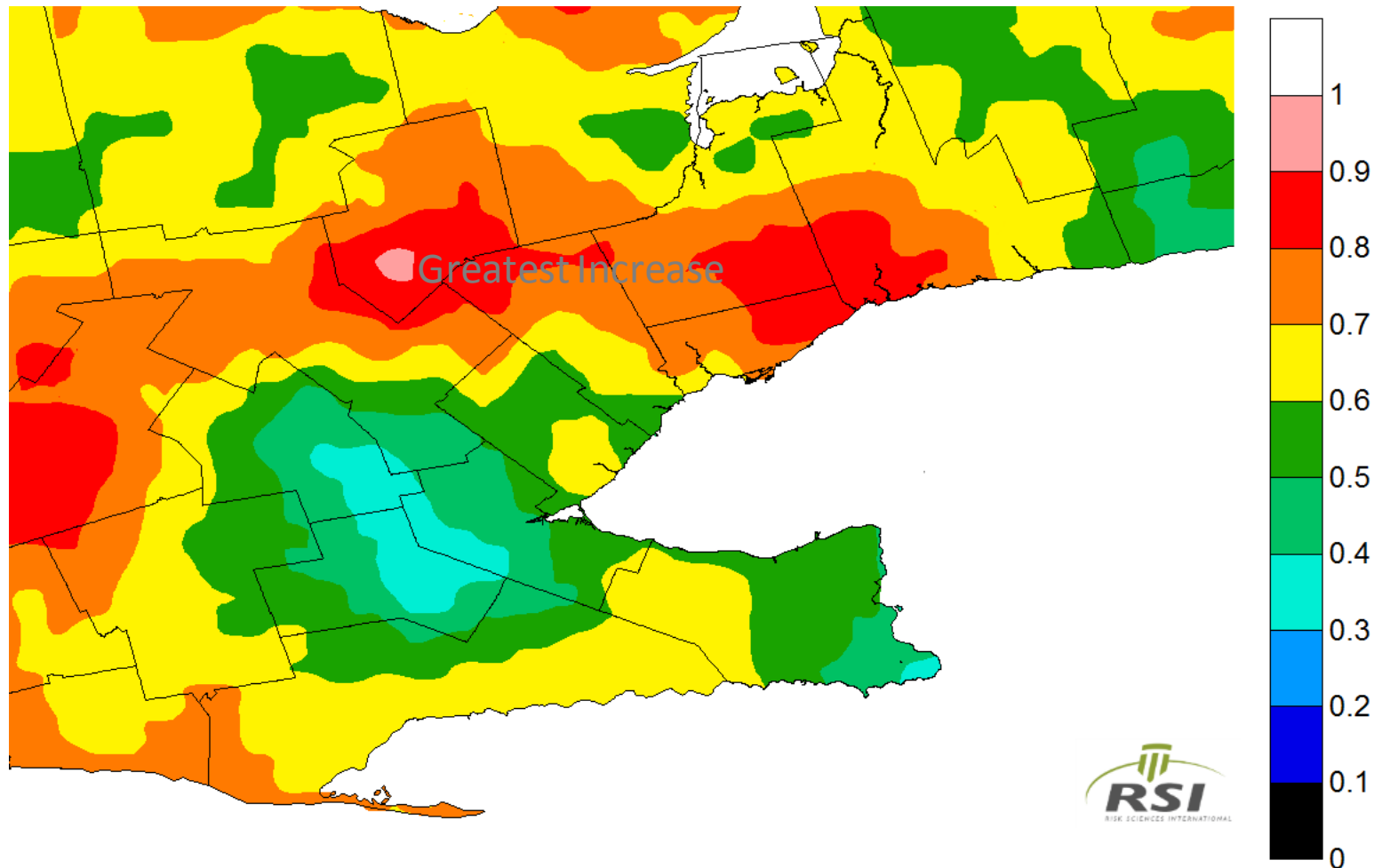


ONTARIO MEAN TEMPERATURE



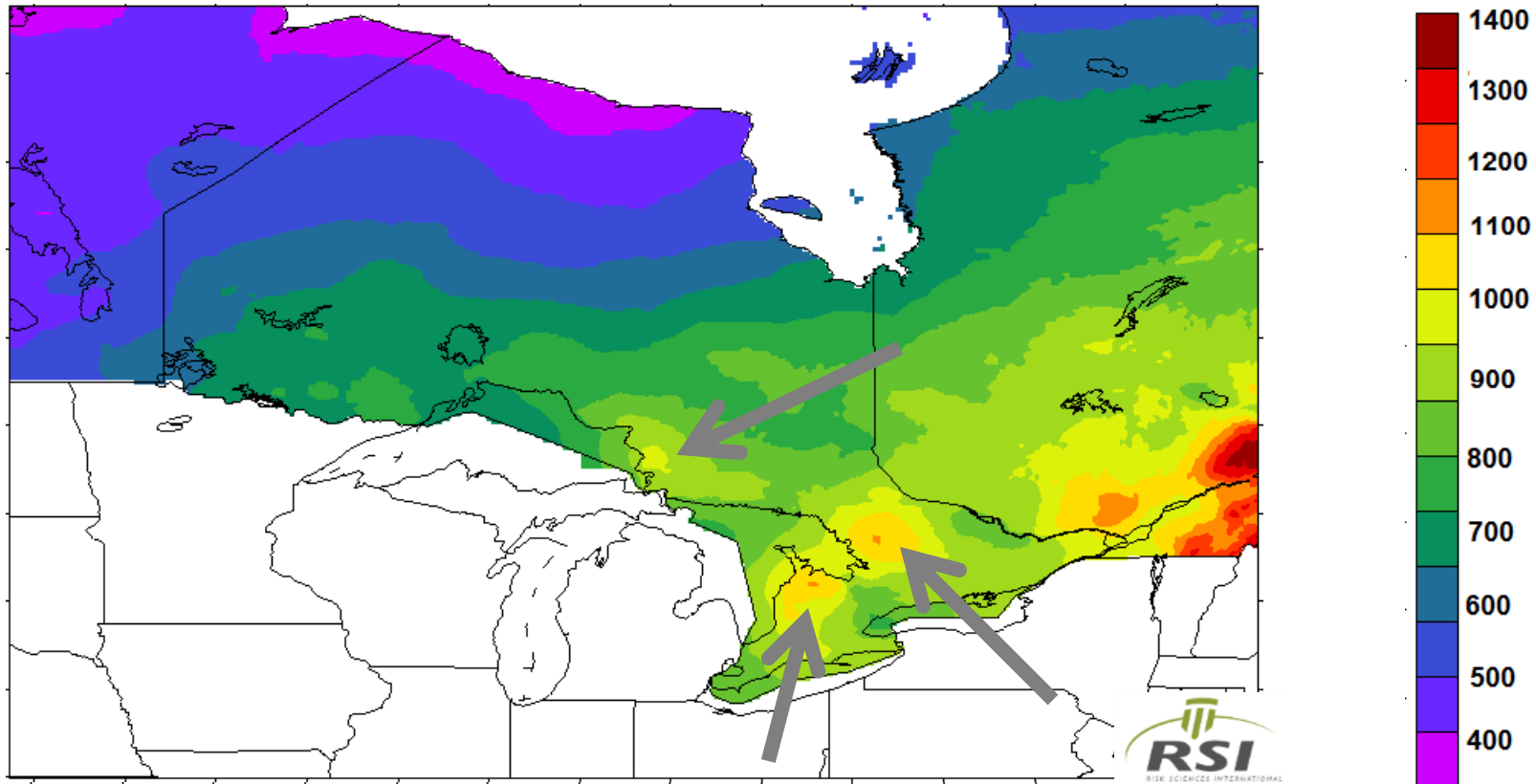
Notice northward progression of warmer contours e.g. orange

TEMPERATURE CHANGE – GTA MEAN ANNUAL TEMPERATURES



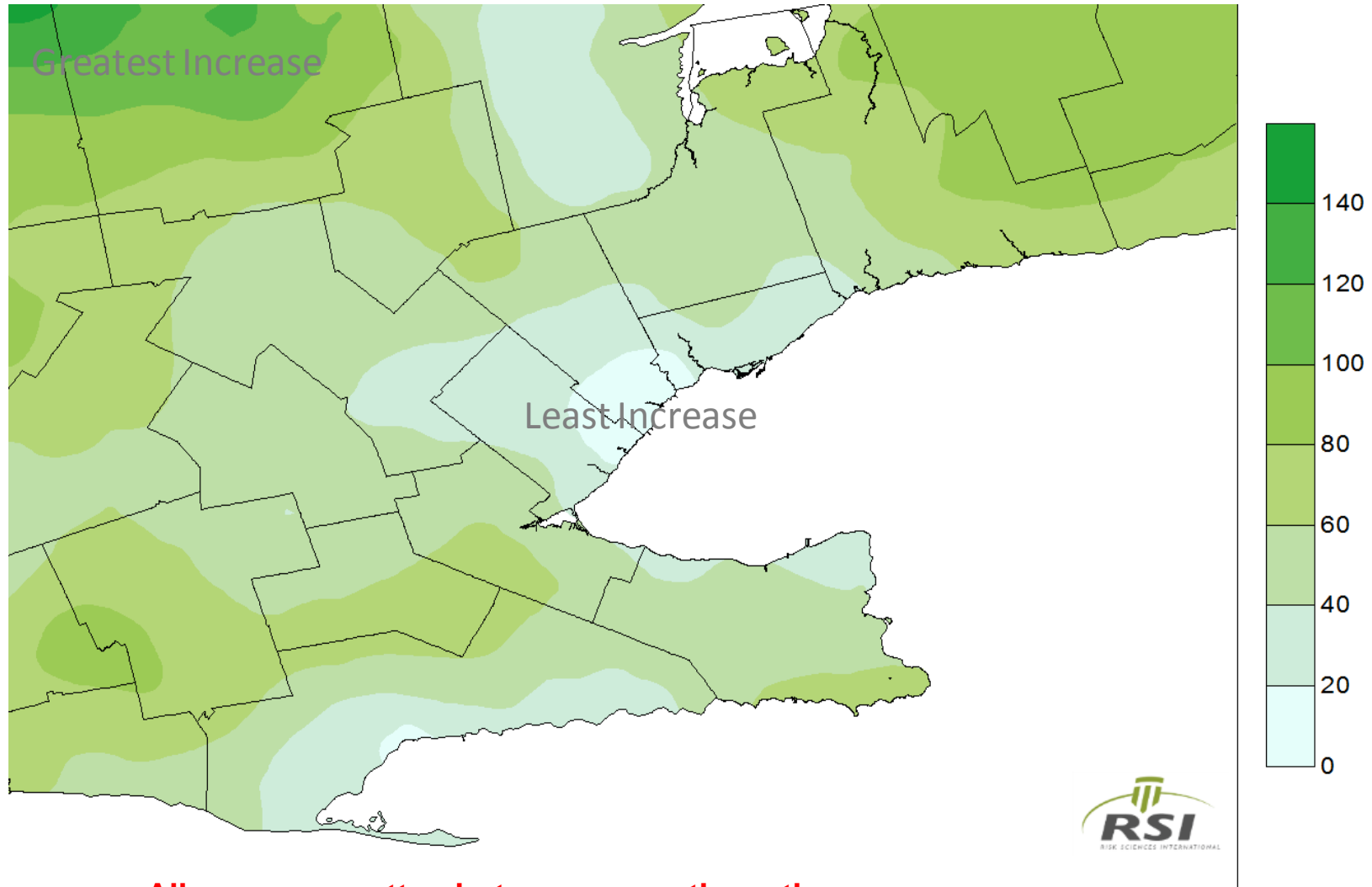
Increases are not equal everywhere. Local effects.

ONTARIO MEAN PRECIPITATION



Greatest Increases to lee of the Great Lakes – lake effect precipitation

PRECIPITATION CHANGE - GTA

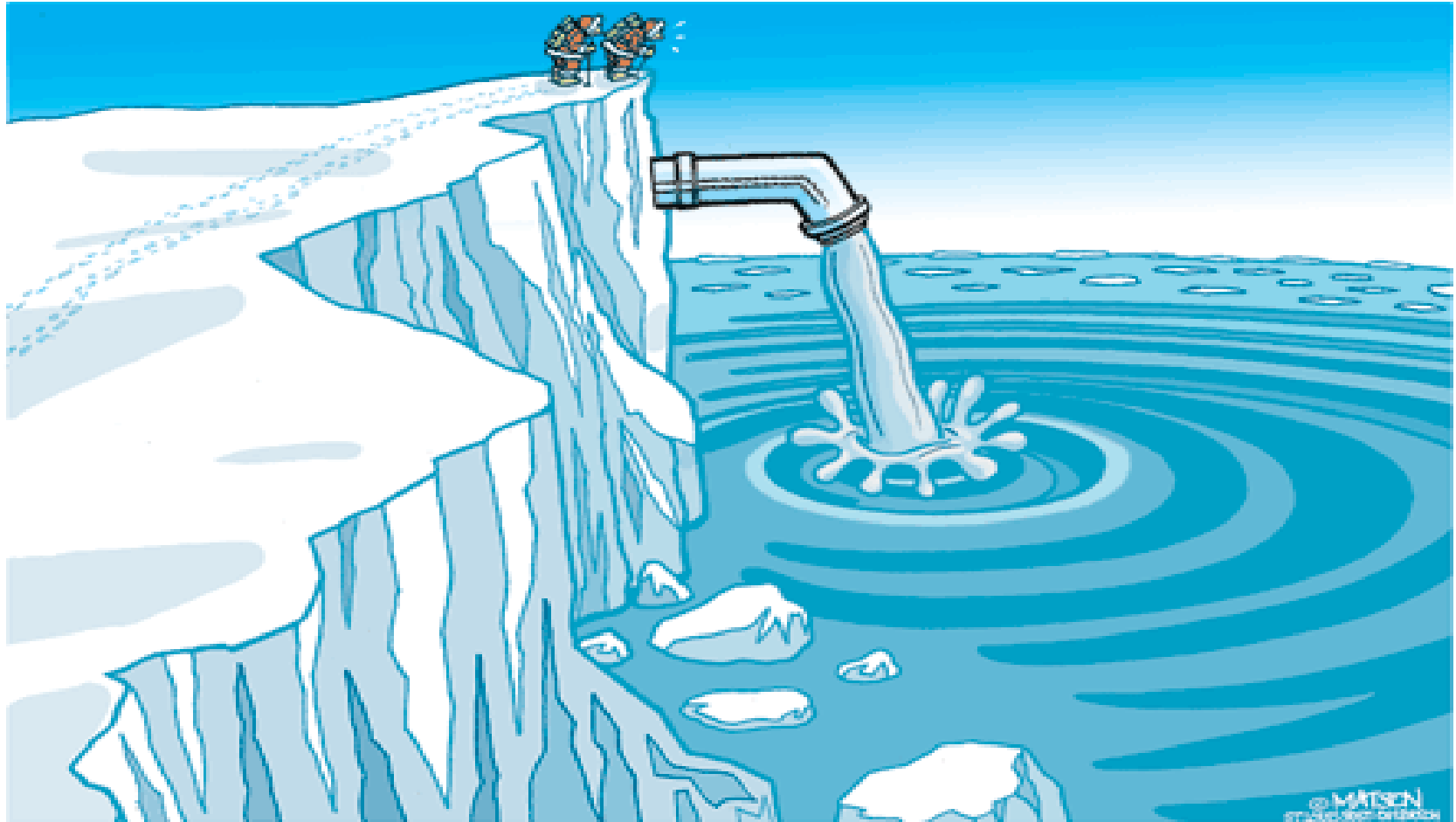


All areas are wetter- but some more than others

OUR CLIMATE FUTURE



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"HOW ON EARTH DO WE TURN IT OFF?"

MOST AUTHORITATIVE SOURCE



- Intergovernmental Panel on Climate Change (IPCC)
- Reports every 6 years from worldwide scientific community
- In spite of some denial of human-made climate change, there is overwhelming consensus among climate scientists
- Our best science uses complex atmospheric models

Notably, changes we have seen are totally consistent with future projections

Some Highlights/Quotes:

- “Warming of the climate system is unequivocal”
- “Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes”
- “It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century”
- “Warming will continue to exhibit interannual-to-decadal variability and will not be regionally uniform”
- “The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions”

Some Highlights - 'Extremes Report: SREX':

- “It is *virtually certain* that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur”
- “It is *very likely* that the length, frequency, and/or intensity of ... heat waves will increase”
- “It is likely that the frequency of heavy precipitation will increase”
- “Attribution of single extreme events to anthropogenic climate change is challenging”

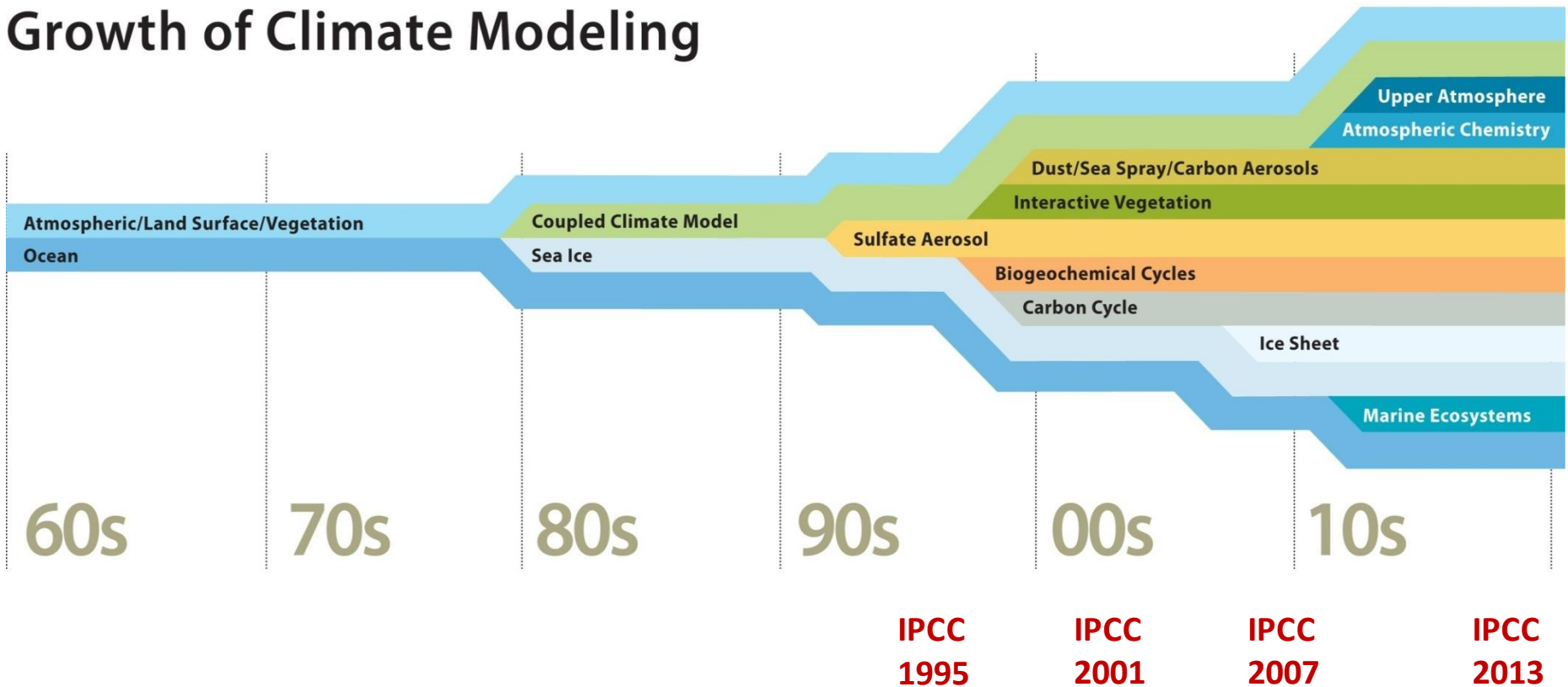
THE MODELS.. increasingly complex



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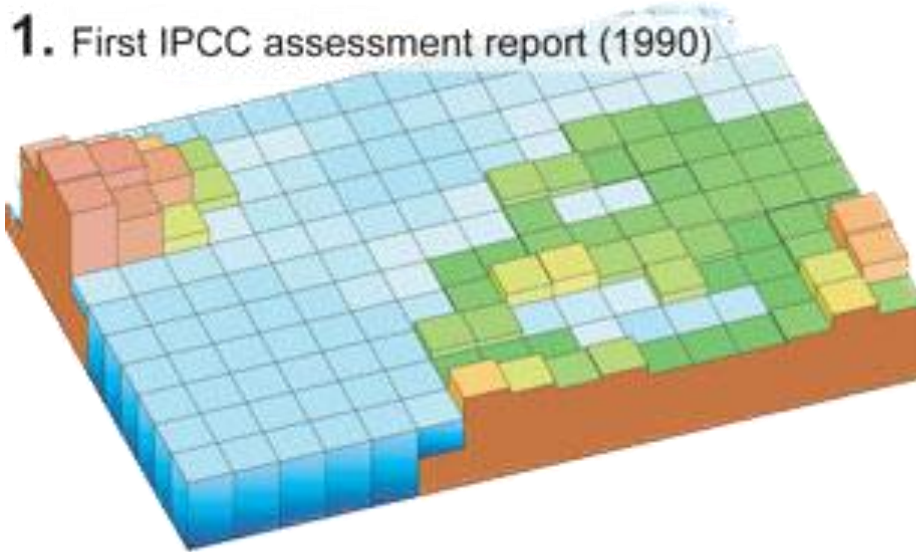


Growth of Climate Modeling

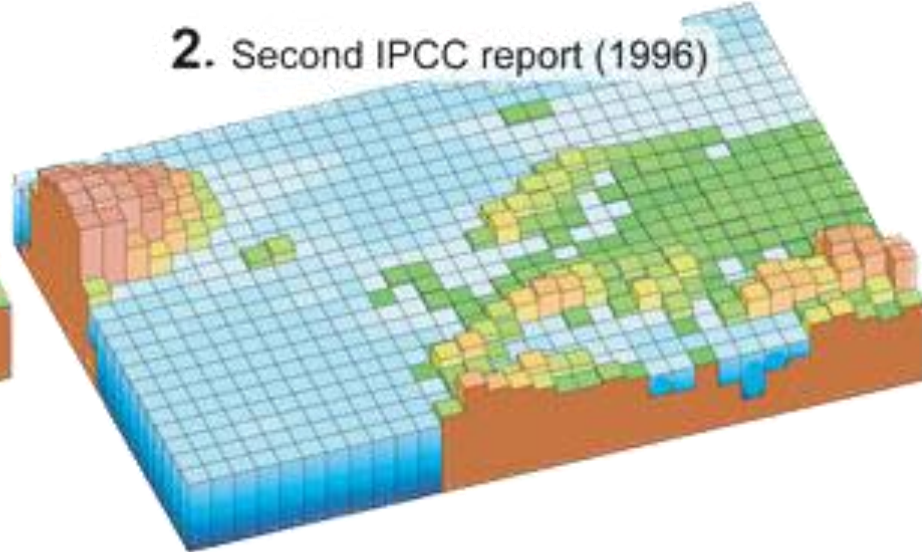


THE MODELS... better resolution

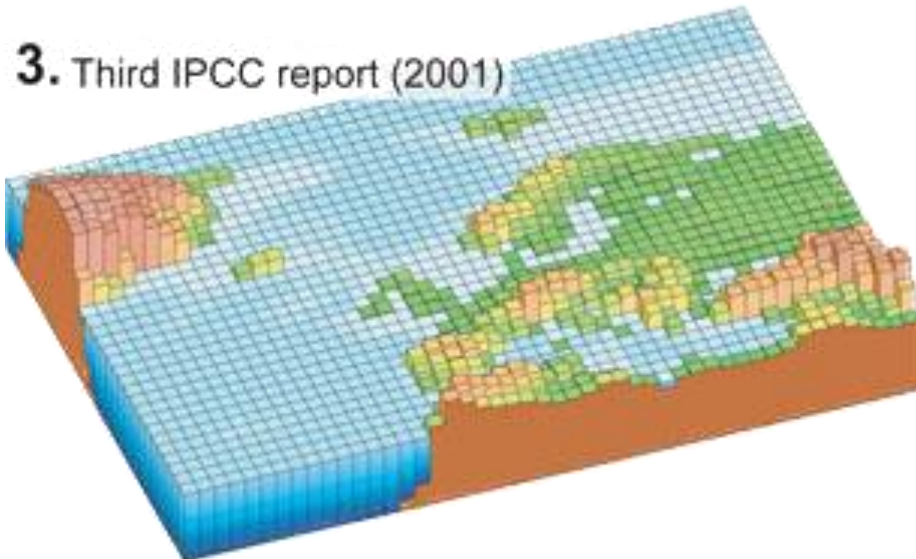
1. First IPCC assessment report (1990)



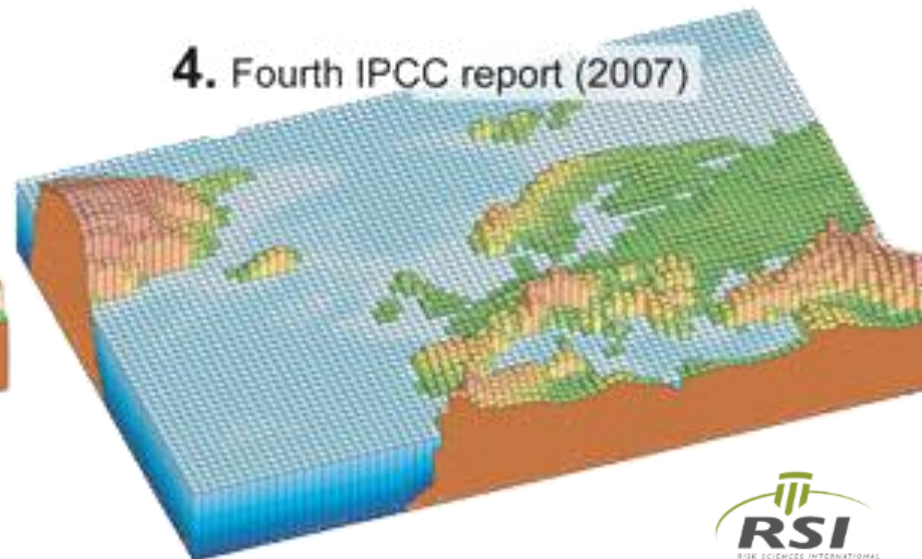
2. Second IPCC report (1996)



3. Third IPCC report (2001)



4. Fourth IPCC report (2007)

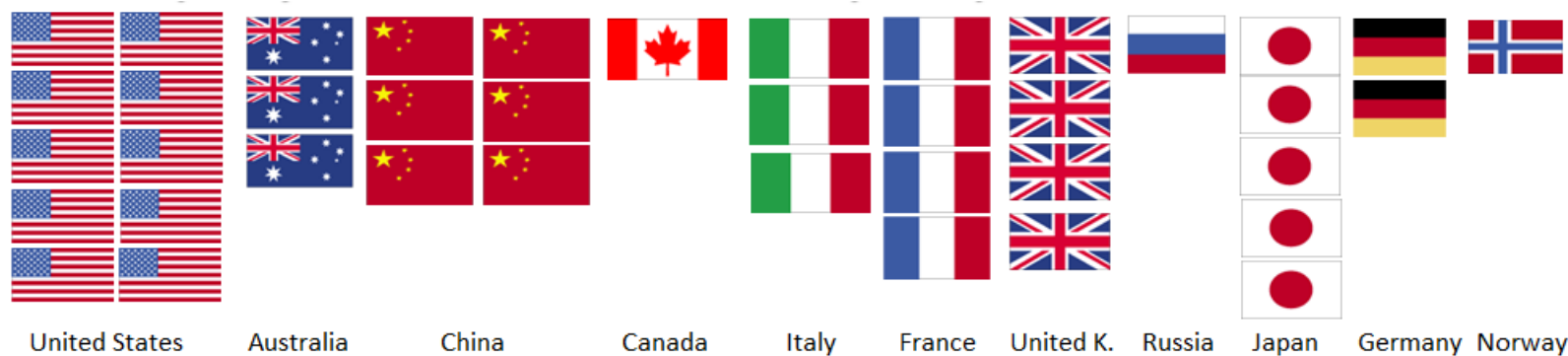


THE MODELS

- AR4 (2007) 24 Global Climate Models (GCMs) available



- AR5 (2013) 40 Global Climate Models (GCMs) available



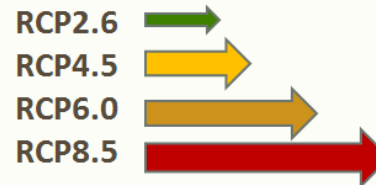
GHG EMISSIONS

- New assumptions of GHG emissions
- Representative Concentration Pathways (RCPs)

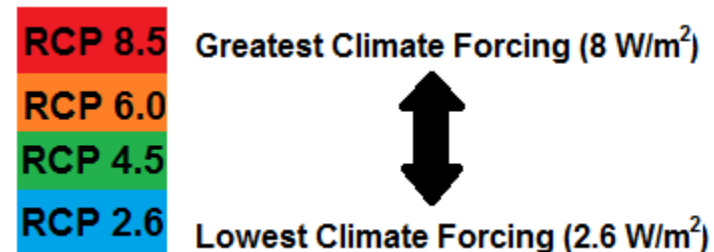
- Old Emission Scenarios 'SRES' (Special Report on Emission Scenarios)



- New Scenarios 'RCPs'

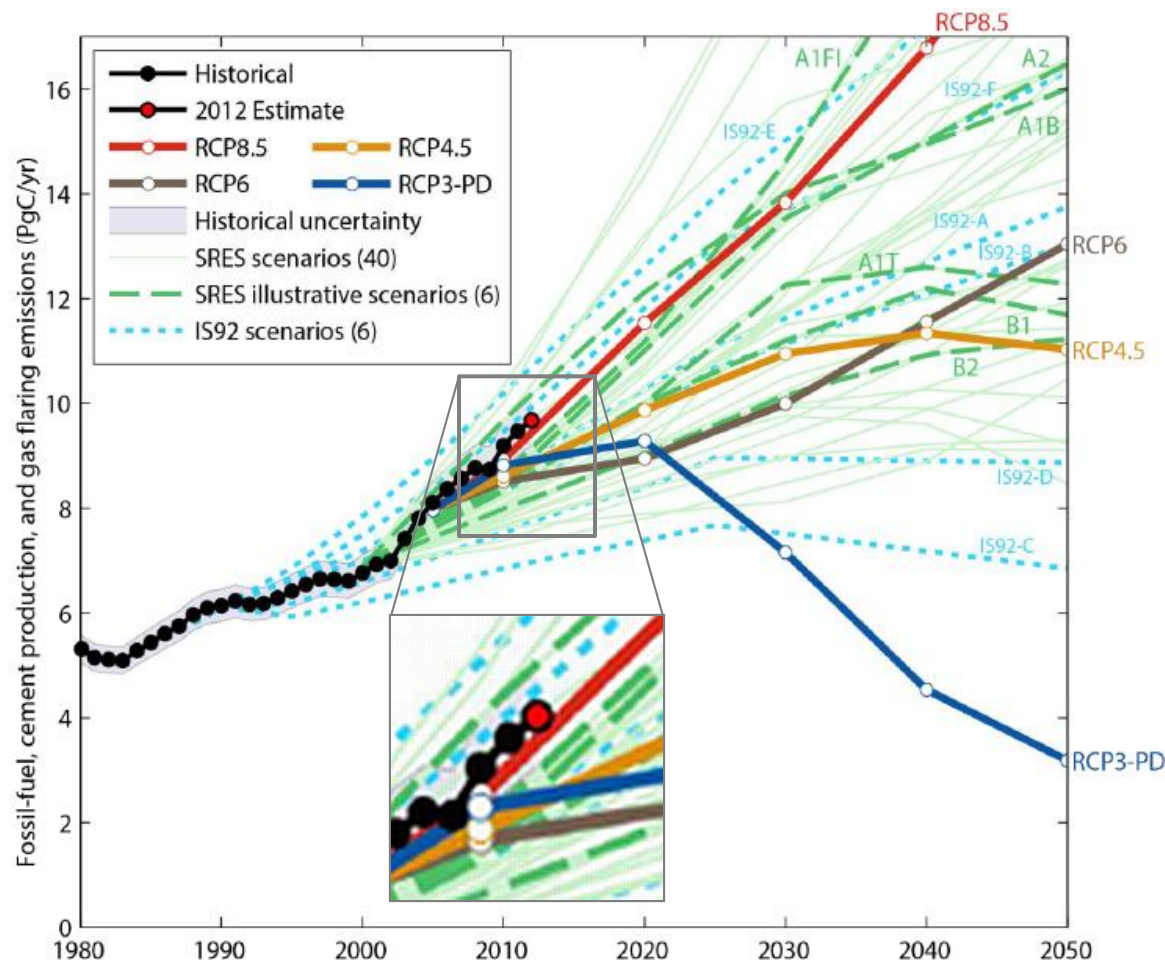
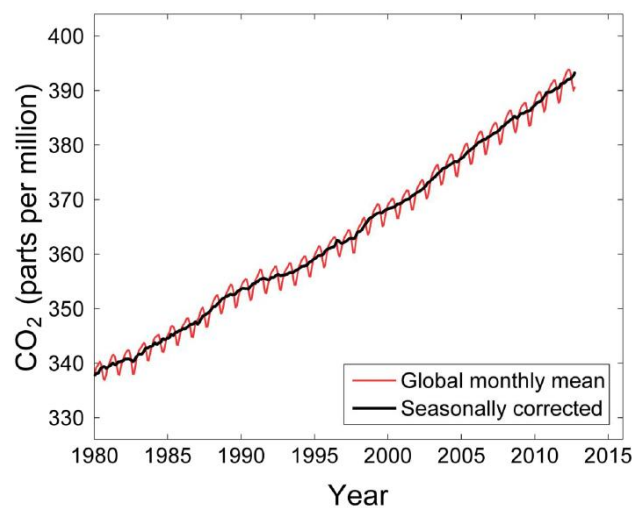


- RCPs are purely 'energy increases' – how we reach them could be through many different routes (no linked socioeconomic or technology assumptions)



GHG EMISSIONS

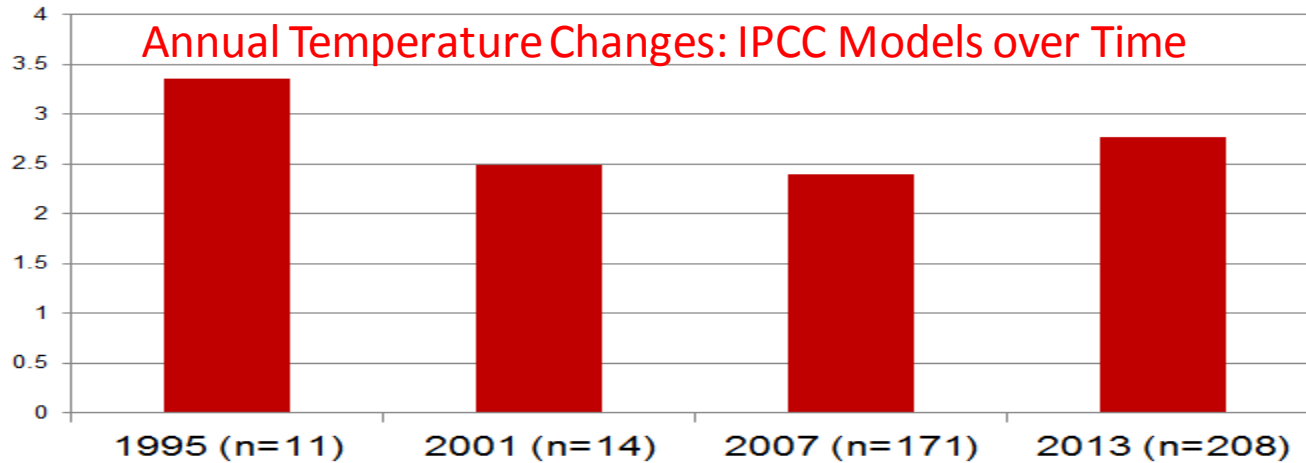
- Current emissions appear to follow the **highest** RCP8.5 pathway
- NO international agreements in place



THE NEW IPCC (AR5) 2013 vs older

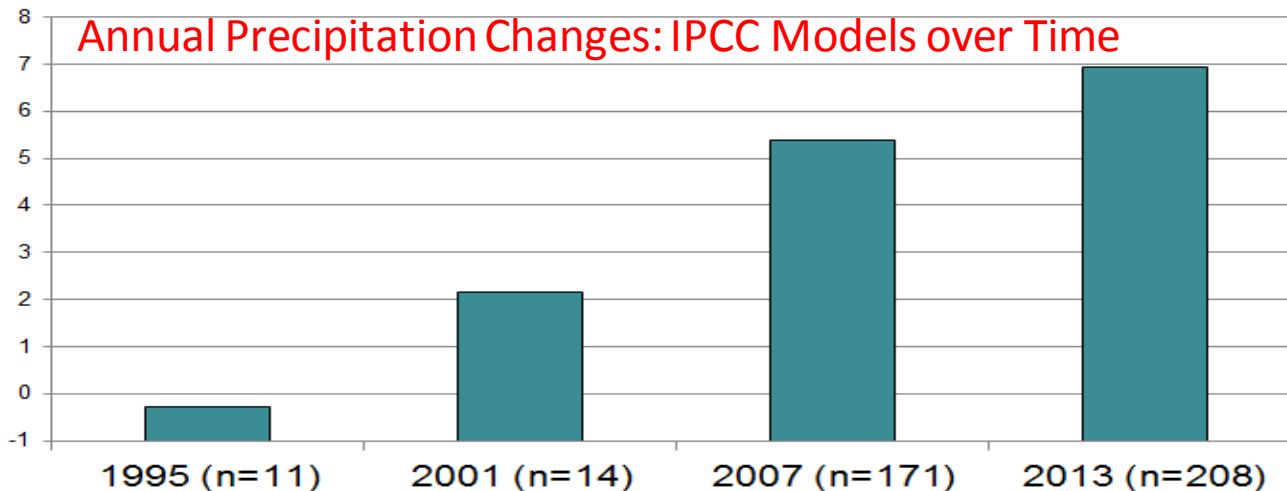


**S. Ont Annual Temperature Change for the 2050s
(from 1971-2000 baseline)**



Generations
of models –
*all show
warming*

**S. Ont Annual Precipitation Change (%) for the 2050s
(from 1971-2000 baseline)**



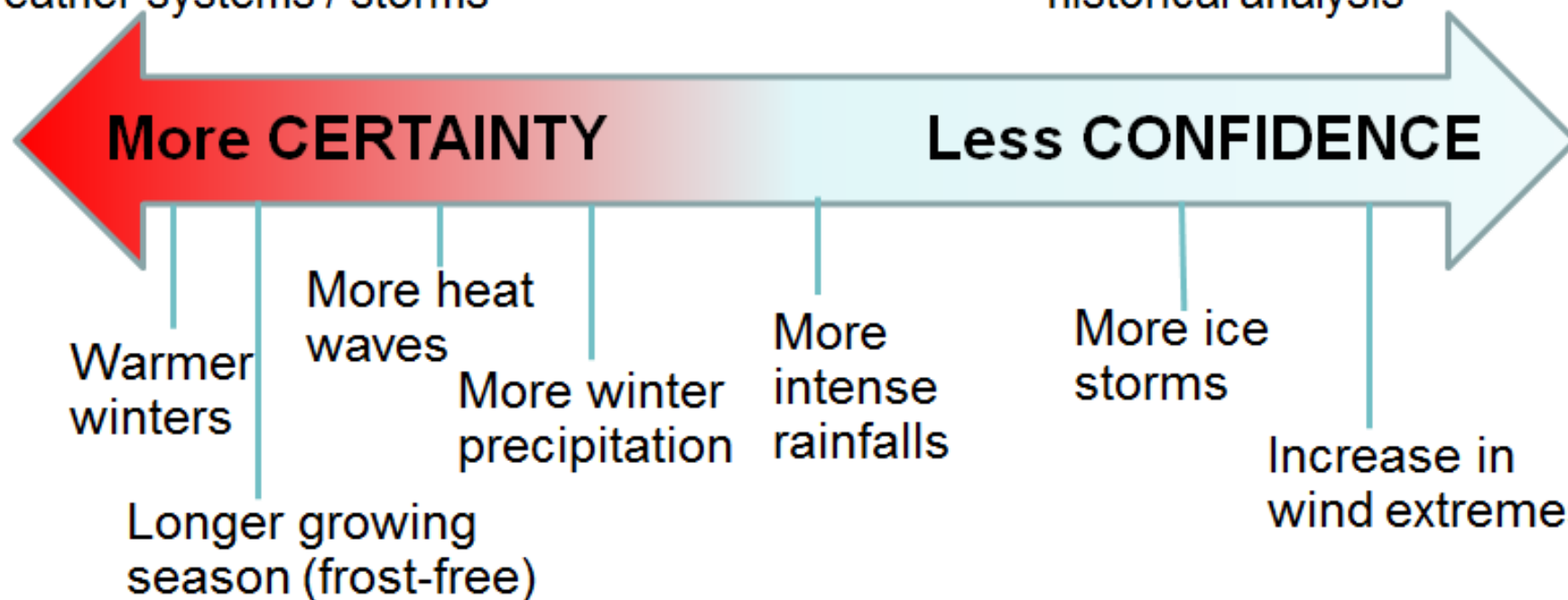
Generations
of models –
*tending to
increasingly
wetter*

PROJECTION UNCERTAINTIES



Climate models more effective
at means and large-scale
weather systems / storms

Difficult to resolve convective
storms in climate models /
historical analysis



The IPCC is very clear that the use of a **limited** number of climate models is not recommended for decision-making

- The use of a limited number of models or scenarios provides no information on the uncertainties – multiple models or ensembles can help
- Although each GCM represents the ‘best effort’ of each modelling centre, there are biases (& adjustments needed)
- The use of an ensemble (mean/median) of models tends to converge to a ‘best estimate’ by reducing the strong random biases in single models

AR5 ENSEMBLE PROJECTIONS

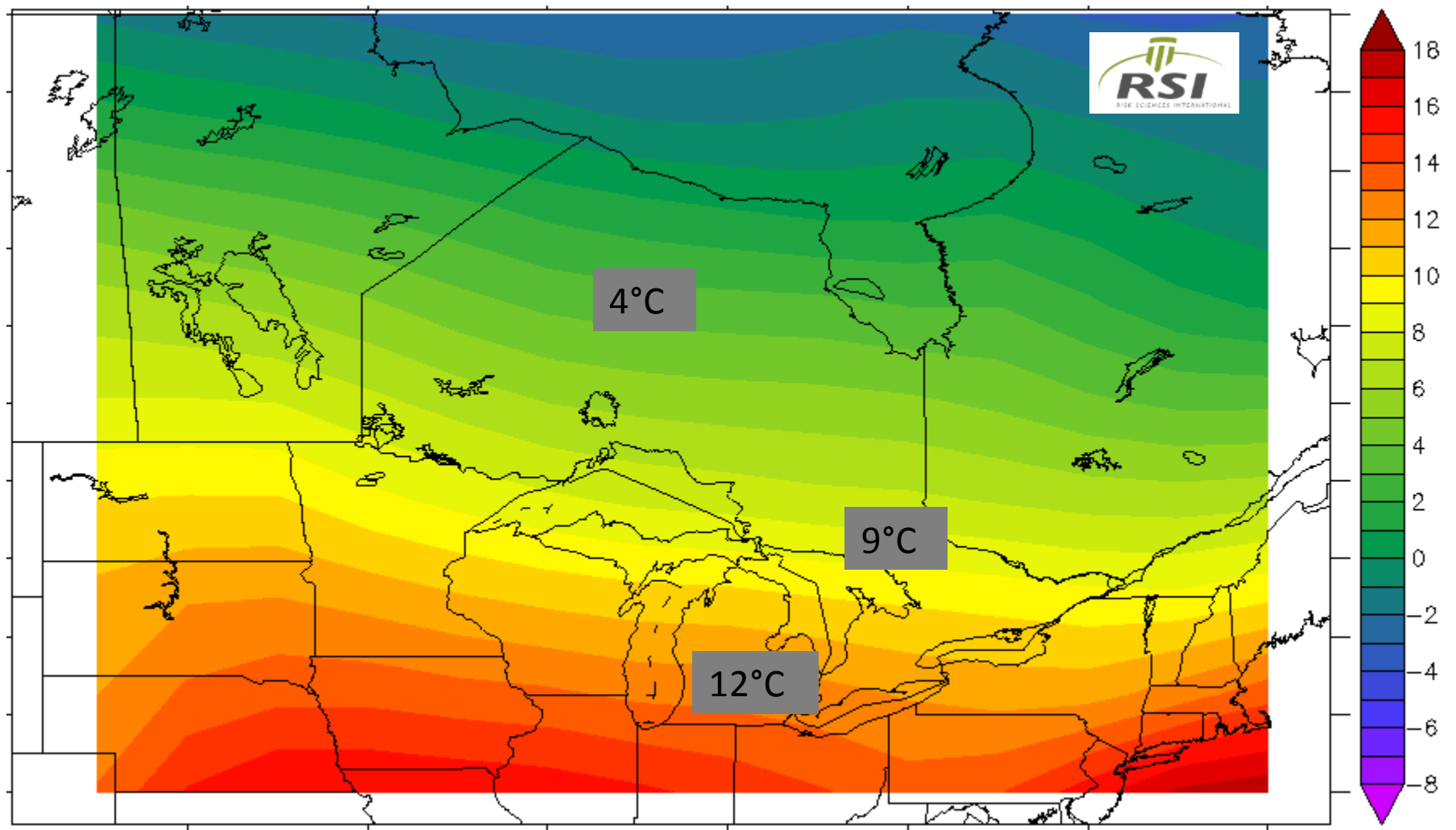


- For our clients we calculate the ensemble change from all models from the international modelling centres
- About 5 Terabytes of model data from the IPCC
- All model runs are re-gridded, re-calibrated and averaged (100s of model runs – 40 models x multiple runs)
- The differences or 'spread' of the model estimates gives us an indication of projection certainty
- Unequal changes over each season

AR5 ENSEMBLE MEAN ANNUAL TEMP



(RCP8.5) 2050s (2041 – 2070)



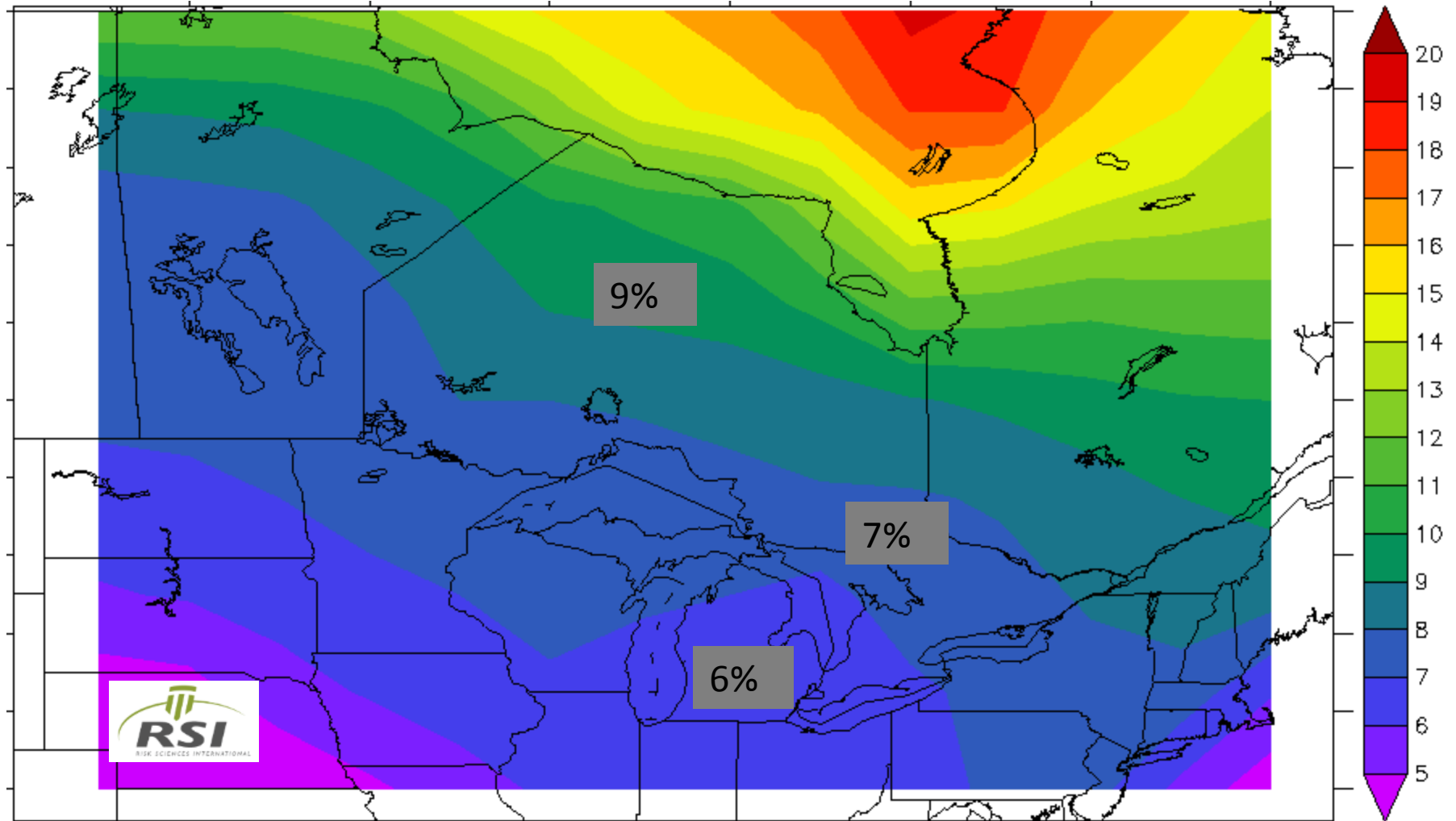
AR5 ENSEMBLE MEAN ANNUAL PRECIP



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(RCP8.5) 1981-2010 to 2050s PERCENT CHANGE - **WETTER**



AR5 ENSEMBLE EXTREMES



GTA Ontario Precipitation Extremes (2050s and 2100)

Indicator Name (observed baseline value)	Change mid-century from 1981-2010	Change by 2100
Maximum 1 day precipitation (37 mm)	+9%	+20%
Maximum 5 day precipitation (60 mm)	+6%	+17%
99 th Percentile precipitation amount (79 mm)	+37%	+87%

Extremes expected to be more responsive to climate change than averages
Potential for intense thunderstorm rainfalls to increase at greatest rates

Indicates that a greater proportion of precipitation will
come from more extreme events

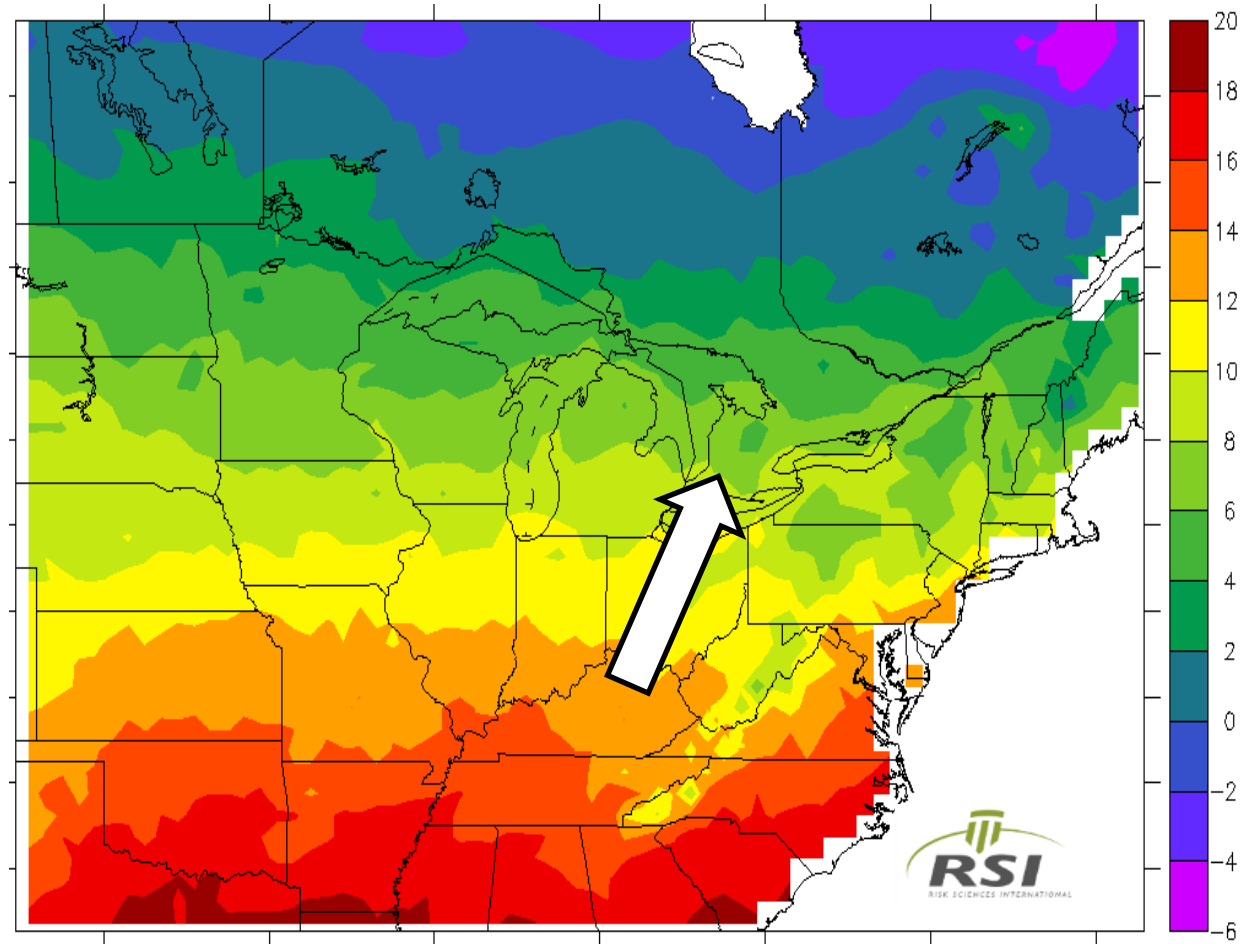
CONCLUSIONS



- Climate change is already affecting us
- Our best adaptation measures require the best science
- Ensemble projections are current best-practices and represent due diligence, consideration of uncertainty
- New IPCC projections are consistent with historical trends
- We appear to be on the 'high' projection pathway based upon our greenhouse gas emissions
- Climate change will have significant impacts on mean climate but perhaps extremes to an even greater extent

OUR FUTURE CLIMATE?

- Looking to the 2050s ensemble projection
- The current climate analog for southern Ontario is **Kentucky**



4 RECENT EVENTS IN ONTARIO

EXTREME WEATHER IN ONTARIO



Goderich Tornado (2011):

- F3 Tornado, winds peaking at 280 km/h
- 1 death and 37 people injured
- 500 trees downed on public property
- 19 commercial and 35 residential buildings demolished, 283 buildings requiring repair
- Snapped, uprooted and downed power line, natural gas leaks
- Preliminary total damage estimate, \$100 million
- \$2.5 million in damage to municipal property and emergency response incurred costs



EXTREME WEATHER IN ONTARIO



Wawa Flood (2012)

- Excess of 100 mm of rainfall in 12 hour period
- Severe flood damage to bridges, a major culvert, sewer line, storm water and road beds, as well as private property
- Extensive damage to fibrotic telecommunication lines
- Evacuation of Michipicoten First Nation community members (population 65)
- City's flood disaster related costs exceed \$3.5 million
- City continues to be in state of emergency today



EXTREME WEATHER IN ONTARIO



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Thunder Bay Flood (2012)

- Four days of thunderstorms and intensive rain; antecedent (wet) periods often important in flooding events
- Severe flood damage to bridge and road infrastructure, landfill, sewage treatment plant
- Thousands of basement floods (business and residential), power disruptions, submerged vehicles
- City's flood related costs \$22.9 million
- Estimated insured damages over \$200 million



EXTREME WEATHER IN ONTARIO



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Toronto and area flooding (2013)

- Severe thunderstorms and record level rainfall in only a few hours
- Severe flood related damage to; parks and recreation facilities, transportation infrastructure, sewer and water systems, ravines, roadways and private property
- Significant power outages and disruption to municipal services
- CN rail, Toronto Hydro experienced considerable damage
- City of Toronto storm related costs, estimated \$65,235,842
- Excess of \$850m in private insurance claims

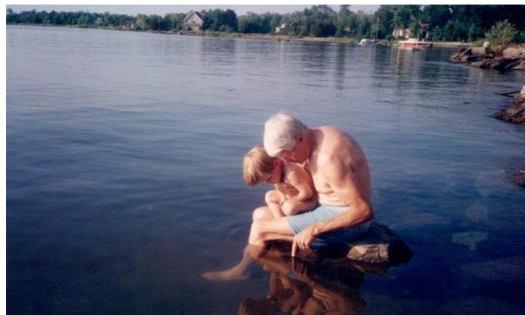


EXTREME WEATHER IN ONTARIO



Georgian Bay Low Lake Levels (2013)

- In 2013, Lakes Huron and Michigan measured the lowest levels since record keeping began 100 years ago, 74 centimeters below their long-term average, 43 centimeter decline since January 2012
- 68 marinas, 76 private businesses and 31 government facilities are affected by lower water levels
- Estimated \$500 million spent by cottagers this summer to extend and repair docks and water systems
- Minimum \$7.9 million will be spent by municipalities this year in response to low water levels
- Estimated negative impact on local economies: between \$50 and \$100 million



1994



2013

EXTREME WEATHER IN ONTARIO



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2013	
Heat Alert	Extreme Heat Alert
September 11, 2013	July 19, 2013
September 10, 2013	July 18, 2013
July 15, 2013	July 17, 2013
June 26, 2013	July 16, 2013
June 23, 2013	June 25, 2013
May 31, 2013	June 24, 2013
May 30, 2013	
2012	
Heat Alert	Extreme Heat Alert
August 31, 2012	July 18, 2012
August 4, 2012	July 17, 2012
August 2, 2012	July 14, 2012
July 23, 2012	July 13, 2012
July 16, 2012	July 6, 2012
July 12, 2012	July 5, 2012
July 3, 2012	July 4, 2012
June 30, 2012	June 21, 2012
June 29, 2012	June 20, 2012
June 28, 2012	
June 19, 2012	
May 28, 2012	

Make it a Healthy Day!
Sudbury & District Health Unit

Home Français

Healthy People, Healthy Places | Food Safety, Health Hazards & Infectious Diseases | Clinics & Classes | Resources

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Healthy Tip:
Drive Safe: Car Crashes are the number one cause of death for Canadian children.

ALERTS

Two deaths linked to ingestion of hand sanitizer containing methanol
10/28/2013

Influenza Vaccine (2013-14)
10/21/2013

Emergencies: would you be prepared?
10/7/2013

[view all alerts >](#)

Home > What's New > Heat Alert Declared for Sudbury and Manitoulin Districts

Heat Alert Declared for Sudbury and Manitoulin Districts

TUESDAY, JULY 16, 2013

Dr. Penny Sutcliffe, Sudbury & District Medical Officer of Health, has declared a Heat Alert for Alert was issued because the humidex is expected to reach 40 or higher over the next two da

Exposure to high heat can lead to illnesses such as heat exhaustion and heat stroke, and in severe cases, death include rapid breathing, weakness or fainting, more tiredness than usual, headache, and confusion. If you or someone you know is experiencing these symptoms, contact a health care professional, friend, or family member for help. In emergencies, call 911.

Highview
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office

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JUN 28 2013

Heat stroke alert for all pets!

Home » News » Heat Stroke Alert For All Pets

EXTREME WEATHER IN ONTARIO



2013 Central and Eastern Canada Ice Storm:

- 3 day event (Dec 20 -23) resulting in up to 30mm of ice accumulation
- 27 fatalities
- 1.5m people without power across 6 provinces and 5 states
- 600,000 homes without power in Ontario
- >2000 homes without power 10 days later
- Accurate cost estimates outstanding (at least \$106m for Toronto alone, primarily for tree cleanup as at January 9th, 2014)



5 SOURCING CLIMATE INFORMATION

SOURCING PROJECTIONS (FREE)



Global and Regional Climate Change Projections (2013 IPCC AR5)

- Working Group I contribution to the IPCC Fifth Assessment Report (WGI AR5) – in form of terabytes of data files requiring quality control

<http://www.ipcc.ch/report/ar5/wg1/#.UsxZ8vRDtzU>

Canadian Climate Change Projections (2007 IPCC AR4)

- Canadian Climate Change Scenarios Network (CCCSN)

<http://www.cccsn.ec.gc.ca/?page=main&lang=en>

Ontario Climate Change Projections

- Ontario Ministry Of Natural Resources, Interactive Climate Change Mapping Tools

http://www.mnr.gov.on.ca/en/Business/ClimateChange/2ColumnSubPage/STDPROD_090054.html

SOURCING CLIMATE CHANGE DATA



- Risk Sciences International (RSI) - 2013 IPCC AR5
<http://www.risksciences.com/page?s=575&lang=en-CA>
- Ouranos (Quebec) <http://www.ouranos.ca/en/>
- The Pacific Climate Impacts Consortium (BC) <http://www.pacificclimate.org/>
- The Ontario Climate Consortium (Ontario) - 2007 IPCC AR4 <http://climateontario.org/wp/>
- National Oceanic and Atmospheric Administration (USA) <http://www.noaa.gov/>
- Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR) - collaborating with RSI <http://www.climateontario.ca/>
- Scientists in local universities (e.g. UWO, Waterloo, U of T)
- Environmental consultants (Golder, Deloitte, Dillon, etc)

ADDITIONAL RESOURCES



- Centre for Climate and Energy Solutions
<http://www.c2es.org/>
- Columbia Basin Trust
http://www.cbt.org/Initiatives/Climate_Change/
- Fraser Basin Council
<http://retooling.ca>
- Federation of Canadian Municipalities
http://www.fcm.ca/Documents/reports/PCP/Municipal_Resources_for_Adapting_to_Climate_Change_EN.pdf

ADDITIONAL RESOURCES



- Ontario Ministry of Natural Resources
<http://www.mnr.gov.on.ca/en/Business/ClimateChange>
- AdaptNet – Nautilus Institute
<http://www.nautilus.org/mailling-lists/adaptnet>
- Climate Progress
<http://thinkprogress.org/romm/issue/>
- Municipal Information Network
<http://www.municipalinfonet.com/>
- Climate Change Adaptation Community of Practice
<http://www.ccadaptation.ca/>

ADDITIONAL RESOURCES



- CAKE - Climate Adaptation Knowledge Exchange
<http://www.cakex.org/>
- OCCIAR – Ontario Centre for Climate Impacts and Adaptation Resources
<http://www.climateontario.ca/>
- United Kingdom Climate Impacts Program (UKCIP)
<http://www.ukcip.org.uk/essentials/>
- Institute for Catastrophic Loss Reduction (ICLR)
<http://www.iclr.org>
- Canadian Institute of Planners
<http://www.cip-icu.ca/>

CONCLUSION



- Climate change is already affecting us
- It does not affect us all equally (socially, geographically)
- We have an idea of what provincial average changes will be
- Extremes will be considerably more severe
- The best science is needed to tell us what the downscaled local picture will be
- This is essential for decision makers
- There is a lot that can be done while waiting on this information
- Many of the earlier steps in an adaptation program do not require climate science
- The MARS webinar series will show how others have gone about adaptation

EXERCISE



On the MARS portal, a discussion page has been set up to accompany this webinar

With respect to your municipality we would like you to answer the following questions;

- Which potential climate parameters/impacts concern you the most? Why?
- How do you think the changing climate could affect your community?
- How do you think the changing climate could affect your municipal operations?

Please visit <https://www.ccadaptation.ca/en/mars> and share your perspective!

NEXT WEBINAR

MODULE 2: INTRODUCTION TO THE MARS PORTAL

JANUARY 29TH, 2pm