



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

FOSTERING CLIMATE RESILIENCE IN THE TRANSPORTATION SECTOR: USER-DRIVEN CLIMATE INFORMATION ON CLIMATEDATA.CA

Lindsay Matthews and Carrington Pomeroy
Canadian Centre for Climate Services

UNECE –Group of Experts on Assessment of Climate Change Impacts and
Adaptation for Inland Transport, September 3, 2021

CLIMATE-TRANSPORTATION INTERFACE



CLIMATE IMPACTS IN THE TRANSPORTATION SECTOR

Canada in a Changing Climate (2021)

National Issues Report: [Chapter 7: Sector Impacts & Adaptation](#)

The transportation sector must adapt to:

- More frequent, more intense precipitation
- More extremes in temperatures
- More variable freeze-thaw cycles
- Changes in the timing of weather events (freezing, thawing)
- Coastal flooding



SECTION 7.7

Extreme weather events impact transportation, disrupting supply chains

Fuel tanker plunges through Déline, N.W.T., ice road

Driver escaped without injury, transportation department says

By Chris Windeyer, CBC News | Posted: Mar 06, 2016 4:43 PM CT | Last Updated: Mar 06, 2016 4:53 PM CT



A fuel truck went through the ice on the Déline access road Saturday. (Environment and Natural Resources)

Via Rail Train Derailment In Togo, Saskatchewan Due To Washed Out Tracks

The Huffington Post Canada

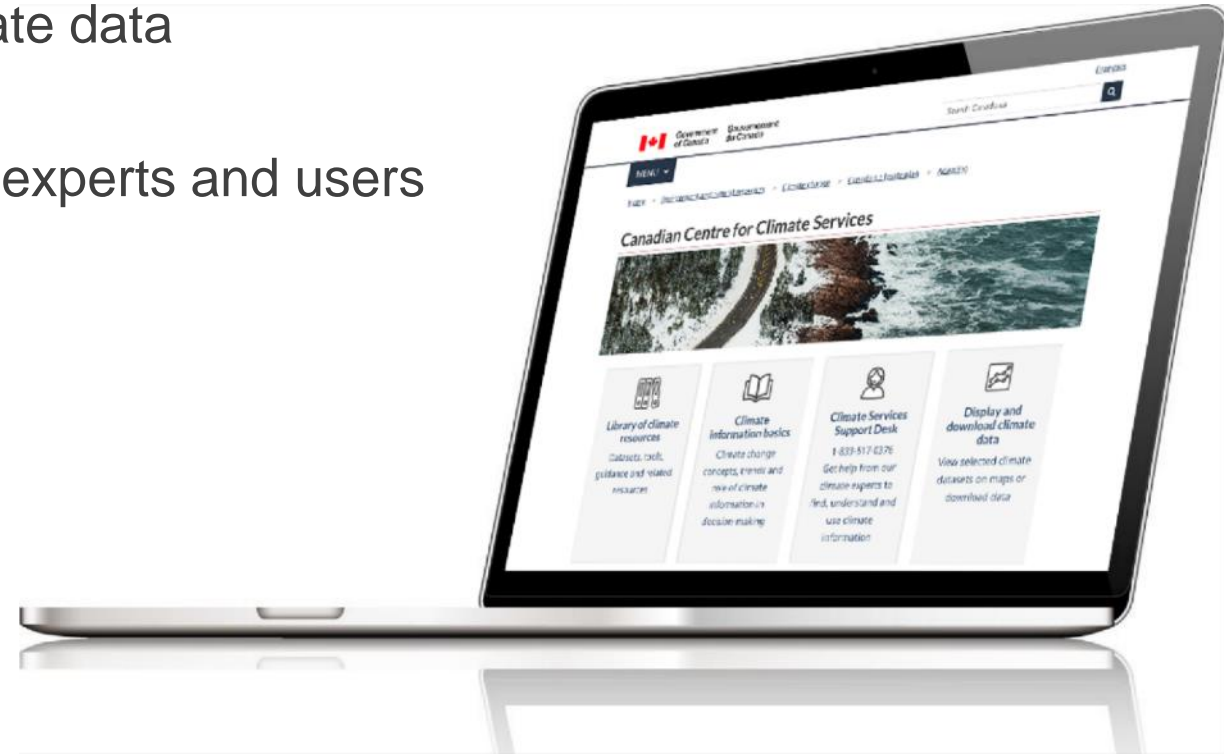
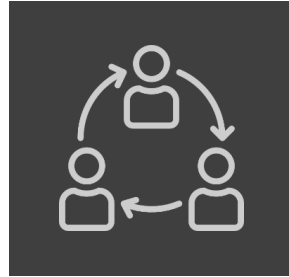
Posted: 04/29/2013 11:44 am EDT | Updated: 04/29/2013 1:03 pm EDT



RCMP File Photo

CANADIAN CENTRE FOR CLIMATE SERVICES

- **Increasing awareness and access** to climate data and information
- **Providing training and guidance** on using climate data
- **Engaging with users** to understand needs
- **Developing new products** by collaborating with experts and users

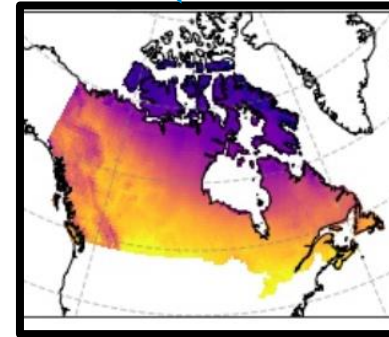
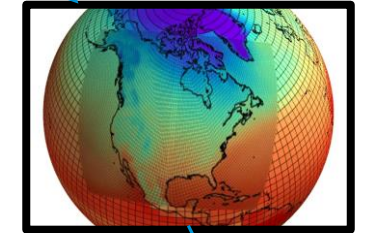
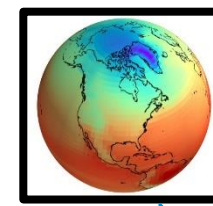




CMIP Model Outputs



Statistical Downscaling




NATIONAL CLIMATE SERVICES PROVIDER

Canadian Centre for Climate Services
www.canada.ca/climate-services
 Government of Canada / Gouvernement du Canada

NATIONAL TOOLS

Climate Atlas of Canada
www.climateatlas.ca


Canadian Climate Data
www.ClimateData.ca


Power Analytics & Visualization for Climate Science (PAVICS)
<https://pavics.ouranos.ca/>


REGIONAL CLIMATE SERVICES PROVIDERS

Ouranos
www.ouranos.ca
 (region: mostly Quebec)


Pacific Climate Impacts Consortium
www.pacificclimate.org
 (region: mostly Pacific NW)


Climate West
www.climatewest.ca
 (region: Prairies)


Climatatlantic
Website coming soon
 (region: Atlantic)





ClimateData.ca

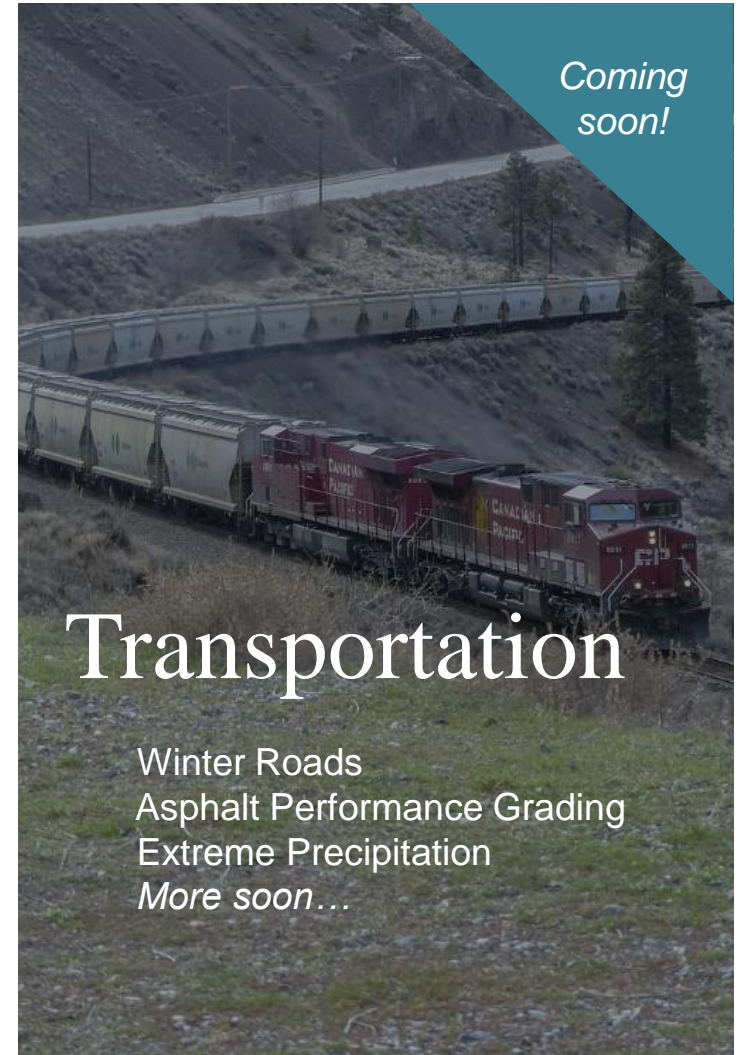


High-resolution, searchable climate data:

- Observed daily station data, gridded historical data
- Downscaled climate change projections – CMIP5 (BCCAQv2 methodology)
- Visualisation, including comparison of emissions scenarios
- Summaries by location
- Variables: national maps, zoom in on region
- Analyze page: customized indices
- Sector modules: tailored information

ClimateData.ca TRANSPORTATION SECTOR MODULE

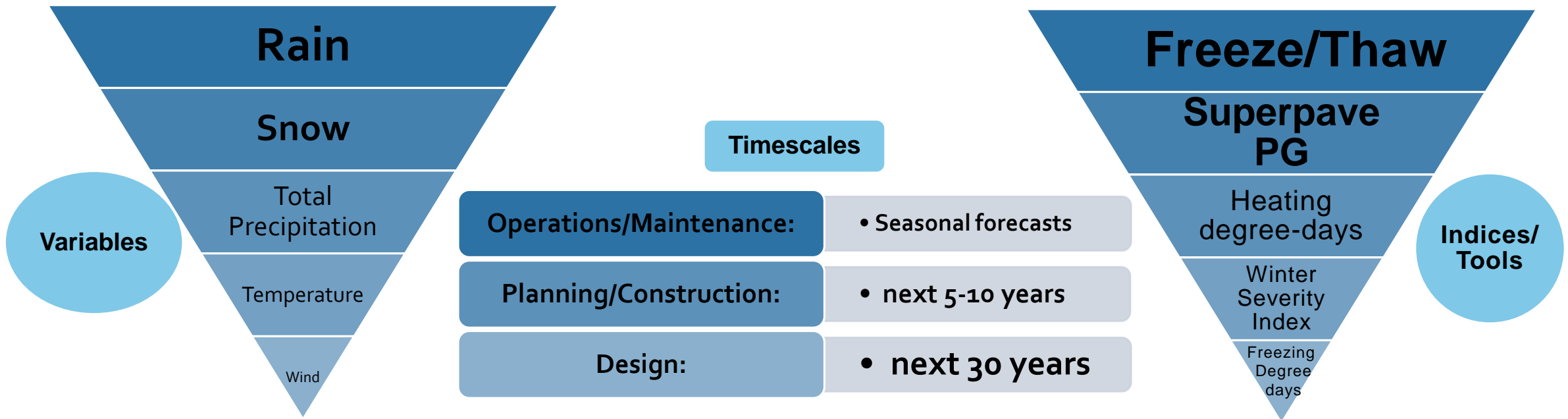
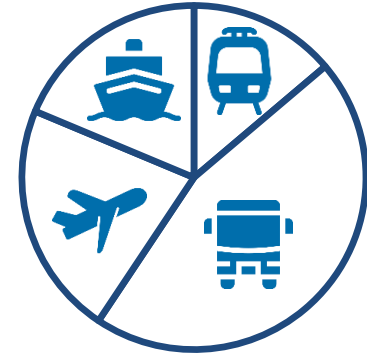
- Coming soon!
- Working group composed of CCCS and regional partners
- Tailored case studies, variables and tools
- Surveyed experts and stakeholders across the country



TRANSPORTATION MODULE SURVEY RESULTS: DATA

Online from Dec. 10th, 2020 to Jan. 4th, 2021

172 Total respondents: 137 English and 35 French



TRANSPORTATION MODULE SURVEY RESULTS: *INFORMATION*

Top Climate Information Needs

Decision-Making

- Easier access
- Guidance
- More certainty
- More reliable data
- Different variables

Integrate

- Risk assessment support
- Interactive mapping
- Data use training
- Webinars, access to experts
- Case studies and examples

Resources

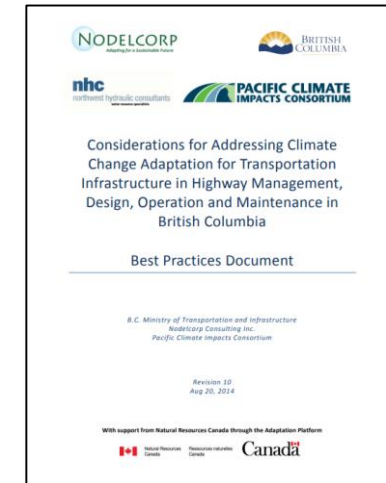
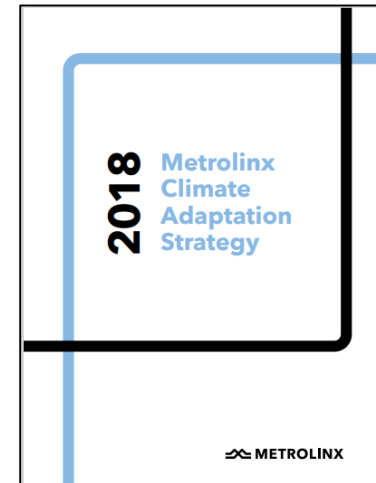
- Podcasts
- Storytelling
- Webinars
- Infographics
- Online interactives



TRANSPORTATION MODULE: CASE STUDIES

Case Studies:

- PIEVC Protocol: three highway climate-vulnerability assessments and new regulations for BC engineers
- Metrolinx: Mainstreaming climate risk assessment
- Pavement and Extreme Temperatures in Toronto
- Winter Ice Roads: James Bay Winter Road



TRANSPORTATION MODULE: ANALYSIS TOOLS

Location Variable Sector Analyze Download Learn About Glossary FEEDBACK EN FR

1 CHOOSE A DATASET
2 SELECT LOCATIONS
3 CUSTOMIZE VARIABLES
4 CHOOSE A TIMEFRAME
5 ADVANCED

Wet Days
Average 'Wet Day' Precipitation Intensity
Maximum Consecutive Wet Days
Maximum Consecutive Dry Days
Days above Tmax and Tmin
Days above Tmax
Days above Tmin
Days below Tmin
Degree Days Above a Threshold
Degree Days Below a Threshold
 Degree days exceedance date

DATASET LOCATION VARIABLE(S)
BCCAQv2 2 Grids Degree days exceedance date

Degree days exceedance date
Day of year when the sum of degree-day (tmean <= 0 degc) exceeds 380 c days, the cumulative sum starts on 11-01 (days since 07-01)
degrees C. Optionally a specific resampling periods)

Lansdowne House : day of year when the integral of degree days (tmean <= 0 degc) exceeds 380 c days, the cumulative sum starts on 11-01 (days since 07-01)

month-day
time
RCP 26
RCP 4.5
RCP 8.5
ANUSPLIN

region RCP
Lansdowne_House all RCPs



TRANSPORTATION MODULE: DATA PRODUCTS

Already provided:

- Hottest Day
- Days with $T_{max} > 32^{\circ}\text{C}$
- Wet Days $> 20\text{mm}$ or Max 1 Day Precipitation
- Heating and Cooling Degree Days
- IDF curves

Added for the Transportation module:

- Extreme heat index map – Days with $T_{max} > 37^{\circ}\text{C}$
- Freeze-thaw index map

Available through the Analyze Page:

- Freeze-Thaw index
- Freezing Degree Days
- Days Above/Below custom T_{max}/T_{min} thresholds
- Wet Days with custom thresholds

Functionality added to Analyze Page:

- Degree Day Exceedance Date – provides dates at which custom degree day totals are exceeded (e.g., ice roads case study)

New Related/Supporting Products:

- Future IDF Curve Guidance



BRAINSTORMING PRIORITIES

What do you think would be of most importance to include in a transportation-focused portal to assist users in this sector?

1. Guidance about RCPs
2. Guidance on using climate data for decision making
3. A link to climate risk assessment methodology
4. More case studies of climate assessments
5. More climate variables of interest
6. Other?





Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

THANK YOU!

Website

English:

canada.ca/climate-services

Français:

canada.ca/services-climatiques

Climate Services Support Desk



1-833-517-0376



info.cccs-ccsc@canada.ca