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PACIFIC CLIMATE IMPACTS CONSORTIUM

PCIC UPDATE JULY 2015

UPDATED AND IMPROVED BC PRISM CLIMATE MAPS

Because our users require the most up-to-date climate data available, PCIC is devoted to updating and refining our tools, our analyses and the data that we offer. A lot of work goes on behind the scenes to ensure that we are providing state of the art climate information for stakeholders in the BC and Yukon regions that is easily accessible for users and meets their needs.

As a part of this process, we are working on the next update to our Parameter Regression on Independent Slopes Model (PRISM) climate maps. This will bring our maps in line with the current standard period, 1981–2010. The maps incorporate new data and improved analysis, in order to provide the most up to date and accurate information possible for our users in BC.

The use of PRISM climate maps stems from our users' need for high-resolution climatological maps of our province. In order to develop these, PCIC worked with Oregon State University throughout 2013 and 2014 to apply their PRISM technology to British Columbia. The finished product was a set of maps at 800 metre resolution for the whole province that are available through an easy to use interface on our Data Portal.

The new maps incorporate a more extensive network of data from within Alberta and utilize a more complete record of stations from BC Hydro. The new maps also use precipitation estimates derived from snow pack measurements and glaciers that were originally derived for the 1971–2000 maps released two years ago.

To generate the new climate maps, station climatologies have been developed for thousands of stations in British Columbia. These will be released on PCIC's Data Portal in the near future.

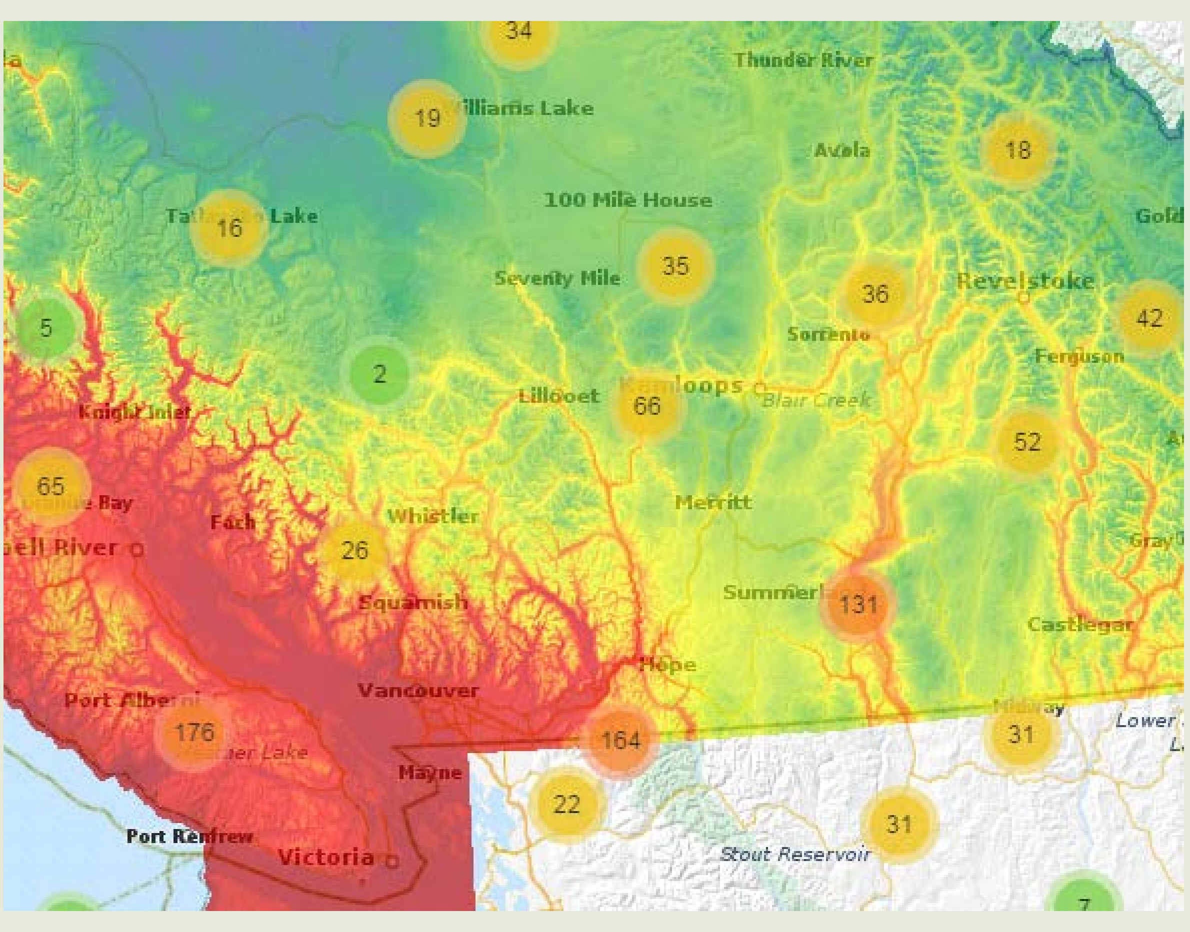

Figure 1: A screenshot of the climate map review tool from the review period, showing the average minimum temperature in January for the 1981-2010 period, from the new PRISM climate maps. The numbered circles indicate the number of stations used within a given region..

While PCIC climatologist Faron Anslow was gathering new data and refining his analysis of it, behind the scenes, PCIC's computational support staff developed an online climate map review tool (see Figure 1). This tool provides a simple-to-use interface for querying the maps and for annotating geographical points and regional outlines. The critical review process of the newPRISM mapping productwas greatly facilitated by this tool.

These new maps will be widely released later this year, on PCIC's Data Portal.

TWO PCIC EMPLOYEES MOVE ON TO NEW PROJECTS, BUT NOT FAR AWAY

There is a constant stream of talent coming through PCIC's doors. On any given day, both visiting and in-house specialists in various areas of climate science, computer science, climatology, hydrology and statistics, along with the administrative and computational staff that support them, can be found in the building working on projects that will benefit stakeholders in BC and Yukon. Though PCIC is often visited by experts in a wide range of disciplines from around the world, it is PCIC's core team that serves as the backbone of our organization.

Over the last few months, two members of PCIC's core team have moved into new positions on campus. Research Climatologist Dr. Alex Cannon joined PCIC in 2012 to aid in the development of tools and methods to predict climate extremes on seasonal and decadal timescales, using his skills in statistical modelling and machine learning. After working on a large number of projects, many on statistical downscaling methods for PCIC's users, Dr. Cannon has moved across campus to join the team at Environment Canada's Climate Data and Analysis section. Dr. Cannon brought a great deal of knowledge to PCIC, which benefitted numerous projects. He was always available to help other staff, review their work and discuss their ideas. Many young scientists came to work with and learn from him while he was here, and he was unfailingly generous with his time and eager to share what he knew with them. We are sure that he will be a valuable asset to Environment Canada and we look forward to seeing his future research projects.

Cassbreea Dewis joined PCIC in 2006, bringing with her a broad range of organizational skills from her prior experience in environmental non-profit management. As PCIC's Lead Planning and Operations, she used her knowledge in strategic planning, corporate outreach, finance and human resource management to help PCIC grow from a small team in Sedgewick to an internationally recognized regional climate services provider. Ms. Dewis has recently moved to UVic Administrative Services, where her exceptional managerial skillset will no doubt prove very valuable. Endlessly energetic, capable of staying on top of minutiae from all of the projects that PCIC has on the go at any given time and taking a personal interest in the professional growth of all of PCIC's staff, she contributed significantly to PCIC's success.

Though we will miss Cassbreea and Alex, we are grateful for their contributions and happy that they are still close by.

UPDATING THE VIC HYDROLOGIC MODEL

The variable infiltration capacity (VIC) hydrology model has been used by PCIC hydrologists in the Hydrologic Impacts (HI) theme as the main tool for predicting the hydrologic effects of climate change and variability. VIC is a spatially-distributed process-based model, which means that it takes a region, divides it into smaller portions and determines what would happen in those small portions by solving the relevant physical equations. Specifically, it is designed to explicitly solve the vertical water and energy balance on a computational mesh with a spatial resolution of 1/16-degree (approximately 30 km^2 at 50-degrees north latitude). Recent work using this model includes assessment of projected climate change on the hydrology of the Peace (101,000 km^2), upper Columbia (100,000km^2), Fraser (230,000 km^2) and Campbell River (1,200 km^2) basins.

Over the past two years, the HI theme has been working on updating the VIC model. The application of the model has been expanded to cover a domain that includes all land areas draining into or out of British Columbia and the Yukon, including the entire Columbia basin to tidewater. This expanded spatial domain covers an area of approximately 2.3 million km^2. A substantial amount of effort has also gone into re-parametrizing the model for this larger domain, including making use of more recent soil, land cover, terrain and climate data. The VIC model itself is being updated to include several new features. Major updates include:

1. The ability to represent glacier mass balance, including an energy–balance approach to glacier accumulation and melt; and
2. The ability to represent glacier dynamics via coupling of VIC to a Regional Glaciation Model developed at the University of British Columbia.

Testing of the glacier mass balance component has been promising and coding of the glacier dynamics is nearing completion. Minor modifications include a more spatially explicit parameterization of changing snowcover on the ground and its effects on the surface energy balance (snow albedo temporal dynamics) and climate gradients, as well as the conversion of all model input/output to industry-standard data formats. This upgraded version of the model will also be coupled to an updated streamflow routing code (called RVIC) developed by the University of Washington. Following further testing, calibration and validation, the model should be ready to begin climate change impact assessments on the Columbia River basin later this year.

CONTINUING PARTNERSHIP WITH BC HYDRO

Effective April 1st, 2015, PCIC and BC Hydro signed a new 4-year partnership agreement. This most recent agreement ensures the continuation of an on-going and productive eight-year formal relationship between BC Hydro and PCIC. As a result of past agreements, PCIC has been able to provide projected changes in hydrology and reservoir inflows over the 21st century for operations in the Peace, Columbia and Campbell River basins, which is being used to assess the potential effects of climate change on hydro-power generation. BC Hydro support has also been instrumental in the upgrading of the VIC model and the development of the data portal. Although the current agreement is expected to result in continuing assessment of hydrologic impacts (including the expansion of the hydrologic modelling to additional basins), it is also expected that PCIC will deliver climate services and knowledge on a much broader range of topics, such as integrated resource planning, transmission and distribution.

FEEDBACK ON OURANOS GUIDEBOOK

Ouranos, a Consortium on Regional Climatology and Adaptation to Climate Change published a guidebook on climate scenarios last fall, A guidebook on climate scenarios: Using climate information to guide adaptation research and decisions. The preparation of this guide was funded under the Adaptation Platform Program led by Natural Resources Canada. The guide seeks to introduce and familiarize actors involved in climate change adaptation to climate information in order to better evaluate their own climate information needs and to make better use of that information. More specifically, the document presents a decision-tree through which users can identify the type of climate information that best suits their adaptation needs. It also presents and details how to interpret a large variety of ways (formats) used to present climate scenarios, and explains a number of key climate science concepts.

To evaluate the usefulness of this new resource and to update its content, Ouranos and NRCan are currently involved in a project that aims to obtain feedback from different sectors across Canada. This promotion and testing of the guide will be done through different means, such as targeted surveys, webinars and on-site workshops with interested parties.

If you have read the guide and would like to provide feedback on the document or if you are interested in attending a workshop on the guidebook in your region, please take a few minutes to complete the following survey.

NEWSWORTHY SCIENCE

PCIC's latest Science Brief highlights a paper by Karl and coauthors (2015) that considers the so-called "hiatus" in global surface temperature trends. Their work, published in the journal *Science*, examines recent surface temperature trends in an updated NOAA data set. They find that, with an enlarged data set that has corrections for bias between drifting buoy data and data taken from ship intakes, as well as extended corrections for water cooling in buckets in the time between being drawn from the sea and being measured, there is a statistically significant warming trend of 0.086 °C per decade over the 1998-2012 period. This trend is just over double the trend found in the previous version of their data set and the authors note that their results “do not support the notion of a ‘slowdown’ in the increase of global surface temperature.”

Read the new Science Brief

RECENT PAPERS AUTHORED BY PCIC STAFF

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