

Vancouver Workshop Report

Introduction

The IDFCC tool Vancouver workshop was held at the SFU Centre for Dialogue building in downtown Vancouver on October 9, 2014. A total of 23 individuals representing various municipalities, provincial ministries, academic institutions and private consulting firms registered for the event, while 19 participants attended the event.

The workshop was five hours in length, following roughly this schedule:

- 9:00-10:00 am: Background presentation
- 10:00-12:30 pm: Practical/hands-on portion
- 12:30 to 2:00 pm: Discussion, receiving of feedback on practical and aspects of the draft IDFCC tool



Attendees

As provided in Table 1, a total of 19 attendees participated in the Vancouver workshop. Participants represented several local municipalities, including the City and District of North Vancouver, the City of Surrey, and Metro Vancouver. Provincial ministries represented at the workshop included the BC Ministry of Forest, Lands and Natural Resource Operations and the BC Ministry of Transportation and Infrastructure. The remaining attendees included staff from a number of private consulting firms.

Table 1: Vancouver, October 9, 2014 Workshop Attendees

Last Name	First Name	Title	Institution
Akhtar	Khaled	Sr. Flood Safety Eng.	BC Ministry of Forests, Lands and Natural Resource Operations
Chung	Dickson	Hydrotechnical Engineer	BC Ministry of Transportation and Infrastructure
Cossette	Dan	Hydrotechnical EIT	BC Ministry of Transportation and Infrastructure
Cross	Ben	Research Assistant	City of North Vancouver
Fenech	Adam	Director, Climate Research Lab	UPEI

Grill	Aaron	Engineer	Metro Vancouver
Hung	Jonathan	EIT	GeoAdvice Engineering Inc.
Khan	Khalid	Sr. Hydrotechnical Engineer	BC Ministry of Transportation and Infrastructure
Larson	Rob	Hydrologist	Worley Parsons Canada
Lee	Jeannie	Drainage Engineer	City of Surrey
Loader	Shaun	EIT	District of North Vancouver
Mahmoud	Mahmoud	President	GES Geotech Inc
Mamun	Abdullah	Water Resources Eng.	Associated Engineering
Mawdsley	Angie	Engineer	District of North Vancouver
Pour	Sara	Stormwater Engineer	Kerr Wood Leidal
Sanii	Sadaf	Geotech./Env. Eng.	GES Geotech Inc.
Thompson	Spencer	Engineer	Urban Systems
Tyacke	Darwin	Sr. Geom. Stdns. Tech.	BC Ministry of Transportation and Infrastructure
Walker	James	Civil Engineer	Dillon Consulting Limited

Workshop Outline

The workshop began with a one-hour presentation outlining the purpose of the workshop, providing background on the IDFCC tool methods and outlining the IDFCC tool. Participants were informed that the two primary purposes of the workshop were to receive practical user feedback on the draft version of the tool and to educate and inform potential users about the IDFCC tool.

As part of the introductory presentation, participants were encouraged to focus on opportunities to improve practical aspects of the tool (e.g., identification of means to improve the user interface), rather than the methodological background of the tool, during the workshop. However, discussion on the methodological background was welcomed. Participants were also apprised of the background, context, objectives and status of the IDFCC tool project.

The bulk of the presentation focussed on the technical background of the tool. Topics covered in this portion of the presentation included a background to global climate modeling, a description of Representative Concentration Pathways (RCPs) and their role in climate modeling, a description of Global Climate Models (GCMs), GCM downscaling methods including methods used to downscale GCM data and update IDF curves in the IDFCC tool, and methods used to generate skill scores for GCMs included in the IDFCC tool.

Users were also presented an outline of tool implementation, including an outline of the database, user interface and methods within the tool used to generate IDF curves. A brief outline of the user interface was also provided.

Working Session

The majority of the time of the workshop was allocated for the working session. After a brief introduction to the IDFCC tool user interface, workshop attendees were assigned a number of tasks to complete using the IDFCC tool. Participants were encouraged to complete the tasks on their own using the available user guide. An amount of time was allotted for each task, after which the task was “taken up” by the IDFCC team.

Tasks assigned to participants during the working portion included:

- Creation and activation of a user account (10 minutes);
- Exploring map functions (20 minutes);
- Selection of a pre-loaded Environment Canada (EC) rain station, and exploring its IDF curve based on historical data (30 minutes);
- Selection of a GCM and exploration of a climate-change impacted IDF curve (40 minutes);
- Generating a user-created station (50 minutes), and;
- Generating IDF curves for the user-created station (10 minutes).

During the working portion, project team members circulated through the room to answer question and record any difficulties users had with completing assigned tasks.

Discussion

A one-hour facilitated discussion was scheduled to allow users to identify and discuss practical issues identified during the working portion in a group setting. Each participant was encouraged to provide feedback in a systematic fashion. Participants were first encouraged to identify any practical issues they identified while using the tool, including issues surrounding the user interface. After a discussion of practical issues surrounding the use of the tool, a group discussion on the methods and application of tool outputs occurred.

Workshop Results

Major themes of questions, discussion and comments provided by the workshop participants are summarized in Table 2. Table 2 also provides a count of the number of time particular comments were raised during the workshop discussion and working session. Further, several comments incited prolonged discussion amongst many workshop participants, indicating a high level of interest in the topic.

As discussed above, participants at the workshop were encouraged to focus their comments and questions on practical issues related to the tool, including identification of opportunities to improve the usability of the tool and identification of errors in the draft version of the tool. As reflected in Table 2, the majority of comments, questions and themes of discussion at the workshop related to practical issues.

Relatively minor practical issues identified by workshop participants included unclear log-in requirements, difficulty setting a default “home” location in while in map view, provision of unnecessary options (e.g., the option to delete an EC rain station, even though users can only delete their own user-created stations), inclusion of information on selected GCM, RCP and year of climate projection when exporting image files of tool outputs, difficulty panning on IDF plots, and providing a function that allows users to continue working on sessions after closing the program. Retaining settings when switching between tabs in the output/IDF curve window was also identified as a means of increasing usability of the tool. Users frequently identified issues related to viewing of all components in the IDF curve table and plot pop-up window, as at browser default zoom levels certain aspects of the plots were cut off from view.

Table 2: Major Themes of Discussion and Comments

Theme	Topic	Comment, issue	n
Practical considerations	Log-in, account issues	Didn't know to solve the equation for verification to make a user account	1
	Usability of tool features	Home location option didn't work	1
		Do not provide the option to delete or edit EC stations	1
		Problems with zoom in table and plot pages – at default web browser zoom levels, users are unable to see several components of the graph, etc.	3
		When exporting a plot image, including information on GCM, RCP and year of projection in the plot image	1
		Creating a feature to allow user to save a session	1
		Retain settings when switching between tables and plots in output/IDF window	1
		Difficulty panning on graphs	1
	User-created stations and user-inputted data	Allow sharing of user created rain stations with all users/the public	1
		How to generate IDFs for user-inputted stations with partial data	1
		Provide a means of updating existing EC IDF curves	1
	Comparison of outputs – GCMs, RCPs, projection years	Can tool allow for comparison of different outputs	(n=3), TGD*
	Accessibility of information on methods	Provide more description of the skill score – what it is and how they are assigned to models	(n=4), TGD*
		How are lower and upper bounds created?	1
		Questions about GCMs – how do they work, methods for developing GCMs	1
	Methods and tool design	GCM and RCP selection	Why were 16 of available 41 GCMs selected for application in the tool?

		Why exclude RCP 6.0?	1
		Why include RCP 2.6?	TGD*
		How do you select the appropriate GCM and RCP for your locality?	TGD*
		Run an ensemble of GCMs and provide an average	1
	Parameter estimations	Tool uses method of l-moments, EC uses method of moments – tool provides slightly different results than EC	1
Suggestions for future tool features	Application outside of Canada	Can you add a rain station outside of Canada?	1
	Spatial interpolation	Can the tool provide spatial interpolation function to create data for areas with no rain stations?	1
Application of results	Application of results	Tool developers should provide guidance on applying results	TGD*

*Topic of Group Discussion – the specific topic resulted in a group discussion, indicating a high level of interest in the comment or topic

Comments were also received regarding several aspects of user-created stations. While the draft version of the tool presented at the workshop allowed users to share user-created rain stations with specific registered tool users, workshop participants representing a specific BC municipality indicated that they would like to share rain station data publicly using the tool. Users also identified issues with the inability of the tool to generate IDF curves based on incomplete rain station data, and one workshop attendee indicated that an ability to edit the data in pre-loaded EC stations would be helpful.

Users also frequently requested the ability to compare the outputs of different GCMs, RCPs and projection years within the tool. For example, tool users requested the ability to select two or more GCMs when developing IDF curves affected by climate change, and then compare within the tool how projections differed between the models. Users also requested the same functionality for different RCPs and projection years (e.g., difference in IDF curves produced for the year 2035 vs. 2070).

Users requested that the tool provide more detail on methods. This request was specifically made regarding the skill score that is assigned to GCMs. For example, users suggested that listing the skill score along with GCMs would improve the utility of the tool, as would a brief explanation within the user interface of how skill scores are generated. Users also requested additional information on how uncertainty ranges are produced (for example, do the upper and lower bounds represent GCM runs, RCPs, differences in outputs between GCMs?).

Several questions were also raised about selection of GCMs and RCPs – both with respect to the tool itself (e.g., why does the tool only provide only 16 of 41 available GCMs? Why not include RCP 6.0?) and with respect to selection of inputs to generate future IDF curves (for example, how should users select the appropriate GCM and RCP

for the rain station of interest?). The inclusion of RCP 2.6 in the tool was a topic of general discussion amongst participants. Specifically, participants argued that it was unlikely that RCP 2.6 will provide an accurate representation of future climate change conditions, and that the RCP 2.6 is referred to by the IPCC for experimental purposes. With respect to selection of appropriate GCMs for local rain stations, a workshop participant argued that the tool should provide an average output for an ensemble of GCMs, allowing the users to overcome issues regarding selection of a specific GCM.

Workshop attendees made some suggestions for future changes to increase applicability of the tool. Specifically, attendees suggested that incorporating an ability to spatially interpolate rain station data to allow for generation of rainfall statistics for areas not serviced by rain stations would be helpful, notably for ministries involved in transportation and roads. Users pointed toward the Ontario Ministry of Transportation IDF Curve Lookup tool (http://www.mto.gov.on.ca/IDF_Curves/terms.shtml) as an example of a tool that provides this functionality. It was also suggested that the IDFCC tool would be valuable for locations outside of Canada.

Finally, a topic of group discussion was application of results generated using the IDFCC tool. Participants discussed the IDFCC tool's provision of a range of outputs, reflecting the impact of selection of different GCMs and RCPs, and the range of outputs associated with multiple GCM runs. The provision of a range of results may create difficulties in selecting a specific result or results on which to base future design standards. It was suggested that development and publication of the tool in early 2015 should be accompanied with workshops on how to apply tool results.

Conclusion

While participants indicated that several small improvements could be made to the IDFCC tool, the hands-on session and group discussion at the Vancouver workshop indicated that participants found the IDFCC tool extremely easy to use. For example, each of the assigned tasks was completed well ahead of schedule with limited difficulty during the working portion of the workshop. At the same time, there was substantial and lively discussion regarding the methodology behind the tool and application of tool results. Several participants indicated that guidance would be required for tool users in order to appropriately apply IDFCC tool results.

Findings from the Vancouver workshop indicated that future IDFCC workshops should allow more time for the presentation on the background methods of the tool (i.e., methods used to generate updated IDF curves and to incorporate GCM outputs into IDF curves). Further, discussion surrounding application of IDFCC tool outputs should also be encouraged at future workshops.