

Precipitation-Related Extremes: Moving Ahead

So far

1. Reminded ourselves of our objective and strategy in general
2. Updates from partners/users
3. Updates from researchers
4. Identified numerous issues and challenges

So:

How best move forward?

1. Specific project tasks that address different opportunities/challenges?
2. How/who will do these?
3. How organize?
4. How interact with partners/users, others in GWF, and ___?
5. How even keep up-to-date?

Discussion

How do we organize ourselves?

- around phenomena

- around observational/model datasets

- around sectors

But much overlap no matter how one organizes...

Two examples follow - centred around phenomena...

GWF EXTREMES - DROUGHT SUMMARY/INVENTORY

1. USERS, ISSUES AND EVENTS

Agriculture

- Crop yields and diseases
- Water usage
- HQP

Electrical

Manitoba Hydro

- 1940/41, 1987/88 and 2002/03 major hydroelectric droughts
- Recurrence and seasonal prediction
- High resolution (WRF) modelling and comparison with coarser models

NB Power

- Need clarification

Engineering

Not listed in proposal but there certainly are issues such as ground contraction

Health

Listed in proposal but need to clarify

Ron and Barrie have conference call on Oct 17 afternoon - several emails followed

Idea (quantify the chain-of-events between T, P in drought and impacts on diseases)

Need high resolution WRF to assess such conditions

Lancet article 2017 - climate change and health

Insurance

No impacts from private insurers identified

Big issue with government insurance

2. IMPACTS DATASETS

Various Users

Special reports and documentation

Impacts (dollar values, etc.)

etc

Public Safety (if needed)

CatIQ (if needed)

3. OBSERVATIONAL DATASETS

ECCC regular observations

Other observational datasets?

Soil moisture

Gridded SPEI product by Benita Tam

1950-2100 with 1, 3, and 12 month SPEI and many RCP4.5 and 8.5 models

‘Unique’ observations from users

Remote sensing

<u>4. MODEL</u>	Spatial	Temporal	Microphysics	Comments
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Reanalyses

GCM

RCM

WRF

5. OUR ACTIONS

Summarize needs/opportunities

Can we better quantify ‘indicators’?

Can we clarify input needed for upcoming assessments?

Assess how well WRF simulates drought including wind and drought indices

Identify specific drought(s) that address as many user issues as possible

Identify drought prediction examples and lessons learned

Assess quality of large scale drought projections in light of, for example, WRF simulations

6. REFERENCES (a list has been developed)

GWF EXTREMES - HAZARDOUS WINTER PRECIPITATION

SUMMARY/INVENTORY

1. USERS, ISSUES AND EVENTS

Electrical

Manitoba Hydro

- **April 27 and 28, 1984:** Major ice storm
- **October 4 and 5, 2012 :** Ice storm in Steinbach/Lac Du Bonnet areas - with wet snow
- **March 2017:** Locations including Churchill, Gillam and Thompson were affected as well as dam construction sites - major precipitation event (perhaps with mixed precipitation).
- **Localized events such as near Brandon (need specific examples)**
- **Synoptic patterns of high volume events with limited spatial extent (e.g., an event that accumulates considerable precipitation, but is only recorded at one station)?**
- **Will such events and chains-of-events change in occurrence? Factors leading to such events?**

NB Power

- **January 25, 2017**
- **December 30, 2013**

Engineering

Francis, Xuebin, Lawrence?

Health

Needs to be updated

2. IMPACTS DATASETS

Various Users

Special networks

Impacts (dollar values, etc.)

etc

Public Safety (if needed)

CatIQ

3. OBSERVATIONAL DATASETS

Eva Mekis Dataset near 0°C

Stations across Canada with temperatures near 0°C (manned/auto)

?25 year period: 19---?

Bob Kochtubajda Dataset near 0°C

Central Western Canada and Arctic (manned observer sites)

42 year period: 1964-2005

ECCC regular observations (identified freezing rain events; heavy wet snow events?)

Gridded products such as CaPA

‘Unique’ observations from users

Remote sensing

4. MODEL

Spatial

Temporal

Microphysics

Comments

Reanalyses

GCM

RCM

WRF

5. Moving Forward

Once all this information is collated, will have to develop a research plan that is tractable with both the information we have and the ‘horses’ that need to do the work.

Better summarize partner/user needs/opportunities - common/unique aspects

Better quantify indicators?

Specific examples affecting multiple partners/users?

Assess how well models simulate past critical events

Assess future projections from various approaches

6. REFERENCES - a list has been developed

Summer - hail/short-duration precipitation

Big group...

Discussion

Year 1

- Initial workshop(s) to fully engage our users, further refine the areas of concern identified in this proposal, identify time periods/locations of past events that illustrate concerns, develop indicators of impacts seeking as much commonality as possible across sectors, and jointly scope tractable scientific approaches to obtain the information needed by users for adaptation and risk mitigation. The determination of “tractability” will include relevance to user concerns, scientific feasibility within the time and expertise constraints of the project, and availability of data and model output of sufficient quality, resolution, and spatial/temporal extent.
- In consultation with the Knowledge Mobilization (KM) committee, develop a detailed scientific work plan, focussing initially on scientifically tractable issues common to multiple sectors with high potential for early knowledge mobilization.
- In parallel, recruit HQPs and the Network and Knowledge Mobilization manager
- Gather relevant observational and user-derived data for each sector
- Acquire relevant model output from available GCMs, RCMs and convection permitting models (notably WRF).
- Initiate analyses and other research activities specified in the work plan. It is anticipated that the work plan will include the analysis of precipitation extremes for events of different durations, the frequency, location and intensity of hail and freezing rain, and the occurrence, location, spatial extent and intensity of drought. If feasible and resources permit, studies could also be undertaken on events with critical precipitation and wind aspects.
- Establish collaborative research activities with appropriate components of sector organizations
- Initiate alternating monthly conference calls for the entire project and Project Steering Committee

Discussion

How do we organize ourselves?

around phenomena (as in our proposal)?

(But substantial overlap no matter how one organizes...)

or ... maybe 'no' organization other than the whole group (sub-group)
appropriately addressing issues, communicating so everyone up-to-date

Should we agree on common?

datasets

projection experiments

Do we have some 'quick' wins to address partner/user issues/needs?

	Extreme phenomenon of concern						
	Drought	Excess Wet	Extreme Precip.	Hail	Precipitation Timing	Freezing rain	Snow
Agriculture	✓	✓	✓ subdaily daily	✓	✓ event sequence		
Electrical	✓	✓	✓ prob. Max.		✓ low freq. variation	✓	✓ wet snow + wind
Engineering Design			✓ subdaily daily			✓	✓ extreme snow
Health	✓	✓	✓ daily 5-day		✓ event sequence	✓	✓ snow
Insurance	✓		✓ subdaily	✓		✓	✓ extreme snow
Researchers	BB, JB, PB, JH, BQ, RS, EW		JB, PB, JH, BK, MK, YL, RR, EW, FZ, XZ			PB, BK, MK, LM, RR, RS, JT, XZ	

Report Contents and Guidelines (Length—11-13 pages):

- * Introduction, including a brief summary of the project, background information and its overarching goals as it is currently conceived (1-2 pages)

- * Plan for Reaching Goals (7 pages)

 - o Goal/Objectives

 - o Models (which models are being deployed, which models are being developed)

 - o Data/sensors (creation, management)

 - o Activities (field campaigns, laboratory studies, surveys, other)

 - o Linkages to Other Projects

 - o Milestones/timelines

 - o Deliverables

- * User Engagement and Knowledge Mobilisation Plan (1 page)

- * Revised Budget – proposed expenditures by objective/goal, by investigator and by HQP (1-2 page)

- * Strategic Analysis with direction on how issues and gaps will be resolved, what needs to be done to achieve the milestones and produce the stated deliverables, and how to coordinate and integrate planned activities (1 page)

Specific Actions and Summary

- Update partner/user needs and opportunities
- Update available observational and model information
- Update on WRF
- Specific, doable activities
 - Can we address some needs/opportunities right now?
- ...