The Canadian Surface Prediction Archive of ECCC's Numerical Weather Predictions





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Paulin Coulibaly, David Schäfer, Nicolas Gasset,
Vincent Fortin, Djamel Bouhemhem, Michael Leahy, François Anctil, Brent Hall











Environment and Climate Change Canada
Environnement et Changement climatique Canada







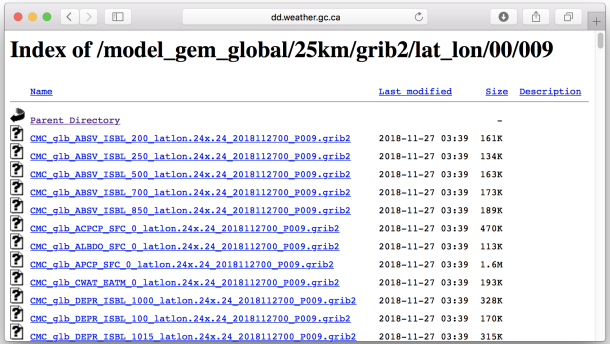
Vancouver – February 20-21, 2019

Workshop on Flood Forecasting

ECCC's Current NWP Data Distribution System

DataMart

http://dd.meteo.gc.ca/about_dd_apropos.txt

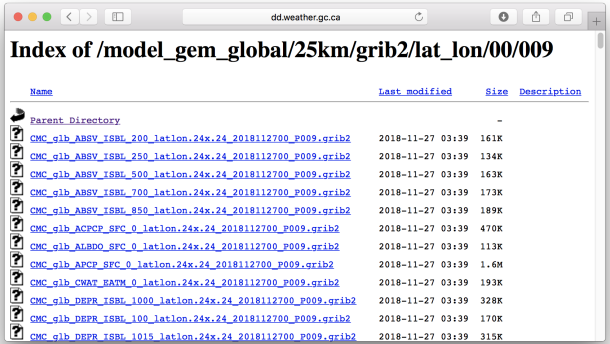


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ECCC's Current NWP Data Distribution System

DataMart

http://dd.meteo.gc.ca/about_dd_apropos.txt



- no archive of forecasts
- data interpolated to grib2 supported grid
- no spatial cropping
- heavy post-processing

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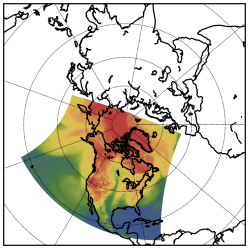
Aim of CaSPAr

archive
forecasts & analyses
produced by

Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

convert
raw FST data to
standardized NetCDF

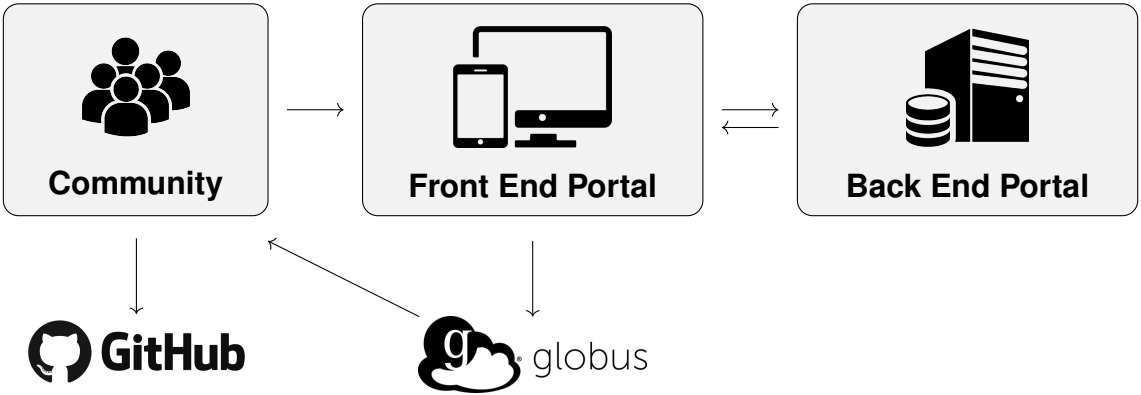


provide
gis-based web interface
to make data available



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Architecture



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#1

Individual Subsetting of Data

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Frontend

– Submit Your Request –

- ☐ Select product
- ☐ Credentials
- ☐ Domain
- ☐ Variables
- ☐ Horizons
- ☐ Issues
- ☐ Time period
- ☐ Submitted!

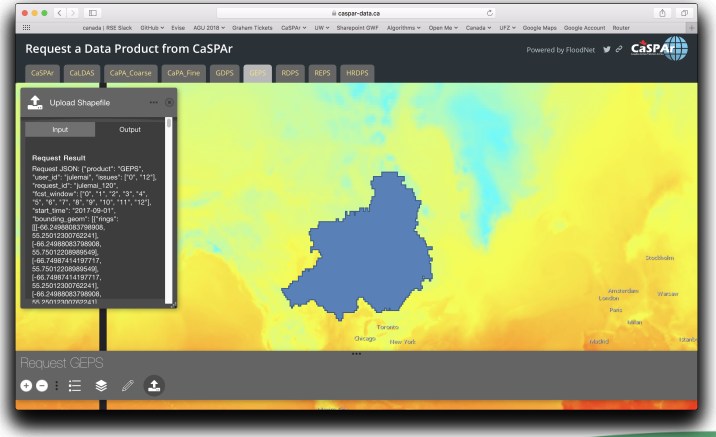


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Frontend

– Submit Your Request –

- ✓ Select product
- ✓ Credentials
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- ✓ Variables
- ✓ Horizons
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- ✓ Time period
- ✓ Submitted!



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#2

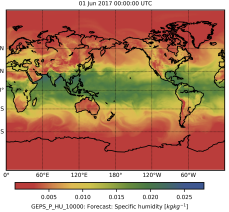
Easy Comparison of NWP Products

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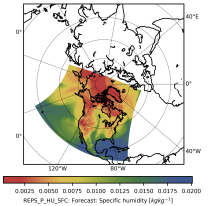
Easy Comparison of NWP Products

– Products Available (7 days after issue) –

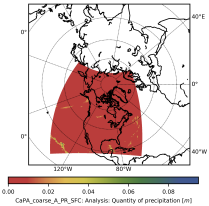
GEPS



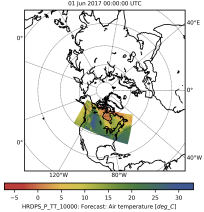
REPS



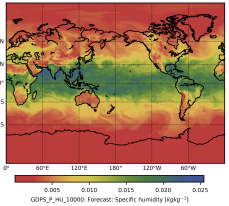
CaPA 10.0k



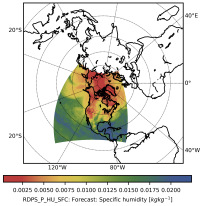
HRDPS



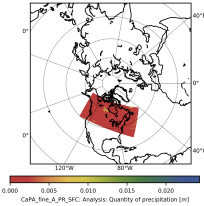
GDPS



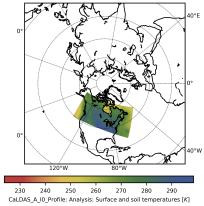
RDPS



CaPA 2.5k



CaLDAS



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Easy Comparison of NWP Products

– Products Available (7 days after issue) –

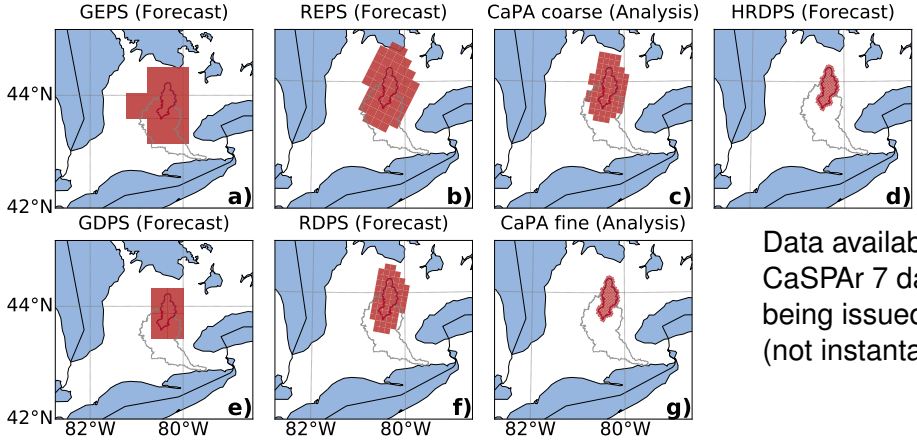
8+ TB
new data
per month

(20+ months are archived to date)

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Easy Comparison of NWP Products

– Grand River Flood Event June 2017 –

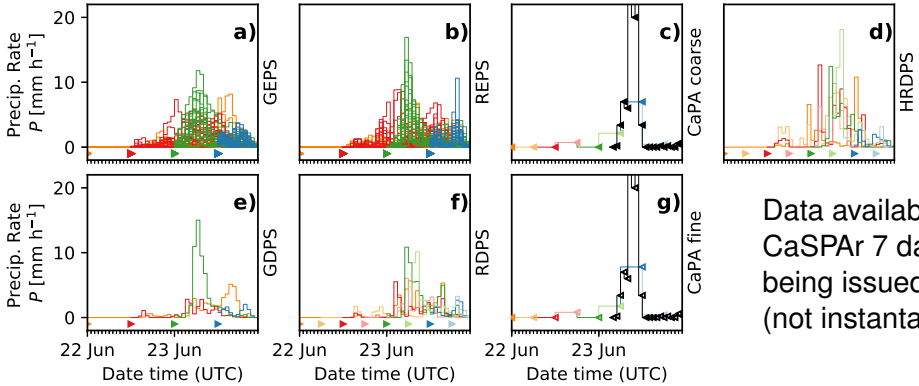


Data available in CaSPAr 7 days after being issued (not instantaneous)

Easy Comparison of NWP Products

– Grand River Flood Event June 2017 –

Forecasted precipitation – Grand River watershed upstream of West Montrose



Data available in CaSPAr 7 days after being issued (not instantaneous)

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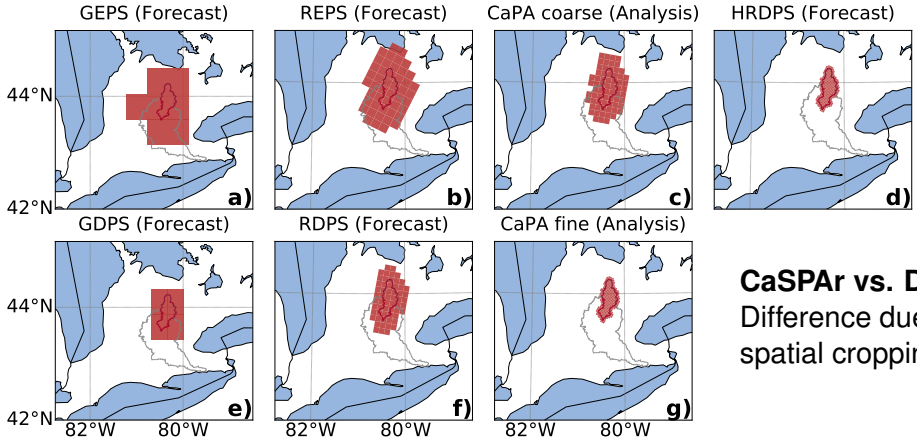
#3

Drastic Reduction of Data Amount to Download

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Drastic Reduction of Data Amount to Download

– Grand River Flood Event June 2017 –



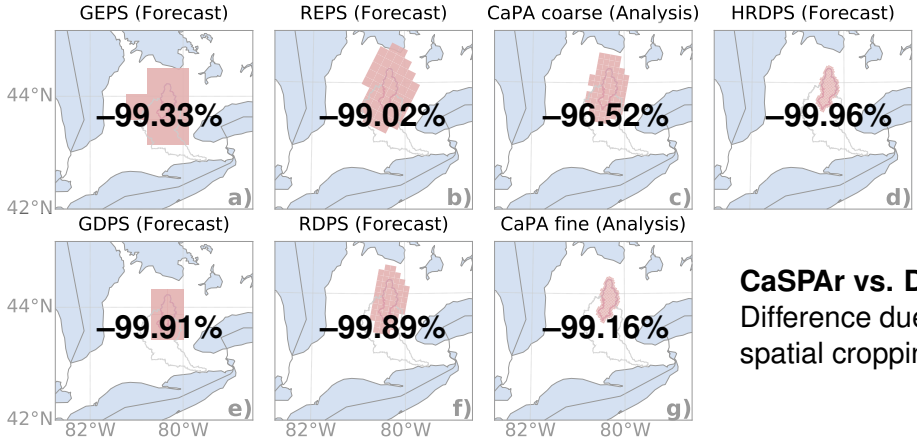
CaSPAr vs. DataMart

Difference due to spatial cropping

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Drastic Reduction of Data Amount to Download

– Grand River Flood Event June 2017 –



CaSPAr vs. DataMart
Difference due to spatial cropping

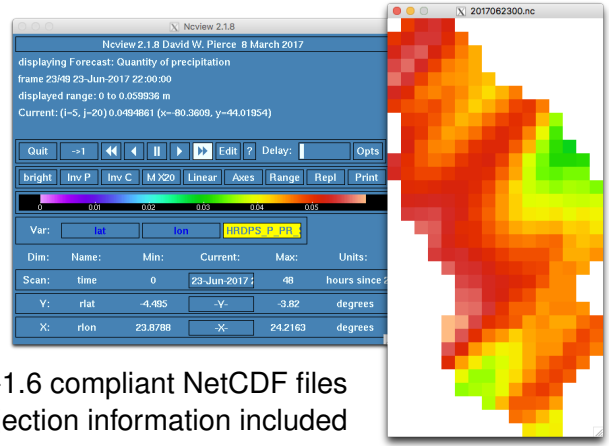
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#4

Standardized File Format

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Standardized File Format



- ✓ CF-1.6 compliant NetCDF files
- ✓ projection information included

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#5

Seamless Utilization of Input Data

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Seamless Utilization of Input Data

– Models running with NetCDF inputs directly –

- Hydrologic Modeling Framework RAVEN
- Hydrologic Modeling Framework SUMMA
- Variable Infiltration Capacity Model VIC v5.0
- Mesoscale Hydrologic Model – mHM
- MEC-Surface & Hydrology model – MESH
- Weather Research and Forecasting Model – WRF-Hydro
- Community Land Model – CLM
- Multi-parametrization Land Surface Model – Noah-MP

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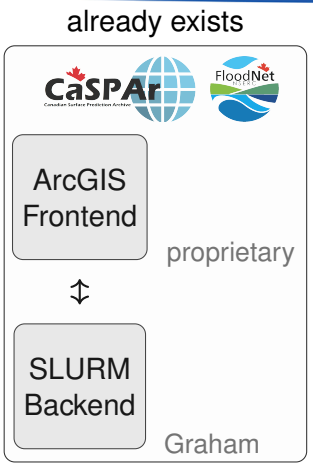
Summary of CaSPAr Highlights

1. **Individual subsetting** of data via web-interface and (soon) API
2. **Easy comparison** of NWP products
3. **Drastic reduction** of data amount to download
4. **Standardized** NetCDF file format (CF-1.6 compliant)
5. **Seamless utilization** of input data for model runs
6. **Fast** data download via Globus
7. **GitHub** library of data processing scripts
8. Modular and decoupled **Frontend and Backend**



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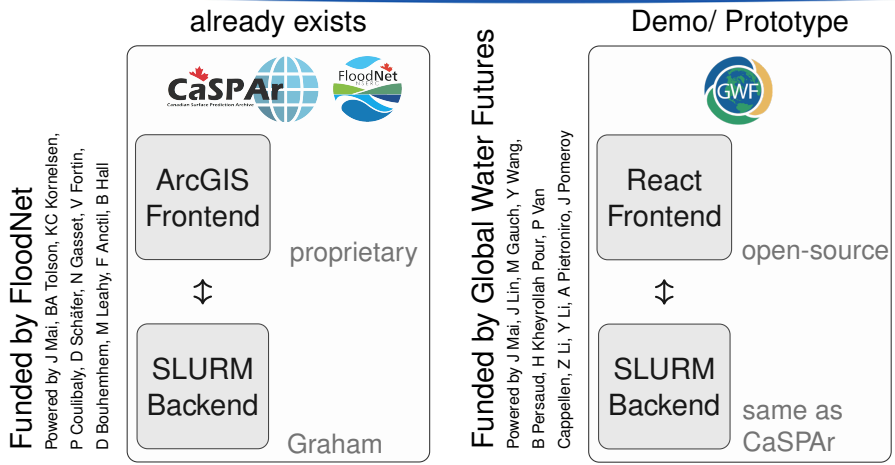
GWF data Cuizinart
– Current Implementations –



Funded by FloodNet
Powered by J Mai, BA Tolson, KC Kornelsen, P Coulibaly, D Schäfer, N Gasset, V Fortin, D Bouhemhem, M Leahy, F Anctil, B Hall

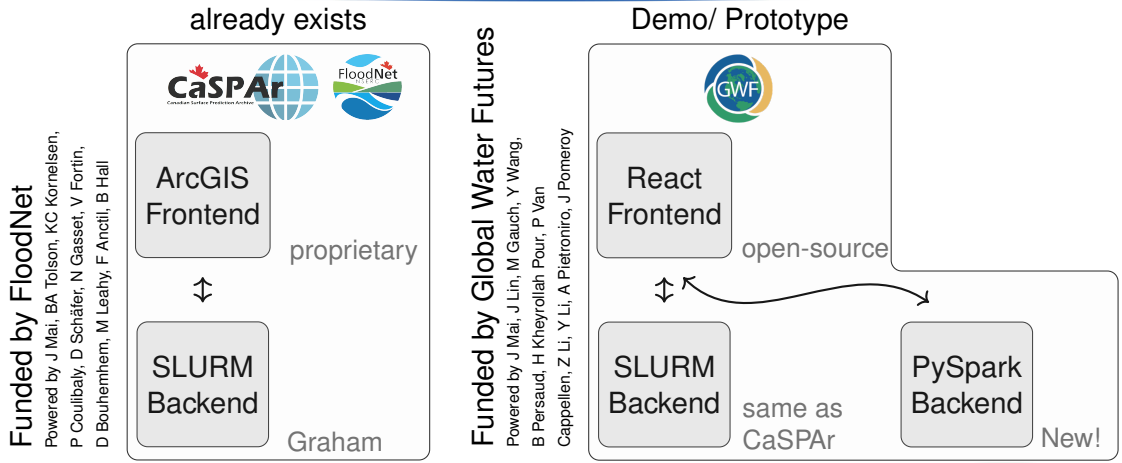
GWF data Cuizinart

– Current Implementations –



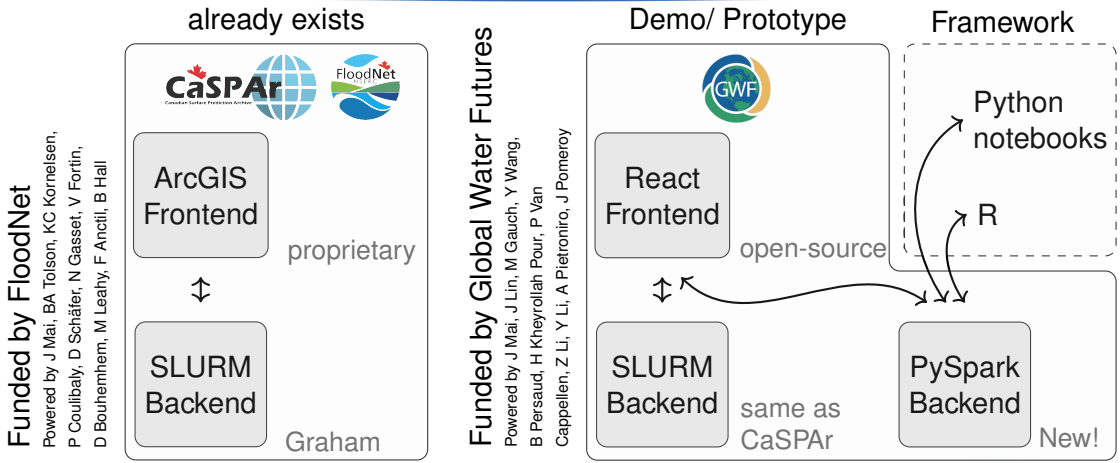
GWF data Cuizinart

– Current Implementations –



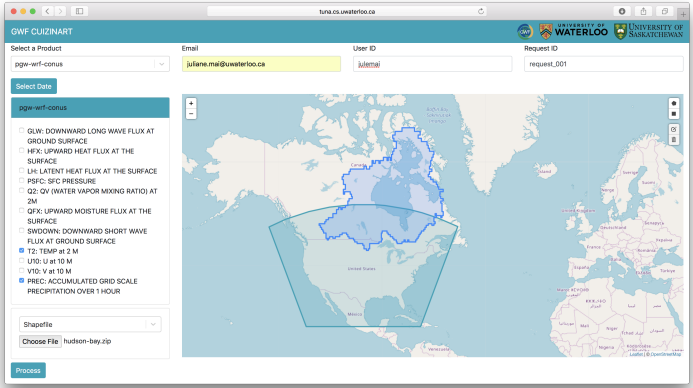
GWF data Cuizinart

– Current Implementations –



GWF data Cuizinart

– Dissemination of Large Gridded Datasets Within and Beyond GWF –



Frontend of GWF Cuizinart with domain selected by shapefile upload

(or GeoJSON or drawing)

Thank you!





Juliane Mai, **Bryan A Tolson**, Kurt C Kornelsen,
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Vincent Fortin, Djamel Bouhemhem, Michael Leahy, François Anctil, Brent Hall



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