# Integrated Hydrologic Simulations to Support Watershed Management

Aquanty's real-time and on-demand hydrologic forecasting platforms powered by HydroGeoSphere provide a wide range of benefits to stakeholders by enhancing their understanding of watershed hydrology and providing predictive analytics for short- and long-term water resources planning. Our user-friendly technology plays a significant role in improving landscape management, evaluating drought and flood risks, and understanding the impacts of climate change across Canada. The **HydroGeoSphere (HGS)** simulation and **Real Time (HGSRT)** technology provide the basis for addressing water resources challenges at all scales, from field level soil moisture and chemical leaching forecasts to continental hydroclimatological risk analysis. Its application aids in the management and understanding of both water quantity and quality, and the complex interactions between groundwater and surface water. Our platforms serve as invaluable tools for watershed managers, government bodies, agricultural stakeholders, and others.
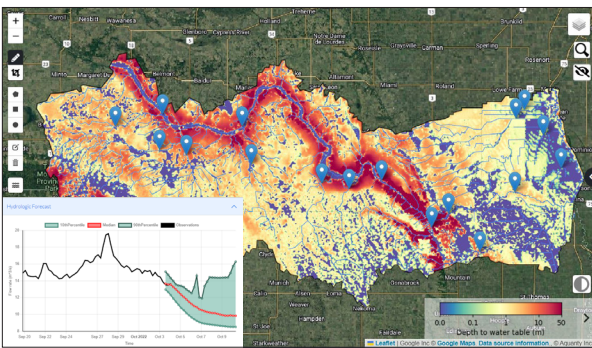


## FURTHER READING

*MFGA Aquanty Project Reports and Popular Media.*
*Available on the MFGA website: https://mfga.net/aquanty-project.*

*Water Modelling, Water Data Not Seen Before*
*by Carolyn Camilleri, in Groundwater Canada, Winter 2023.*

*Eliminating the unknowns: Canada1Water reveals the country's water future with a new continental-scale model,*
*by Andrew Kirkwood, in Water News, Fall 2023.*

## Benefits

- **Comprehensive & holistic understanding**
- **Improved decision making**
- **Assess and mitigate risk**
- **Long term planning for climate change**
- **Optimized water resource management**
- **Cost-effective solutions**

## Applications

- **South Nation Conservation Authority** uses HGSRT for real-time hydrologic forecasting for flood and drought management, planning for low-water response, analyzing climate change scenarios, and assessing the impact of best management practices on water resources sustainability.

- **Canada1Water:** a continental scale analysis of climate change impacts on surface water, groundwater, and seasonal soil moisture conditions. This analysis considers various emissions scenarios and land management practices across the country, providing decision makers and policy planners the tools to develop effective climate change adaptation strategies.

- **The MFGA-Aquanty Forecast Tool** provides real-time hydrologic forecasting to support decision-making regarding water movement, soil health, and climate risk assessment and mitigation within the Assiniboine River Basin, in partnership with the Manitoba Forage and Grassland Association.

## Key Features

- Aquanty's fully-integrated hydrologic simulations consider various interconnected components of a watershed including surface water, groundwater, precipitation, land use, soil types, and more. This comprehensive view helps managers achieve a **comprehensive & holistic understanding** of watershed hydrology.

- **Improved decision making** through simulating various scenarios and conditions assist watershed managers in making informed decisions related to water allocation, land use planning, flood management, and ecological preservation.

- **Assess and mitigate risk** associated with floods, droughts, and water quality degradation enabling you to plan for and develop resilient communities & economies, and optimize water resources management.

- **Long term planning for climate change:** prepare adaptive strategies to mitigate the impacts of changing climatic conditions on water resources and ensure sustainable ecosystem health; anticipate the impact of land use changes and evaluate benefits of best management practices.

- **Policy and planning support** available across Canada; review watershed hydrology indicators for over 1300 watersheds/catchments covering continental Canada.

- Garner **cost-effective solutions** by simulating different scenarios virtually. HGS simulations and real time forecasting can help managers identify cost-effective solutions and investments in infrastructure or management practices that yield the best outcomes for the watershed.

For more information contact us at **info@aquanty.com** or visit **Aquanty.com**

**aquanty**

# Aquanty – World-Class Water Resources Science and Technology

Aquanty specializes in predictive analytics, simulation and forecasting, and research services. Our technology and services are deployed globally across a broad range of industrial sectors including; agriculture, oil and gas, mining, watershed management, contaminant remediation, and nuclear storage and disposal. Aquanty's scientists are recognized as leading international experts in integrated climate, groundwater & surface water modelling. Our mission is to deliver holistic water resource and climate solutions to support informed decision making for our clients in a rapidly changing world.

## HydroGeoSphere™

### The world's most powerful hydrologic modelling platform

- **Fully integrated surface and groundwater simulations** provide a holistic understanding of complex and interconnected watershed dynamics for water resources management.
- **Reactive solute and thermal energy transport** capabilities give you the tools to predict contaminant fate and travel time probability statistics for source identification.
- **Advanced numerical methods** to support simulations of unprecedented scale and complexity; fully-implicit coupling for all domains provides for a robust, mass conserved solution.
- **A physics-based approach** to hydrology greatly reduces the inherent uncertainty of empirical modelling techniques and provides the most robust approach to simulating the effects of climate change.

## HGS REAL TIME

### Reliable hydrologic forecasting powered by HydroGeoSphere

- **Multi-objective hydrologic forecasting** for flood, drought, base-flow, soil moisture, surface water and groundwater.
- **Enhanced decision support** for water resources management based on a holistic, integrated approach to watershed hydrology.
- **Synergize operational data sources** including near-real-time field observations and remote sensing products with meteorological predictions to produce reliable forecasts.
- **Cloud-computing architecture** supports ensemble of weather forecast scenarios, forecast outputs analyzed and reported in a probabilistic framework.

## HydroGeoHub™

### Aquanty's web architecture puts earth system modelling within reach of every person

- **Unify data management and analytics** for an integrated understanding of hydrology, geology, meteorology and climatology.
- **White label web infrastructure** to deliver best-in-class hydrologic modelling and decision support to your clients.
- **Flexible and extensible** architecture to handle any data pipeline world-wide, putting the right information in front of the right people at the right time.
- **Analytical tools and custom workflows** to simplify your unique operational requirements.

## Modelling On Demand™

### Automatic web-based simulations for decision support and scenario analysis

- **Time saving through automation:** models constructed at the click of a button using comprehensive geological data framework producing results in minutes for rapid decision support.
- **Flexible and agile** model inputs allow you to adapt to changing requirements. When needs evolve, models can be created or modified as necessary, enabling quick responses to dynamic situations.
- **Globally scalable, versatile and ready to deploy** for field-scale soil moisture forecasting and pesticide/nutrient runoff and fate; watershed-based customizable scenario analysis and climate change assessment.

*Proud Partner of the Canada1Water initiative*

www.canada1water.ca