aquanty

😸 HydroSphere AI

The Machine Learning Revolution for Hydrological Forecasting

An advanced artificial-intelligence driven computing system that effortlessly integrates near-real-time field observations and remote sensing products with the latest meteorological predictions to produce dependable hydrological forecasts. With a foundation in advanced data analytics, HydroSphereAI supports a wide range of capabilities, including real-time data assimilation, adaptive learning algorithms, and predictive analytics.

HydroSphereAI overcomes the limitations of traditional forecasting methods by using machine learning to analyze diverse multi-source datasets, delivering exceptional streamflow predictions, even in ungauged watersheds where historical data is scarce or unavailable.

By integrating state-of-the-art machine learning techniques, HydroSphereAI represents the next generation in the evolving field of hydrological forecasting for extreme weather events.



Key Features and Benefits

 Advanced Machine Learning **Powered Algorithms**

Utilizes Long Short-Term Memory (LSTM) networks, HydroSphereAI has been trained on extensive historical data, to model complex hydrological processes and deliver actionable insights for any stream, river or waterway.

High Forecast Skill in **Ungauged Basins**

Demonstrates superior forecast accuracy compared to traditional rainfall-runoff models, especially in regions without historical gauge data; the ML-based approach addresses the limitations and uncertainty associated with climate change.

Near Real-Time Forecasting **On-Demand**

Integrates seamlessly with numerical weather predictions to provide timely and reliable hydrological forecasts from 7- to 39-days in duration. Simulations are run every day, giving you accurate streamflow predictions on-demand.

Augmented Training Datasets Trained on the HydroAtlas watershed database with a wide range of hydroenvironmental attributes, supplemented with custom training data including historical precipitation (ERA5) and streamflow (HYDAT) data.

Data Integration

Aquanty's web systems are designed to deliver data via API to most environmental data management

platforms. Augment your existing data and forecasting infrastructure.

- Customized For Your Catchment Work with Aquanty to re-train the HydroSphereAI algorithm with your site-specific data for unprecedented accuracy.
- Extreme Event Preparedness Provides early warnings to mitigate the impact of floods; manage water resources during drought, ensuring water availability for critical needs.

Globally Scalable

Trained on a comprehensive database with a wide range of watershed attributes, HydroSphereAI is readily deployable in watersheds of all types around the world.







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.

HydroClimateSight

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.

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.

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 fieldscale soil moisture forecasting and pesticide/nutrient runoff and fate; watershed-based customizable scenario analysis and climate change assessment.

Proud Partner of the Canada 1 Water initiative



www.canada1water.ca

